Visual and textural inspection of all products suggested that they formed stable, solid, creamy spreads at room temperatures. All products were firm solids at refrigeration and freezer temperatures. Tasting results of all products suggested very pleasant, rich creamy texture with product melting in the mouth reviewed positively by tasters. Individual tasters preferences varied with respect to like or dislike of pistachio flavor, coconut flavor, preference for more or less sweet product and more or less cocoa flavor. One particular sample was described as being similar to a milk chocolate spread, as the sunflower cream fraction contributed a neutral flavor.

EXAMPLE 20 - Generation of Adipose Tissue Replica

Adipose tissue replicas were generated using the ingredients recited in Table 3.

TABLE 3

Adipose Tissue Replica	
Ingredient	**%**
Coconut oil	65
Pea vicillin protein in buffer	21.3
Cocoa butter	10
Buffer	2.7
Lecithin slurry, 50 mg/ml	1
Total	100

Lecithin (SOLEC™ F Deoiled Soy Lecithin, The Solae Company, St. Louis, MO) was prepared at a concentration of 50 mg/ml in 20 mM potassium phosphate, 100 mM NaCl, pH 8.0 buffer and sonicated (Sonifier Analog Cell Disruptor model 102C, BRANSON Ultrasonics Corporation, Danbury, Connecticut) for 30 seconds.

The pea vicilin protein was supplied as a liquid containing approximately 140 mg/g pea vicilin in 20 mM potassium phosphate, 100 mM NaCl, pH 8.0 buffer.

Coconut oil (Shay and Company, Milwaukie, OR) and cocoa butter (Cocoa Family, Duarte, CA) were melted by heating to 50 - 70°C and then combined and held warm until needed.

The buffered protein solution, additional buffer, and lecithin slurry were mixed in a 32 ounce sized metal beaker and equilibrated to room temperature. An emulsion was formed using a hand held homogenizer (OMNI model GLH fitted with G20-195ST

20mm generator probe, OMNI International, Kennesaw, GA). The homogenizer probe was put into the protein lecithin mixture and turned on to speed 4. The warmed oil was then added slowly over the course of about 2 minutes while continuously moving the probe around in the mixture.

The emulsion was then heat set by placing the metal beaker into a 95°C waterbath. Using a clean spatula, the emulsion was stirred every 20 seconds for 3 minutes total. The beaker was then removed from the waterbath and stored at 4°C for several hours until thoroughly cooled.

EXAMPLE 21 - Generation of Raw Tissue Replica

A raw tissue replicawas generated using the ingredients recited in Table 4.

TABLE 4:

Raw Tissue Replica	
Ingredient	**%**
Buffer	41.6
Heme protein in buffer	26.7
Pea legumin in buffer, dried	12.1
Pea vicillin in buffer, dried	9.4
Flavor precursor mix, 17x	6.2
Transglutaminase preparation	4
Total	100

The buffer was 20 mM potassium phosphate, 100 mM NaCl, pH 7.4. The heme protein was prepared at a concentration of 55 mg/g in 20 mM potassium phosphate, 100 mM NaCl, pH 7.4 buffer. The 17x flavor precursor mix precursor is described in Example 27. The pea legumin was prepared in 20 mM potassium phosphate, 500 mM NaCl, pH 8 buffer and then freeze dried prior to use. The final protein concentration of the dried material was 746 mg/g. The pea vicilin was prepared in 20 mM potassium phosphate, 200mM NaCl, pH 8 buffer and then freeze dried prior to use. The final protein concentration of the dried material was 497 mg/g.

The liquid ingredients (buffer, heme, and flavor precursor mix) were mixed in a plastic beaker. The dry pea legumin and pea vicilin were then added and allowed to fully rehydrate while gently stirring for 1 hour at room temperature. The dry transglutaminase preparation (ACTIVA® TI, Ajinomoto, Fort Lee, NJ) was then added and stirred for about 5 minutes until dissolved. The stirring was then turned off and the mixture was allowed to gel at room temperature until firm. After the gel had formed the raw tissue replicawas stored refrigerated until used.

EXAMPLE 22 - Hard Connective tissue replica

A hard connective tissue replica was made as following using soy protein isolate (Supro Ex38, Solae), wheat gluten (Cargill), and bamboo fiber (Alpha-Fiber B-200, The Ingredient House). The purified proteins were freeze-dried and milled using a standard coffee grinder. Commercially available powders of soy protein isolate and wheat gluten were used as received.

The connective tissue replica contained 49% soy protein isolate, 49% wheat gluten and 2% bamboo fiber. The ingredients were thoroughly mixed and loaded into the loading tube of the extruder's batch feeder. A twin-screw extruder (Nano 16, Leistritz Extrusion Corp.), with a high-pressure water injection pump (Eldex) and custom-made die nozzles (stainless steel tube, 3 mm ID, 15 cm length, pressure rating 3000+ PSI) attached using a Hy-Lok two-ferule tube fitting and a custom-made die with a threaded nozzle and 10 mm ID, 20 mm long flow channel was used.

The dry mixture was fed into the extruder at the rate 1 g/min. Water was fed by the pump into the second zone of the extruder's barrel. The rate of water feeding is adjusted to the rate of dry mixture feeding such as to provide 55% moisture level in the final extrudiate. A temperature gradient was maintained along the extruder barrel as follows: feed zone - 25°C, zone 1 – 30°C, zone 2 – 60°C, zone 3 – 130°C, zone 4 – 130°C. The die plate was neither actively heated, nor cooled. The die nozzle was actively cooled (by applying moist tissue replica) to maintain extrudate temperature below 100°C.

Hard connective tissue replica obtained by this process was dark off-white ("cappuccino") colored material shaped into 3 mm thick filaments that had tensile strength similar to animal connective tissue (3 MPa).

Example 23. Soft Connective tissue replica

A soft connective tissue replica was made as in Example 22, except that the rate of water feeding was adjusted to the rate of dry mixture feeding to provide 60% moisture level in the final extrudate. A temperature gradient was maintained along the extruder barrel as follows: feed zone - 25°C, zone 1 – 30°C, zone 2 – 60°C, zone 3 – 115°C, zone 4 – 115°C. The die plate was neither actively heated, nor cooled. The die nozzle was actively cooled (by applying moist tissue) to maintain extrudate temperature below 100°C.

Soft connective tissue replica obtained by this process was light off-white colored material shaped into 3 mm thick filaments that had low tensile strength (< 0.1 MPa) and had a significant propensity to split longitudinally into bands and thin fibers

EXAMPLE 24. Thin connective tissue replica (zein fibers) process:

A thin connective tissue replica was prepared using zein protein powder, glycerol (FCC grade), polyethylene glycol (PEG 400 or PEG3350), ethanol, sodium hydroxide (FCC grade), and water. The zein powder and PEG3350 at a 35% w/w ratio to zein were dissolved in 85% aqueous ethanol to reach a final zein concentration of 57% w/w. The pH of the solution was adjusted to 7.0 with 1M solution of sodium hydroxide in ethanol. A syringe pump with A 1-12 ml syringe, spinning nozzle (hypodermic needle, 18-27 gauge, or a plastic nozzle, 18-24 gauge), heating silicon tape, and a heating fan was used, with a collector assembled using a computer-controlled motor rotating a Delrin rod, which serves as a collector.

This solution was loaded into the syringe, which was mounted onto the syringe pump, with an 18 gauge plastic tip attached. A silicon heating tape was looped around the tip to maintain it at elevated temperature. After solution was extruded out of the tip and forms a drop, it was picked up with a spatula and carefully transferred towards the

collector rod to form a filament between the tip and the collector. The extrusion rate was optimized to produce even flow of material from the tip (5 ml/h for a 12 ml syringe and 18 gauge tip). The collector rotation speed was 3 RPM. The heating fan was positioned to blow hot air onto the spooling fiber. After spooling, the fibers were cured in a 120°C oven for 24 hours.

Thin connective tissue replica obtained by this process was semi-clear yellow colored material shaped into 300-micrometer thick fibers that were semi-flexible in air, and became very flexible and elastic in presence of water, maintaining high tensile strength similar to animal connective tissue (6 MPa)

EXAMPLE 25. Noodles

Noodles were prepared using purified pea vicilin (freeze-dried), and soy protein isolate (Supro EX38 by Solae, Solbar Q842 (CHS)) or soy protein concentrate (Hisolate, Harvest Innovations). To prepare the noodles, 67% soy protein concentrate or isolate, and 33% ground pea vicilin powder were thoroughly mixed and loaded into the loading tube of the extruder's batch feeder. The dry mixture was fed into the extruder at the rate in the range of 1-2 g/min. Water was fed by the pump into the second zone of the extruder's barrel at the rate 3.6-5.3 ml/min such as to maintain the final moisture content in the extrudate at 72.5%. A temperature gradient was maintained along the extruder barrel as follows: feed zone - 25 ºC, zone 1 – 30 ºC, zone 2 – 60 ºC, zone 3 – 100 ºC, zone 4 – 100 ºC. Zone 1 temperature can be varied in the range of 25 – 45 ºC. Zone 2 temperature can be varied in the range of 45 – 65°C. Zone 3 and 4 temperatures can be varied in the range of 95 – 100°C. The die plate was neither actively heated, nor cooled. The die nozzle was passively cooled by ambient air ensuring extrudate temperature below 100°C.

Noodles obtained by this process were light yellow colored material shaped into 1.5 mm thick filaments that had low tensile strength (< 0.1 MPa) and a moderately sticky texture.

Example 26. Sticky Tissue Replica Preparation

Sticky tissue replica was prepared using purified pea vicilin (freeze-dried) and purified pea legumin (freeze-dried). To prepare the sticky tissue replica, 50% ground pea vicilin powder and 50% ground pea legumin powder were thoroughly mixed and loaded into the loading tube of the extruder's batch feeder. The dry mixture was fed into the extruder at the rate in the range 0.4 – 0.8 g/min. Water was fed by the pump into the second zone of the extruder's barrel at the rate in the range 1.6 – 3.2 ml/min, such that the final moisture content of the extrudate was maintained at 80%. As the total throughput increased from 2 g/min to 4 g/min, the screw speed was increased from 100 to 200 RPM. Larger die diameters (4 mm and above) are also helpful for preventing backflow at higher throughputs. A temperature gradient was maintained along the extruder barrel as follows: feed zone - 25 ºC, zone 1 – 30 ºC, zone 2 – 60 ºC, zone 3 – 90 ºC, zone 4 – 90 ºC. The die plate was neither actively heated, nor cooled. The die nozzle was passively cooled by ambient air. The die nozzle is kept free of obstructions by solidifying gel material.

Sticky tissue replica obtained by this process was semi-transparent water-white colored material shaped into irregular 1-5 cm sized bulbs that had sticky paste-like texture.

Example 27. Preparation of the flavor precursor mix

A flavor precursor mix was prepared by mixing concentrated stock solutions of each additive to make a 17X solution. Table 5 contains the chemical composition of the mix and the mM concentration of each component in the final burger. The concentrated flavor precursor mix was sterile filtered and adjusted to pH 5.5 – 6.0 using NaOH, and used at a 1X concentration in burgers.

TABLE 5.

Chemical composition of the flavor precursor mix.

Chemical entity	mM
Alanine	5.6
Arginine	0.6
Asparagine	0.8

Aspartate	0.8
Cysteine	0.8
Glutamic acid	3.4
Glutamine	0.7
Glycine	1.3
Histidine	0.6
Isoleucine	0.8
Leucine	0.8
Lysine	0.7
Methionine	0.7
Phenylalanine	0.6
Proline	0.9
Threonine	0.8
Tryptophan	0.5
Tyrosine	0.6
Valine	0.9
glucose	5.6
Ribose	6.7
Maltodextrin	5.0
Thiamine	0.5
GMP	0.2
IMP	0.6
Lactic acid	1.0
creatine	1.0
NaCl	10
KCl	10
Kphos pH 6.0	10

Example 28 - Freeze-alignment to produce texturized protein for use as muscle replicas

This example describes a non-extrusion based method to produce texturized protein materials that can be used in meat replicas.

A muscle tissue-replica was prepared by first preparing a gel of lentil proteins by mixing a 4.5% (w/v) solution of lentil proteins in 20mM potassium phosphate buffer pH 7.4 + 100mM sodium chloride with 20% (v/v) canola oil (from Jedwards International). The mixture was gelled by heating at 95°C for 15 minutes and slow cooled to room

temperature (at the rate of 1°C/minute). The gel was then poured into a vessel and frozen at -40°C by placing above a liquid nitrogen bath until completely frozen. The frozen material was then dried in a freeze-dryer. When the material was completely dried, the material was stabilized by autoclaving (121°C, 15 minutes). The resulting material is a texturized muscle tissue replica formed with plant proteins.

The aligned muscle replica then was presoaked in water for 5 minutes, cut into pieces of length 3-4mm and then combined with 10g adipose-replica, 10g connective tissue replica and 5g cold-set gels to form 50g beef patty replicas. An in-house sensory panel attributed inclusion of freeze-aligned tissue to impart improved fibrous texture to the patty.

A muscle-tissue replica also was prepared by first forming freeze-aligned material as described above. After the tissue replica was steam cooked at 121°C for 10 minutes, the material was allowed to soak in a solution of heat-denatured pea vicilins (at 6% w/v in 20mM potassium phosphate buffer pH 7.4 + 100mM sodium chloride, heat denatured by heating at 95°C for 30 minutes), 1% equine myoglobin (w/v) (Sigma), and 40% (v/v) canola oil (from Jedwards International). Gelation of the medium was induced by addition of calcium chloride at 20 mM. The sample was allowed to sit for 5 minutes at room temperature to allow for gel formation. The resulting muscle-replica contained aligned material in a cold-set gel reminiscent of beef muscle in steak.

EXAMPLE 29 - Cold gelation of proteins for meat applications

In one example, a cold-set gel comprising myoglobin was prepared by first heat denaturing a 6% (w/v) solution of pea-vicilins in 20mM potassium phosphate buffer, pH 7.4 with 100mM sodium chloride at 100°C for 30 minutes. The solution was allowed to cool back to room temperature. Canola oil (from Jedwards International) and equine myoglobin (Sigma) were added to a final concentration of 20% (v/v) and 1% (w/v), respectively. Gel formation was induced by adding calcium chloride at 20mM. A 50g beef patty replica was formed by combining 5g of the cold gel with 10g of adipose tissue-replica, 10g of connective tissue-replica, and 25g of muscle tissue-replica. Five mls of a

7% (w/w) solution of crude lentil protein was added to the mixture and patties were formed.

Example 30 - Binding materials in meat replicas

In one example, a beef replica was made by first preparing a coacervate from a 3% (w/v) solution of pea vicilins and legumins (vicilin:legumin ratio of 3:1) in 20 mM potassium phosphate pH 7.4 + 100 mM sodium chloride. Melted palm oil (from Jedwards International) was added to the solution to a final concentration of 5% and mixed by vortexing. The emulsion then was acidified by adding hydrochloric acid while stirring to a pH of 5. The slurry was then centrifuged at 5000 x g for 10 minutes and the liquid top layer was decanted from the coacervate.

A 50g beef patty replica was formed by combining the coacervate at 10% with adipose tissue-replica (20%), connective tissue-replica (20%) and muscle tissue-replica (50%). Five mls of a 7% solution of crude lentil protein was added to the mixture and patties were formed. Patties that included coacervate as binding material were observed to be more cohesive than patties that did not.

EXAMPLE 31 - Assembly of a sticky and noodle type ground tissue replica and burger replica

Ground tissue replica and burger replicas were prepared using the ingredients in Table 6. During all pre-processing steps, the temperature of the materials was maintained cold (4 – 15°C).

TABLE 6

Composition of sticky and noodle type formulation	
Ingredient	**%**
Adipose	26
Soft connective	20.6
Sticky	12
Raw	10
Noodles	10

Hard connective	10
Flavor and heme solution	10
k-carrageenan	1.4
Total	100

Adipose tissue replica from Example 6 was chilled following the final heat-cool step into a solid block. Optionally 0.2% by weight of heme protein can be added as a 20 mg/ml liquid solution and manually worked into the adipose. The adipose was then crumbled manually into small bits 3 – 7 mm in diameter while cold.

Soft connective tissue replica from Example 23 was produced by an extrusion process as long string-like pieces. The soft connective was chopped with a mini chopper (Mini-Prep® Plus Processor model DLC-2L Cuisinart, Stamford, CT) in a single step process. Approximate 200g of soft connective was placed in the mini chopper and processed on the chop setting for 60 seconds to yield pieces of 1 – 3 mm in length with ragged edges.

Sticky tissue replica and noodles tissue replica (see Examples 25 and 26) were produced by an extrusion process as long noodle-like pieces or amorphous pieces, respectively. Raw tissue replica of Example 21 was provided from the enzymatic crosslinking process as a solid block. All three of these tissue replicas were manually broken down into pieces 1 - 3 cm in diameter.

Hard connective tissue replica from Example 22 was produced from an extrusion process as long string-like pieces. The hard connective tissue replica was chopped to three levels, named coarse, intermediate, and fine, in a mini chopper (Mini-Prep® Plus Processor model DLC-2L Cuisinart, Stamford, CT). 160 – 200 g of hard connective tissue replica was placed in the mini chopper and processed on the chop setting for 90 seconds. One third of the material was removed as the coarse chopped fraction. The material remaining in the chopper was then processed for an additional 60 seconds and one third of the original weight was removed as the intermediate chopped fraction. The material remaining in the chopper was then processed for an additional 30 seconds to produce the fine fraction.

Leghemoglobin was freeze-dried and then reconstituted in a 17x flavor precursor mix (see Example 27) adjusted to pH 6.0 with 10 N NaOH to make the flavor and heme protein solution.

Following pre-processing described above, the soft connective, sticky, raw, noodles, hard connective, and 2/3 of the adipose were mixed by hand in a bowl. A typical batch size was 100 g to 2000 g. The flavor and heme solution was then dribbled onto the mixed tissue replicas and mixed gently by hand, then k-carrageenan powder was tsprinkled over the mixture and mixed in by hand. During the assembly, grinding, and forming all materials were kept cold (4 – 15°C). The mixture was ground using a stand mixer fitted with a food grinder attachment (KitchenAid® Professional 600 Series 6 Quart Bowl-Lift Stand Mixer model KP26M1XER and KitchenAid® Food Grinder model FGA, St. Joseph, MI) on speed setting 1. The food grinder material was fed by a screw conveyor past a rotating knife installed in front of a fixed hole plate.

The ground tissue replica mix was collected in a bowl and the remaining 1/3 of the crumbled adipose was then added to the ground tissue replica mix and mixed in by hand. Approximately 30 g or 90 g portions of ground tissue replica were then formed by hand into round patty shapes. Typical dimensions for 30 g patties were 50 mm x 12 mm. Typical dimensions for 90 g patties were 70 mm x 18 mm. Patties were refrigerated until cooked. Cooked patties had appearance, texture, and flavor similar to ground beef as judged by a trained sensory panel. In addition to cooking in patty format, the ground tissue replica can also be used in a variety of dishes such as taco filling, casseroles, sauces, toppings, soups, stews, or loaves.

EXAMPLE 32 - Assembly of a Wheat Gluten containing ground tissue replica and burger replicas

Ground tissue replica and burgers were prepared using the ingredients in Table 7.

TABLE 7:

Composition of Wheat Gluten Type formulation	
Ingredient	**%**
Adipose	25
Soft connective	30
Raw tissue replica with heme and flavor	35
Wheat gluten	5
Hard connective	5
Total	100

Adipose, soft connective, and hard connective were preprocessed as described in Example 31. During all pre-processing steps, the temperature of the materials was maintained cold (4 – 15°C).

Raw muscle with heme protein and flavor was then prepared as follows. Freeze-dried pea vicilin and pea legumin were dissolved in water and 16x flavor stock. The freeze-dried heme protein was dissolved in this mixture and the pH was adjusted with citric acid to 5.8. A dry transglutaminase preparation (ACTIVA® TI Ajinomoto Fort Lee, NJ) was then added and mixed for about 5 min to fully dissolve. The mixture was then allowed to stir for an additional 10 minutes until some increase in viscosity was observed. The soft connective and hard connective were then added and the mixture was allowed to sit for 1 hour at room temperature to cure and form a solid mass.

Wheat gluten powder (vital wheat gluten, Great Northern, item 131100, Giusto's Vita-Grain, South San Francisco, CA) then was added to the gelled raw muscle and mixed to distribute. This mixture was then immediately ground using a stand mixer fitted with a food grinder attachment as described in the previous example. Ground tissue replica was then chilled for 5 min at -20°C. Finally, the chopped adipose, pre-chilled to 4°C, was added to the chilled ground tissue replica.

Ground tissue replica mix with adipose tissue replica added was then formed by hand into two 90 g round patties. 90 g patties are typically 70 mm x 18 mm. A typical batch size was 180 - 200 g and produced two patties. The patties were then allowed to

rest at room temperature for 30 minutes. After resting the patties can be cooked or refrigerated until ready to cook.

EXAMPLE 33: Generation of beef flavor in replica burgers by the addition of Heme and flavor precursors.

Characteristic flavor and fragrance components in meat are mostly produced during the cooking process by chemical reactions molecules (precursors) including amino acids, fats and sugars that are found in plants as well as meat. Flavor precursors along with 1% Leghemoglobin were added to the muscle component of the burger replicas as indicated in Table 8. Three replicas, one with no precursors, and two different mixtures of precursors, along with 80:20 beef were cooked then served to a trained sensory panel to describe the flavor attributes shown in Table 9. The addition of precursors increased the beefy flavor, the bloody notes, overall flavor quanity, and decreased the off notes in the replica. The replicas and beef sample also were analyzed by GCMS by adding 3 grams of uncooked replica or beef into a GCMS vial. All samples were cooked at 150°C for 3 mins, cooled to 50°C to extract for 12 minutes using GCMS (SPME fiber sampling of headspace). A search algorithm analyzed the retention time and mass fingerprint information to assign chemical names to peaks. In the replica burger with 1% Leg hemeoglobin, and precursor mixture 2, 136 beef compounds were created. In Table 10, all the compounds created in the replica burger that were also identified by GCMS in the beef samples are indicated.

TABLE 8

Flavor precursors added to the beef replicas before cooking.

Samples	**767**	**804**	**929**
Additive (mm)	**Precursor Mix 1**	**No Precursors**	**Precursor Mix 2**
Alanine	5.61		5.61
Cysteine	0.83		0.83
Glutamic acid	3.40		3.40
Leucine	0.76		0.76
Lysine	0.68		0.68

Methionine	0.67		0.67
Tryptophan	0.49		0.49
Tyrosine	0.55		0.55
Valine	0.85		0.85
Glucose	5.55		5.55
Ribose	6.66		6.66
Lactic acid	1.00		1.00
creatine	1.00		1.00
Thiamine	0.50		0.50
IMP + GMP	0.40		0.40
Sucrose			2.00
Fructose			2.00
Xylose			2.00
Maltodextrin	0.50%		0.50%

TABLE 9

The sensory score determined by the sensory panel for the replica burgers and 80:20 beef sample.

Sample #		**Beef**	**767**	**804**	**929**
Flavor Quality	mean	7.0	3.8	3.2	4.3
	STDEV	0.0	1.3	1.0	1.2
Flavor Intensity	mean	4.3	4.2	4.3	4.3
	STDEV	0.8	1.2	1.4	1.2
Flavor: Beefy	mean	5.8	3.3	2.3	4.2
	STDEV	1.0	1.2	0.8	1.2
Flavor: bloody/Metallic	mean	4.5	2.0	2.2	3.2
	STDEV	1.2	1.0	0.9	1.4
Flavor: Savory	mean	3.3	3.8	3.7	4.2
	STDEV	1.2	1.2	1.2	1.8
Off Flavors: chemical/oxidized/beany	mean	1.5	2.3	3.5	2.7
	STDEV	0.8	1.2	1.8	1.0

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TABLE 10

Beef flavor compounds created in replica burger with 1% LegH and precursor mix 2 as detected by GCMS.

3-octen-2-one	octanoic acid	(Z)-2-decenal,
1-penten-3-ol	octane	carbon disulfide
n-caproic acid vinyl ester	octanal	butyrolactone
2-acetylthiazole	nonanal	butanoic acid
thiophene	4,7-dimethyl-undecane,	3-methyl-butanal,
methyl-thiirane,	methyl ethanoate	2-methyl-butanal,
thiazole	methional	butanal
styrene	methacrolein	3,6,6-trimethyl-bicyclo[3.1.1]hept-2-ene,
	isovaleric acid	benzyl alcohol
pyrrole	isopropyl alcohol	1,3-dimethyl-benzene
pyridine	hexanoic acid	benzene
trimethyl-pyrazine	2,2,4,6,6-pentamethyl-heptane,	benzaldehyde
tetramethyl-pyrazine,	2-methyl-heptane,	acetophenone
methyl-pyrazine,	heptane	acetonitrile
ethyl-pyrazine	heptanal	acetone
3-ethyl-2,5-dimethyl-pyrazine	furfural	acetoin
2,5-dimethyl-pyrazine	furaneol	acetic acid ethenyl ester
2,3-dimethyl-pyrazine	3-methyl-furan	acetic acid
2-ethyl-5-methyl-pyrazine	2-propyl-furan	acetamide
2-ethenyl-6-methyl-pyrazine,	2-pentyl-furan	acetaldehyde
pyrazine	2-methyl-furan	4-methyl-5-thiazoleethanol
2-methyl-propanal,	2-ethyl-furan	6-methyl-5-hepten-2-one
propanal	furan	trans-2-(2-pentenyl)furan
phenylacetaldehyde	formamide	(E)-4-octene,
phenol	ethyl acetate	4-cyclopentene-1,3-dione
pentanoic acid	1-(2-furanyl)-ethanone	4-cyanocyclohexene
3-ethyl-2,2-dimethyl-pentane	1-(1H-pyrrol-2-yl)-ethanone	dihydro-2-methyl-3(2H)-furanone,
pentanal	dimethyl trisulfide	(E,E)-3,5-octadien-2-one
p-cresol	dimethyl sulfide	3,5-octadien-2-one
oxalic acid, butyl propyl ester	d-limonene	2,2-dimethyl-undecane
1-heptene	1-octen-3-ol	toluene
1-ethyl-5-methylcyclopentene	1-octanol	1-pentanol
1-butanol	1-hexanol	1-octen-3-one

1H-pyrrole-2-carboxaldehyde	2-methyl-1H-pyrrole	2-butanone
2-nonanone	3-methyl-2-butenal	2-thiophenecarboxaldehyde
2-n-butylacrolein	3-ethylcyclopentanone	2-pyrrolidinone
2-methyl-2-heptene	2(5H)-furanone	2-propenal
(E)-2-hexenal,	dihydro-5-pentyl-2(3H)-furanone	1-hydroxy-2-propanone
(E)-2-heptenal,	5-ethyldihydro-2(3H)-furanone	1-(acetyloxy)-2-propanone
6-methyl-2-heptanone	5-acetyldihydro-2(3H)-furanone	2-pentanone
2-heptanone	2,6-dimethylpyrazine	(E)-2-octenal
2-furanmethanol	(E,E)-2,4-nonadienal	2-octanone
3-ethyl-2-1,4-dioxin	(E,E)-2,4-heptadienal	(E)-2-nonenal
3-ethyl-2-methyl-1,3-hexadiene	(E,E)-2,4-decadienal	8-methyl-1-undecene
2-butenal	2,3-dimethyl-5-ethylpyrazine	1-propanol
1-penten-3-one		

EXAMPLE 34 - Removal of off-flavors from plant protein solutions

i) Synthesis of ligand modified LOX removal resin

A 1 mL settled volume of CM Sepharose resin (Sigma Aldrich Catalog # CCF100) was loaded into a BioRad minicolumn. 3 mL of 50 mM MES (2-morpholinoethanesulfonic acid) buffer preset to a pH range of 5.5 to 6 was allowed to pass through the resin bed. Separately, to 1 mL of the same buffer was added in succession, 0.044 mL of 4,7,10- trioxa-1,13-tridecanediamine, 0.030 mL of 12 N HCl, 23 mg of NHS (N-hydroxy-succinimide), and 38 mg of EDC (1-ethyl-3-(3-dimethylaminopropyl)carbodiimide hydrochloride) with dissolution after each addition. The resulting solution was added to the top of the column bed and allowed to gravity flow through and the effluent was collected. The resulting effluent was returned to the top of the column bed. The cycle of addition of solution, elution and return was done four times. When the last elution was finished, 3 mL of 50 mM MES buffer preset to a pH of 5.5 to 6 was allowed to gravity flow through the column. Linoleic acid (0.03 mL) was dissolved in 0.5 mL DMF (N,N-dimethylformamide), followed in sequence by 12 mg NHS, 19 mg EDC, and 0.5 mL of 50 mM MES buffer preset to a pH of 5.5 to 6. The

NHS/EDC mixture was shaken to mix, resulting in a two-phase liquid which was applied to the top of the column and eluted through the resin bed, allowed to gravity flow through the column and effluent collected. The effluent was returned to the top of the column bed. The cycle of addition of solution, elution and return was done four times. Once the last collection was finished a solution of 70% ethanol in water (5 mL) was added to the top of the column, followed by 3 mL of 0.1 M sodium hydroxide. This was followed by 0.1 M buffer of potassium phosphate preadjusted to pH 7 to 8.

ii) Removal of off-flavors from pea proteins using the ligand modified LOX removal resin.

A solution of pea proteins (30 mls at 20 mg/ml protein concentration in 20 mM potassium phosphate buffer pH 7.4, 100mM sodium chloride) was passed through a 100 ml resin bed described above. All unbound material was collected and the resin further washed with 200 mls of buffer. Both fractions were combined and resin was stripped of bound protein by washing with 2 bed volumes of 20 mM potassium phosphate, 1M sodium chloride. Resin bed was regenerated by washing with 2 bed volumes of 0.1M NaOH followed by 3 bed volumes of water and re-equilibration with buffer.

Depletion of LOX activity in the pooled unbound fraction was confirmed by assaying for enzyme activity. Sodium linoleate was used as substrate for LOX and formation of hydroperoxide intermediates was monitored by absorbance at 234nm. Assays were performed at pH9 in 50mM sodium borate buffer. Assays confirmed depletion of LOX activity in the pooled unbound fraction. LOX was removed from resin in washes with 0.5M and 1M sodium chloride.

Improvement in flavor in the LOX depleted protein solutions (both as-is and incubated with canola oil at 10%) was confirmed by a panel of 4 tasters. Samples of pea proteins at same concentration, but not depleted of LOX was used at control. Tasters described LOX -depleted samples as mild tasting and control samples as having beany, planty taste. In addition, GC-MS analysis of samples showed 5X reduction in overall volatiles in the LOX-depleted samples.

Reduction of off-flavors using dialysis and activated carbon

A solution of pea albumins (30 mls at 40 mg/ml in 20mM potassium phosphate buffer pH 7.4, 100 mM sodium chloride) was dialyzed against 100 volumes of buffer overnight at 4°C. The solution was then poured over a bed of activated carbon (100-mesh, Sigma-Aldrich) prewetted with buffer. The slurry was centrifuged at 5000 x g for 10 minutes and the supernatant containing protein was decanted off. This solution was tested for improvement in flavor by both taste and GC-MS. Improved flavor (less bitter, less soapy flavor) was noted by tasters and GC-MS confirmed a >2X reduction in volatile compounds; in particular, samples treated with activated carbon showed a decrease in C6- and C7 compounds (e.g., 1-heptanal, 2-heptenal, or 2-heptanone) that are associated with green/grassy/planty flavors.

Reduction of off-flavors using antioxidants and/or LOX inhibitors

A 7% solution of pea-vicilins was heated with coconut oil (20%) to 95°C for 15 min in the presence of antioxidants or LOX inhibitors and compared for off-flavors sample against a control without any antioxidants or LOX inhibitors. In a similar experiment, soymilk was heated in the presence of antioxidants or LOX inhibitors and tasted in-house for off-flavors. Table 11 summarizes off-flavors noted by tasters. Both epigallocetechin gallate and propyl gallate were effective at minimizing off-flavors in pea samples. However, in case of soymilk, epigallocatechin gallate did not appear to reduce beaniness; propyl gallate and α-tocopherol were found to slightly improve flavor in soymilk.

Table 11

Compound	soymilk	Pea
α-tocopherol	Slightly improved flavor	Oxidized oil
caffeic acid (0.02%)	Beany	Oxidized oil
epigallocatechin gallate	Beany	Improved flavor
propyl gallate (0.02%)	Slightly improved flavor	Improved flavor
β-carotene	Beany	Oxidized oil

EXAMPLE 35 - ADIPOSE REPLICA WITH LECITHIN GRADIENT

Lecithin (SOLEC™ F Deoiled Soy Lecithin, The Solae Company, St. Louis, MO) was prepared at a concentration of 50 mg/mL in 20 mM potassium phosphate, 100 mM NaCl, pH 8.0 buffer and sonicated (Sonifier Analog Cell Disruptor model 102C, BRANSON Ultrasonics Corporation, Danbury, Connecticut) for 30 seconds. Moong protein was supplied as a liquid in 20 mM potassium phosphate, 100 mM NaCl, pH 8.0 buffer. Coconut oil was melted by heating to 50 - 70°C and held warm until needed. The coconut oil, buffered protein solution, additional buffer, and lecithin slurry were mixed at 70°C, and an emulsion was formed using a hand held homogenizer. The emulsion was then heat set by placing the tube into a 95°C waterbath for a total of 5 mins. The tube was then removed from the waterbath and stored at 4°C for twelve hours or longer prior to analysis.

To observe the effect of lecithin on the adipose tissue replica replica, a formulation was prepared that contained 1% w/v moong protein and 75% v/v coconut oil, with the lecithin amount increasing from 0%, 0.05%, 0.25%, 0.5%, and 1.0% w/v.

Properties of the adipose replica were measured by weighing small portions of the material and forming uniform round balls, which were then cooked on a non-stick pan with temperature slowly ramping up to 150°C. The temperature of the pan at which fat visibly released from the balls was measured as the fat release temperature. After cooking to completion, the point at which fat no longer released, the total fat released was measured.

An increase in the amount of lecithin in the adipose replica correlated with an increase in the percent fat released, and with a decrease in the fat release temperature (see FIGs. 2A and 2B). With 0% lecithin, there was an average of 40% fat released, and when lecithin was increased to 0.05%, there was an average of 82% fat released, which further increased to 88% with 0.25% lecithin, then leveled off to an average of 60% with further increases in lecithin. With 0% lecithin, a high temperature of 217°C was required to begin the fat release. The fat release temperature decreased to 122°C with 0.25% lecithin, then leveled off to an average of 62°C with further increases of lecithin.

Firmness of the adipose replica was measured by texture analyzer (TA XT plus). A probe penetrated a flat surface of the adipose replica, and the force at 2 mm penetration was recorded. A small amount of lecithin (0.05%) increased the firmness, and at 0.25% and above, the firmness of the adipose replica decreased. See FIG. 2C.

EXAMPLE 36 - ADIPOSE REPLICA WITH VARYING VEGETABLE OIL TYPE

To observe the effect of vegetable oil type on the adipose replica, a formulation was prepared that contained a 1.5% w/v moong protein and 0.05% w/v lecithin, and 75% v/v of different vegetable oils (canola oil, cocoa butter, coconut oil, and olive oil) using the same methodology as Example 35. Properties of the adipose replica were measured by weighing small portions of the material and forming uniform round balls, which were then cooked on a non-stick pan with temperature slowly ramping up to 250°C. The temperature of the pan at which fat visibly released from the balls was measured as the fat release temperature. After cooking to completion, the point at which fat no longer released, the total fat released was measured.

Varying the vegetable oil type had a large effect on the adipose replica. Oils with a higher amount of unsaturated fats, including canola and rice bran oils, released very little fat (1 and 2% fat released, see FIG. 3), while oils with a higher amount of saturated fats, including cocoa butter and coconut oil released significantly more fat (30% and 50% fat released, see FIG. 4). The adipose replicas with canola and rice bran oils required a temperature greater than 250°C to melt (not measured), while the adipose replicas with cocoa butter and coconut oil released fat at a lower temperature (82°C and 137°C).

EXAMPLE 37 - ADIPOSE REPLICA MADE WITH COACERVATE

Lecithin (SOLECTM F Deoiled Soy Lecithin, The Solae Company, St. Louis, MO) was prepared at a concentration of 50 mg/ml in 20 mM potassium phosphate, 100 mM NaCl, pH 8.0 buffer and sonicated (Sonifier Analog Cell Disruptor model 102C, BRANSON Ultrasonics Corporation, Danbury, Connecticut) for 30 seconds. Pea legumin and pea vicilin proteins in 20 mM potassium phosphate, 100 mM NaCl, pH 8.0

buffer, were mixed to a 1:1 ratio. Cocoa butter was melted by heating to 70°C and held warm until needed. The cocoa butter was added to 2% and 10% w/v to the protein mixtures, and was added at 60°C to maintain cocoa butter in the liquid state. While the solutions were still warm, the mixtures were sonicated 1-3 minutes, until cocoa butter particles were visibly emulsified. The pH of the samples was adjusted to 5.5 with HCl, and the mixtures turned into a milky white color, then centrifuged at 5,000xg for ten minutes. After centrifugation, a pellet was collected, comprising a coacervate of protein and cocoa butter. The 2% fat coacervates were sticky and stretchy, while the 10% fat coacervates were fatty and pliable. The coacervates were sealed in plastic and subjected to high pressure processing (HPP). The sample was sealed in a heat-sealable food-saver plastic bag and then subject to high pressure processing (85k psi for 5 minutes in an Avure 2L Isostatic Food Press). After HPP, the 2% coacervate samples formed a semi-firm, cohesive material. The 10% coacervate samples were crumbly, soft, and oily.

Properties of the processed coacervate samples were measured by breaking off small portions of the material and cooking on a non-stick pan with temperature slowly ramping up to 250°C. The coacervate samples did not release any fat upon cooking to this temperature.

OTHER EMBODIMENTS

While preferred embodiments of the present invention have been shown and described herein, it will be obvious to those skilled in the art that such embodiments are provided by way of example only. Numerous variations, changes, and substitutions will now occur to those skilled in the art without departing from the invention. It should be understood that various alternatives to the embodiments of the invention described herein may be employed in practicing the invention. It is intended that the following claims define the scope of the invention and that methods and structures within the scope of these claims and their equivalents be covered thereby.

Electronic Patent Application Fee Transmittal

Application Number:	16238802
Filing Date:	03-Jan-2019
Title of Invention:	METHODS AND COMPOSITIONS FOR CONSUMABLES
First Named Inventor/Applicant Name:	Marija Vrljic
Filer:	M. Angela Parsons/Judith Witzel
Attorney Docket Number:	38767-0010003

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension - 1 month with $0 paid	1251	1	200	200
Miscellaneous:				
		Total in USD ($)		**200**

Electronic Acknowledgement Receipt

EFS ID:	35535877
Application Number:	16238802
International Application Number:	
Confirmation Number:	3877
Title of Invention:	METHODS AND COMPOSITIONS FOR CONSUMABLES
First Named Inventor/Applicant Name:	Marija Vrljic
Customer Number:	26191
Filer:	M. Angela Parsons/Judith Witzel
Filer Authorized By:	M. Angela Parsons
Attorney Docket Number:	38767-0010003
Receipt Date:	26-MAR-2019
Filing Date:	03-JAN-2019
Time Stamp:	17:15:06
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$200
RAM confirmation Number	032719INTEFSW00004837061050
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Applicant Response to Pre-Exam Formalities Notice	Response.pdf	51662 882d127c1ed87ab8d02b3d1aa2bbf3934ba2ac8e	no	1
Warnings:					
Information:					
2	Specification	Specification_markedup.pdf	915834 3966b68ba82608c0f60d468d8309961042400031	no	139
Warnings:					
Information:					
3	Specification	Specification_clean.pdf	618583 c71a5757f41e6ad636a64d3a4b73c8f7202df3dc	no	139
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	31062 17744e1b239d9f389bcd0ca84a29a0be8f53953b	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	1617141	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number
16/238,802

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	300
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	660
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	760
TOTAL CLAIMS (37 CFR 1.16(i))	24 minus 20 =	* 4			OR	x 100 =	400
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2 minus 3 =	*				x 460 =	0.00
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						400
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	2520

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
AMENDMENT A	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
AMENDMENT A	Application Size Fee (37 CFR 1.16(s))									
AMENDMENT A	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)	OR	RATE($)	ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
AMENDMENT B	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
AMENDMENT B	Application Size Fee (37 CFR 1.16(s))									
AMENDMENT B	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
16/238,802	01/03/2019	1791	2520	38767-0010003	24	2

CONFIRMATION NO. 3877

UPDATED FILING RECEIPT

26191
FISH & RICHARDSON P.C. (TC)
PO BOX 1022
MINNEAPOLIS, MN 55440-1022

OC000000106938298

Date Mailed: 03/28/2019

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

Marija Vrljic, San Mateo, CA;
Sergey Solomatin, Mountain View, CA;
Rachel Fraser, San Francisco, CA;
Patrick O'Reilly Brown, Stanford, CA;
Jessica Karr, San Francisco, CA;
Celeste Holz-Schietinger, East Palo Alto, CA;
Michael Eisen, Berkeley, CA;
Ranjani Varadan, Fremont, CA;

Applicant(s)

Impossible Foods Inc., Redwood City, CA;

Power of Attorney: The patent practitioners associated with Customer Number 26191

Domestic Priority data as claimed by applicant

This application is a CON of 15/786,776 10/18/2017 PAT 10172381
which is a CON of 14/796,970 07/10/2015 PAT 10039306
which is a CON of PCT/US2014/011361 01/13/2014
which is a CON of 13/941,211 07/12/2013 ABN
and claims benefit of 61/908,634 11/25/2013
and claims benefit of 61/751,816 01/11/2013

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 01/17/2019

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/238,802**

Projected Publication Date: 07/04/2019

Non-Publication Request: No

Early Publication Request: No
Title

METHODS AND COMPOSITIONS FOR CONSUMABLES

Preliminary Class

426

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

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Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

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Attorney Docket No.: 38767-0010003 / M2CON-Track 1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Marija Vrljic	Art Unit	:	Unknown
Application No.	:	16/238,802	Examiner	:	Unknown
Filed	:	January 3, 2019	Conf. No.	:	3877
Title	:	METHODS AND COMPOSITIONS FOR CONSUMABLES			

MAIL STOP AMENDMENT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT

Please consider the documents listed on the disclosure form submitted with this statement. As indicated below, copies of the documents are being submitted with this statement to the extent required under 37 CFR § 1.98(a)(2).

Under 35 U.S.C. § 120, this application relies on the earlier filing date of U.S. Application No. 15/786,776 filed on October 18, 2017. The documents corresponding to Desig. ID Nos. 110, 114, 115, 133, 163, 164, 168, 170, 171, 174, 178-180, 258, 261, 296, 302, 318, 393, 408, 462, 478, 497, 505, 556, and 569 have not been submitted to and/or cited by the Office in the prior application, and, to the extent required under 37 CFR § 1.98(a)(2), copies are provided herewith. All other listed documents were submitted to and/or cited by the Office in the prior application, so copies of those documents are not provided in this application.

This statement is being filed before the receipt of a first Office Action on the merits. Therefore, no fees are believed due. If this is incorrect, please apply any charges applicable under 37 CFR § 1.17(p), or credits, to Deposit Account No. 06-1050, referencing the above-indicated Attorney Docket Number.

Please contact the undersigned if there are any questions regarding this statement.

Respectfully submitted,

Date: /May 7, 2019/

/M. Angela Parsons/

M. Angela Parsons, Ph.D.
Reg. No. 44,282

Customer Number 26191
Fish & Richardson P.C.
Telephone: (612) 335-5070
Facsimile: (877) 769-7945

61867003.doc

Sheet 1 of 28

Substitute Disclosure Form	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 38767-0010003	Application No. 16/238,802
Information Disclosure Statement by Applicant (Use several sheets if necessary)		Applicant Impossible Foods Inc.	
(37 CFR §1.98(b))		Filing Date January 3, 2019	Group Art Unit

U.S. Patent Documents							
Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	1.	2934435	4/26/1960	May			
	2.	2934436	4/26/1960	May			
	3.	2934437	4/26/1960	Morton et al.			
	4.	2955041	10/4/1960	Broderick			
	5.	3157516	11/17/1964	Huber			
	6.	3271167	9/6/1966	Perret			
	7.	3316099	4/25/1967	Hoersch			
	8.	3365306	1/23/1968	Perret			
	9.	3394015	7/23/1968	Giacino et al.			
	10.	3394016	7/23/1968	Bidmead			
	11.	3394017	7/23/1968	Giacino et al.			
	12.	3480447	11/25/1969	Hack			
	13.	3493395	2/3/1970	Soeters			
	14.	3519437	7/7/1970	Giacino et al.			
	15.	3524747	8/18/1970	O'Hara			
	16.	3532514	10/6/1970	May			
	17.	3532515	10/6/1970	Broderick			
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Examiner Signature	Date Considered
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Substitute Disclosure Form

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Substitute Disclosure Form	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 38767-0010003	Application No. 16/238,802
Information Disclosure Statement by Applicant (Use several sheets if necessary)		Applicant Impossible Foods Inc.	
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Examiner Initial	Desig. ID	Document Number	Publication Date	Country or Patent Office	Class	Subclass	Translation Yes	Translation No

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Examiner Initial	Desig. ID	Document Number	Publication Date	Country or Patent Office	Class	Subclass	Translation Yes	Translation No
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Information Disclosure Statement by Applicant (Use several sheets if necessary)		Applicant Impossible Foods Inc.	
(37 CFR §1.98(b))		Filing Date January 3, 2019	Group Art Unit

Other Documents (include Author, Title, Date, and Place of Publication)		
Examiner Initial	Desig. ID	Document
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EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.	

Substitute Disclosure Form

Sheet 28 of 28

Substitute Disclosure Form	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 38767-0010003	Application No. 16/238,802
Information Disclosure Statement by Applicant (Use several sheets if necessary)		Applicant Impossible Foods Inc.	
(37 CFR §1.98(b))		Filing Date January 3, 2019	Group Art Unit

Other Documents (include Author, Title, Date, and Place of Publication)		
Examiner Initial	Desig. ID	Document
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Substitute Disclosure Form

Espacenet

Bibliographic data: JP2010523125 (A) — 2010-07-15

Colored Structured Protein Products

Inventor(s):

Applicant(s):

Classification: **- international:** ***A23J3/22***
- cooperative: **A23J3/26**; **A23L11/07**; **A23L5/43**; **A23P30/20**; **D01D4/02**; **D01D5/08**; **D01F1/06**; **D01F4/00**

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Also published as: AT544888 (T) BRPI0809069 (A2) CN101680123 (A) CN101680123 (B) EP2137343 (A1) more

Abstract not available for JP2010523125 (A)
Abstract of corresponding document: US2008254199 (A1)

The present invention provides a process for producing a colored structured protein product with protein fibers that are substantially aligned and the resultant product. Specifically, the plant protein is combined with a colorant and extruded, forming a colored structured protein product with protein fibers that are substantially aligned and the resultant product.

Espacenet

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METHOD FOR MASKING RETORT ODOR

Inventor(s): WATANABE TOSHIYUKI ± (WATANABE TOSHIYUKI, ; 渡辺 俊之)

Applicant(s): EZAKI GLICO CO ± (EZAKI GLICO CO LTD, ; 江崎グリコ株式会社)

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Abstract of JP2013192528 (A)

PROBLEM TO BE SOLVED: To mask retort odor of a sauce for a retort bowl.SOLUTION: A production method for masking the retort odor of a sauce for a retort bowl including meat selected from beef, pork and chicken, is a masking method of a retort odor of a retort bowl in which a sauce for the retort bowl includes at least one fruit juice selected from the group consisting of apple juice, peach juice, mandarin orange juice and muscat juice.

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(71) Applicant *(for all designated States except US)*: **MARY KAY INC.** [US/US]; 16251 N. Dallas Parkway, P.O. Box 799045, Dallas, TX 75379-9045 (US).

(72) Inventors; and
(75) Inventors/Applicants *(for US only)*: **MENTLIK, Anton, A.** [US/US]; 1809 Rolling Ridge Drive, Grapevine, TX 76051 (US). **SWANZE, James** [US/US]; 2807 Wildplum Drive, Arlington, TX 76015 (US).

(74) Agent: **KRAWZSENEK, Michael, R.**; Fulbright & Jaworski L.L.P., 600 Congress Avenue, Suite 2400, Austin, TX 78701 (US).

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(54) Title: GLYCERYL AND GLYCOL ACID COMPOUNDS

(57) Abstract: A composition comprising a glyceryl salicylate compound and/or a glycol salicylate compound. The compositions can be used to reduce the amount of moisture evaporated from skin, protect the skin from UV light, and treat aged or damaged skin.

DESCRIPTION

GLYCERYL AND GLYCOL ACID COMPOUNDS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Application Serial No. 60/747,760, filed May 19, 2006, the contents of which are incorporated by reference.

BACKGROUND OF THE INVENTION

A. Field of the Invention

[0002] The present invention relates generally to a compound that can be used in compositions such as cosmetic skin care compositions. The compound can include an acid molecule attached to a glycerol or glycol molecule *via* an ester linkage.

B. Description of Related Art

[0003] With ageing, chronic exposure to adverse environmental factors, or malnutrition, the visual appearance, physical properties, and physiological functions of skin can change in ways that are considered visually undesirable. The most notable and obvious changes include the development of fine lines and wrinkles, loss of elasticity, increased sagging, loss of firmness, loss of color evenness or tone, coarse surface texture, and mottled pigmentation. Less obvious, but measurable changes which occur as skin ages or endures chronic environmental insult include a general reduction in cellular and tissue vitality, reduction in cell replication rates, reduced cutaneous blood flow, reduced moisture content, accumulated errors in structure and function, alterations in the normal regulation of common biochemical pathways, and a reduction in the skin's ability to remodel and repair itself. Many of the alterations in appearance and function of the skin are caused by changes in the outer epidermal layer of the skin, while others are caused by changes in the lower dermis.

[0004] Several different approaches have been used to treat damaged skin caused by aging, environmental factors, chemicals, or malnutrition. These approaches can oftentimes have various drawbacks, such as significant irritation to the skin or skin toxicity.

SUMMARY OF THE INVENTION

[0005] The present invention overcomes deficiencies in the art. In a non-limiting aspect, the invention relates generally to compounds that can be used in compositions such as cosmetic and pharmaceutical compositions. In certain embodiments, the compound can include an acid molecule attached to a glyceryl or glycol molecule *via* an ester linkage. Generic and specific structures of these compounds are disclosed throughout this specification and incorporated into this section by reference.

[0006] In certain embodiments, the compounds can be incorporated into a composition. The composition can be cosmetic composition or a pharmaceutical composition. The composition can be topically applied to skin. The compositions can be included in a cosmetic vehicle. Non-limiting examples of cosmetic vehicles are disclosed in other sections of this specification and are known to those of skill in the art. Examples of cosmetic vehicles include emulsions (*e.g.*, oil-in-water and water-in-oil emulsions), creams, lotions, solutions (*e.g.*, aqueous or hydro-alcoholic solutions), anhydrous bases (*e.g.*, lipstick or a powder), gels, and ointments. In other non-limiting embodiments, the compositions of the present invention can be included in anti-aging, cleansing, or moisturizing products. The compositions can also be formulated for topical skin application at least 1, 2, 3, 4, 5, 6, 7, or more times a day during use. In other aspects of the present invention, compositions can be storage stable or color stable, or both.

[0007] In certain embodiments, the compositions of the present invention can include from about 0.001% to about 20%, by weight or volume, of glyceryl/acid or glycol/acid compounds, or a combination of both. It should be recognized, however, that the amount of the compounds in a composition can be modified below, within, or above this range based on the desired results (*e.g.*, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 96, 97, 98, 99%, or more, by weight or volume of the composition). Therefore, the amount of a glyceryl/acid or glycol/acid compound can include less than 0.001% or more than 5%, by weight or volume. In other aspects, the compositions can include 0.002, 0.003, 0.004…1, 2, 3, 4, 5, 6, ,7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 95, 96, 97, 98, 99%, or more or, or any range derivable therein, by weight or volume of glyceryl or glycol salicylate or a combination of both. In other embodiments, the compositions of the present invention

can further include a carnitine molecule. The carnitine molecule can be acylated (*e.g.*, acetyl-l-carnitine). In certain aspects, the ratio of any ingredient within the composition when compared to another ingredient can be from about 1:1, 2:1, 3:1, 4:1, 5:1, 6:1, 7:1, 8:1, 9:1, 10:1, 11:1, 12:1, 13:1, 14:1, 15:1, 16:1, 17:1, 18:1, 19:1, 20:1, 21:1, 22:1, 23:1, 24:1, 25:1, 26:1, 27:1, 28:1, 29:1, 30:1, 31:1, 32:1, 33:1, 34:1, 35:1, 36:1, 37:1, 38:1, 39:1, 40:1, 50:1, 60:1, 70:1, 80:1, 90:1, 100:1, or more or any number derivable therein, by weight or volume of the total composition. In other aspects, the ratio of any ingredient within the composition when compared to another ingredient can be from about 1:2, 1:3, 1:4, 1:5, 1:6, 1:7, 1:8, 1:9, 1:10, 1:11, 1:12, 1:13, 1:14, 1:15, 1:16, 1:17, 1:18, 1:19, 1:20, 1:21 , 1:22, 1:23, 1:24, 1:25, 1:26, 1:27, 1:28, 1:29, 1:30, 1:31, 1:32, 1:33, 1:34, 1:35, 1:36, 1:37, 1:38, 1:39, 1:40, 1:50, 1:60, 1:70, 1:80, 1:90, 1:100, or more or any number derivable therein, by weight or volume of the total composition.

[0008] The compositions of the present invention can also be modified to have a desired oxygen radical absorbance capacity (ORAC) value. In certain non-limiting aspects, the compositions of the present invention can be modified to have an ORAC value per mg of at least about 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 35, 40, 45, 50, 55, 60, 70, 80, 90, 95, 100, 200, 300, 400, 500, 600, 700, 800, 900, 1000, 2000, 3000, 4000, 5000, 6000, 7000, 8000, 9000, 10000, 15000, 20000, 30000, 50000, 100000 or more or any range derivable therein.

[0009] In other non-limiting aspects of the present invention, the compositions can further include a vitamin, a mineral, an essential fatty acid, an amino acid (including essential and non-essential amino acids), a flavinoid, and/or a protein, or a combination thereof. Non-limiting examples of vitamins include the B vitamins (*e.g.*, B1, B2, B6, B12, niacin, folic acid, biotin, and pantothenic acid), vitamin C, vitamin D, vitamin E (*e.g..*, tocopherol or tocopheryl acetate), vitamin A (*e.g.*, palmitate, retinyl palmitate, or retinoic acid), and vitamin K. Non-limiting examples of minerals include iron, potassium, phosphorus, magnesium, manganese, selenium, and calcium. Non-limiting examples of essential fatty acids include Omega 3 (linolenic acid), Omega 6 (linoleic acid) and Omega 9 (oleic acid) essential fatty acid, or a combination thereof. Non-limiting examples of amino acids include essential amino acids (*e.g..*, lysine, leucine, isoleucine, methionine, phenylalanine, threonine, tryptophan, valine, histidine, or arginine) and non-essential amino acids (*e.g..*, serine, asparagine, glutamine, aspartic acid, glutamic acid, alanine, tyrosine, cysteine, glycine, or

proline). Non-limiting examples of flavinoids include anthocyanin compounds (*e.g.*, cyanidin-3-glucoside and cyanidin-3-rutinoside).

[0010] The compositions in non-limiting aspects can have a pH of about 6 to about 9. In other aspects, the pH can be 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, or 14. The compositions can include a triglyceride. Non-limiting examples include small, medium, and large chain triglycerides. In certain aspects, the triglyceride is a medium chain triglyceride (*e.g.*, caprylic capric triglyceride). The compositions can also include preservatives. Non-limiting examples of preservatives include methylparaben, propylparaben, or a mixture of methylparaben and propylparaben.

[0011] Also disclosed is a method of treating or preventing a skin condition comprising topical application of a composition comprising a glyceryl/acid compound and/or a glycol/acid compound, wherein the topical application of the composition treats the skin condition. Non-limiting examples of skin conditions include pruritus, spider veins, lentigo, age spots, senile purpura, keratosis, melasma, blotches, fine lines or wrinkles, nodules, sun damaged skin, dermatitis (including, but not limited to seborrheic dermatitis, nummular dermatitis, contact dermatitis, atopic dermatitis, exfoliative dermatitis, perioral dermatitis, and stasis dermatitis), psoriasis, folliculitis, rosacea, acne, impetigo, erysipelas, erythrasma, eczema, and other inflammatory skin conditions. In certain non-limiting aspects, the skin condition can be caused by exposure to UV light, age, irradiation, chronic sun exposure, environmental pollutants, air pollution, wind, cold, heat, chemicals, disease pathologies, smoking, or lack of nutrition. The skin can be facial skin or non-facial skin (*e.g.*, arms, legs, hands, chest, back, feet, etc.). The method can further comprise identify a person in need of skin treatment. The person can be a male or female. The age of the person can be at least 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, or more years old, or any range derivable therein.

[0012] The compositions of the present invention can also be used in methods for exfoliate the skin. This allows the user to shed dead skin cells and also encourages the skin's natural sloughing process. An advantage of this process is that it reveals and exposes "younger," fresher skin. The shedding process unclogs pores, keeps skin clean and helps reduce acne breakouts.

[0013] The methods of the present invention can also include topically applying an amount effective to: increase the stratum corneum turnover rate of the skin; decrease skin roughness; increase collagen synthesis in fibroblasts; increase cellular anti-oxidant defense mechanisms (*e.g.*., exogenous additions of anti-oxidants can bolster, replenish, or prevent the loss of cellular antioxidants such as catalase and glutathione in skin cells (*e.g.*, keratinocytes, melanocytes, langerhans cells, etc.) which will reduce or prevent oxidative damage to the skin, cellular, proteins, and lipids); inhibit melanin production in melanocytes; reduce or prevent oxidative damage to skin (including reducing the amount lipid peroxides and/or protein oxidation in the skin); enhance desmosomal degradation, leading to an increase in corneocyte desquamation; increase cytokines, hyaluronic acid, cell proliferation, collagen production and epidermal proliferation; normalize corneocyte cohesion; enhance lipid synthesis in the intercellular areas; target the sebum in the sebaceous glands; and activate fibroblasts.

[0014] The compositions of the present invention can also be used in a regimen alone or with other compositions (*e.g.*, skin care compositions). For instance, the composition of the present invention can be applied in the morning and/or evening at predetermined intervals and/or amounts. Alternatively, the compositions of the present invention can be applied in the morning and a second skin care composition can be applied in the evening and vice versa.

[0015] Also disclosed are methods for using the glyceryl/acid compounds and glycol/acid compounds as moisturizing agents, film-forming agents, UV absorption agents, and/or skin treatment agents. For instance, the compounds can maintain and/or increase the hydration (such as water content) of skin. The compounds can also lubricate the skin. The compounds can form a film or barrier on the outer surface of the skin which can reduce or prevent the evaporation of water from the skin. In certain aspects, the film can have tactile properties which make the skin feel soft or smooth. The compounds can also be used as UV absorption agents and can be used in methods for increasing the UV absorption characteristics of a composition such as, for example, a sunscreen composition. The compounds can be used in methods for increasing the SPF of a sunscreen composition. In certain aspects, the compounds can be used to increase the efficiency of existing sunscreen products and/or sunscreen agents that are used in such products. Alternatively, the compounds can be used as a stand alone sunscreen agent. In certain embodiments, the compounds can be used in methods for reducing or preventing cosmetic compositions from

chemical or physical deterioration that is induced by ultraviolet light. The compounds and/or compositions of the present invention can diffract or absorb a broad spectrum of UV radiation. For example, the compounds and/or compositions can absorb or diffract UVA (approximately 315 to 400nm), UVB (approximately 280 to 315) and/or UVC (approximately 10 to 280nm) light. In certain aspects, the compounds and/or compositions can absorb or diffract UV light ranging from about 1 to about 400nm, or any integer or range therein (*e.g.*, 2, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, 300, 310, 320, 330, 340, 350, 360, 370, 380, 390, 399).

[0016] Also contemplated are kits that include the compositions of the present invention. In certain embodiments, the composition is comprised in a container. The container can be a bottle, dispenser, or package. The container can dispense a pre-determined amount of the composition. In certain aspects, the compositions is dispensed in a spray or mist, dollop, or liquid. The container can include indicia on its surface. The indicia can be a word, an abbreviation, a picture, or a symbol.

[0017] Also contemplated is a product comprising a composition of the present invention. In non-limiting aspects, the product can be a cosmetic product. The cosmetic product can be those described in other sections of this specification or those known to a person of skill in the art. Non-limiting examples of products include a moisturizer, a cream, a lotion, a skin softener, a foundation, a night cream, a lipstick, a cleanser, a toner, a sunscreen, a mask, or an anti-aging product.

[0018] It is contemplated that any embodiment discussed in this specification can be implemented with respect to any method or composition of the invention, and *vice versa*. Furthermore, compositions of the invention can be used to achieve methods of the invention.

[0019] The term "alkyl" includes straight-chain alkyl groups, branched-chain alkyl groups, cycloalkyl (alicyclic) groups, alkyl heteroatom-substituted cycloalkyl groups, and cycloalkyl heteroatom-substituted alkyl groups.

[0020] The term "alkoxy" includes a group having the structure —OR, where R is an alkyl group. Non-limiting examples of alkoxy groups include $-OCH_3$, $-OCH_2CH_3$, $-OCH_2CH_2CH_3$, $-OCH(CH_3)_2$, $-OCH(CH_2)_2$, *etc.*

[0021] The term "hydroxyalkyl" includes an alkyl group having at least one hydroxy group.

[0022] The term "about" or "approximately" are defined as being close to as understood by one of ordinary skill in the art, and in one non-limiting embodiment the terms are defined to be within 10%, within 5%, within 1%, and/or within 0.5%.

[0023] The terms "inhibiting" or "reducing" or any variation of these terms, when used in the claims and/or the specification includes any measurable decrease or complete inhibition to achieve a desired result.

[0024] The term "effective," as that term is used in the specification and/or claims, means adequate to accomplish a desired, expected, or intended result.

[0025] The use of the word "a" or "an" when used in conjunction with the term "comprising" in the claims and/or the specification may mean "one," but it is also consistent with the meaning of "one or more," "at least one," and "one or more than one."

[0026] The use of the term "or" in the claims is used to mean "and/or" unless explicitly indicated to refer to alternatives only or the alternatives are mutually exclusive, although the disclosure supports a definition that refers to only alternatives and "and/or."

[0027] As used in this specification and claim(s), the words "comprising" (and any form of comprising, such as "comprise" and "comprises"), "having" (and any form of having, such as "have" and "has"), "including" (and any form of including, such as "includes" and "include") or "containing" (and any form of containing, such as "contains" and "contain") are inclusive or open-ended and do not exclude additional, unrecited elements or method steps.

[0028] Other objects, features and advantages of the present invention will become apparent from the following detailed description. It should be understood, however, that the detailed description and the examples, while indicating specific embodiments of the invention, are given by way of illustration only. Additionally, it is contemplated that changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

[0029] In today's image conscious society, people are continually looking for a product that can protect or improve the visual appearance of their skin. Often times, aged skin, uneven skin tone, or skin damaged by environmental factors such as UV light, chronic sun exposure, environmental pollutants, chemicals, disease pathologies, or smoking, is associated with unattractive skin. Compounds of the present invention can be used in all types of cosmetic compositions/formulations for treating, preserving, or preventing the appearance of aged or damaged skin.

[0030] For instance, the compounds of the present invention can have a wide variety of uses in compositions that are applied to skin. Non-limiting examples include using the compounds as a moisturizing agent, a film-forming agent, a UV absorption agent, and a skin treatment agent. As a moisturizing agent, the compounds can help maintain and/or increase the hydration of skin, thereby making the skin softer and more pliable. The compounds can also act as lubricants for the skin to treat, reduce, or prevent skin flaking and dry skin.

[0031] As a film-forming agent, the compounds can be used to form a film or barrier on the outer surface of the skin. This can be beneficial to the skin by reducing or preventing the evaporation of water from the skin. Additionally, the film can have tactile properties that make the skin feel soft and smooth.

[0032] As a UV absorption agent, the compounds can be used to protect the cosmetic composition from chemical or physical deterioration induced by ultraviolet light. The compounds can also be used as a sunscreen agent in sunscreen compositions. The compounds can also increase the sun protection factor (SPF) of a sunscreen composition that already includes a sunscreen agent.

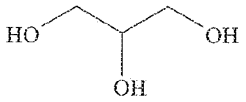
[0033] As a skin treatment agent, the compounds can be used as active ingredients in topical skin care compositions. Non-limiting examples of skin conditions that can be treated with the compounds of the present invention are disclosed throughout this specification.

[0034] These and other aspect of the invention are described in further non-limiting detail below.

A. Glyceryl/Acid and Glycol/Acid Compounds

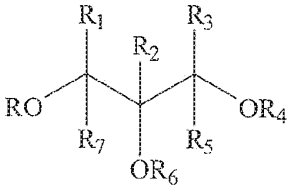
1. Glyceryl/Acid Compounds

[0035] A glyceryl/acid compound of the present invention can be derived from glycerol molecule which has the following structure:

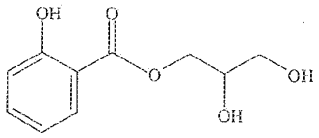


Glycerol

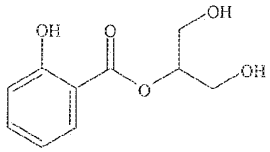
The acid portion of the glyceryl/acid compounds can be attached *via* an ester linkage of the OH group of the glycerol molecule and the COOH group of the acid molecule. In non-limiting aspects, a glyceryl/acid compound can have the following generic chemical structure:



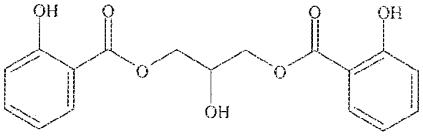
where R, R_1, R_2, R_3, R_4, R_5, and R_6 can each independently be an H, an acid molecule, a hydroxy, a halogen, an oxo (*e.g.*, ether), an alkoxy, a silyloxy, an acyl, an aryl, an acetyl, a carbonyl, a cyano, a heterocyclyl, an amido, an aminocarbonyl, an amino, -NH-alkyl, -N(alkyl)$_2$, -NH-(substituted alkyl), -N-(substituted alkyl)$_2$, -NH-aryl, -N(aryl)$_2$, an azido, a trialkylsilyloxy, an acyloxy, a acylamino, a bis-acylamino, an ester, a NO, a NO_2, or a sulfo (*e.g.*, thioether, thioester, thiocarbonyl, sulfonamido, sulfonyl, *etc.*). In certain aspects, the acid molecule is selected from the group consisting of salicylic acid, cinnamic acid, and benzoic acid, and derivatives and substituted acids thereof. Other non-limiting examples of acids that can be used in the context of the present invention are described in International Cosmetic Ingredient Dictionary and Handbook, 10th Ed., 2004, which is incorporated by reference. In certain aspects, at least one of R, R_4, and R_6 is an acid, R and R_4 are acids, R and R_6 are acids, R_4 and R_6 are acids, or R, R_4, and R_6 are all acids. Non-limiting examples of certain glyceryl/acid compounds of the present invention are illustrated below:



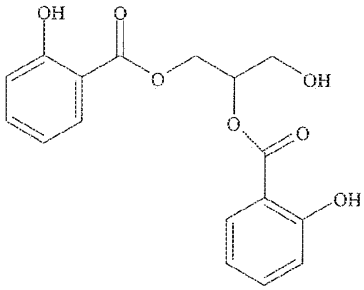
Glyceryl Mono-Salicylate



Glyceryl Mono-Salicylate



Glyceryl Di-Salicylate



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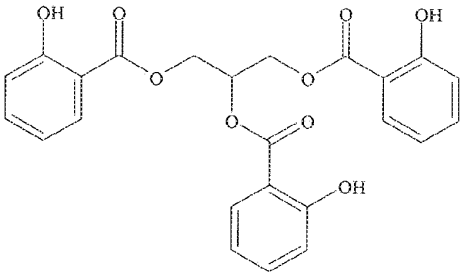

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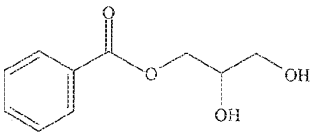
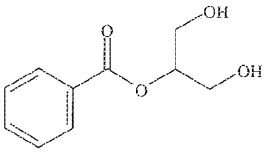


Glyceryl Mono-Benzoate



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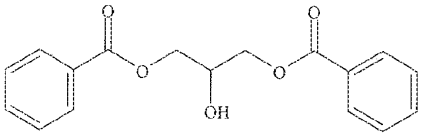

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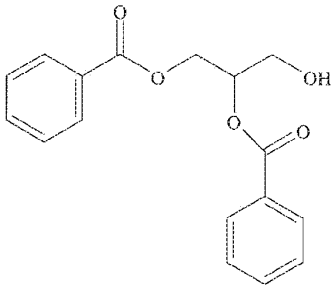
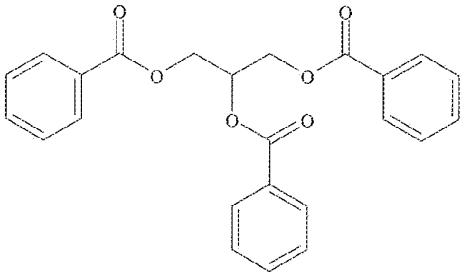
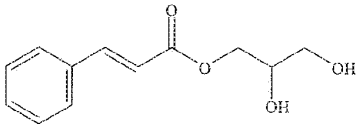


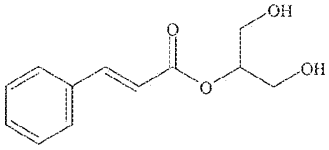
Glyceryl Di-Benzoate



Glyceryl Tri-Benzoate



Glyceryl Mono-Cinnamate



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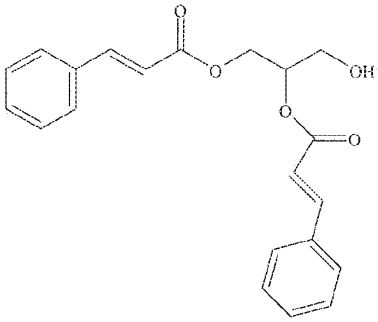
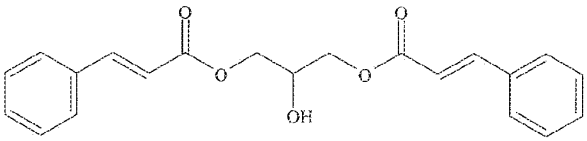
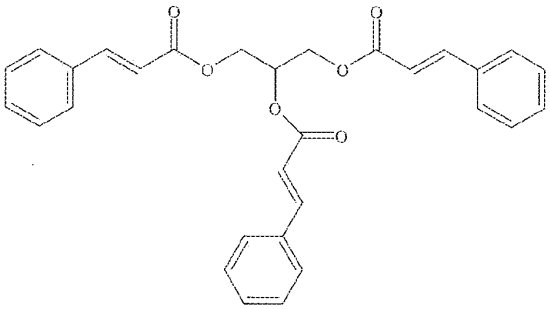


Glyceryl Di-Cinnamate



Glyceryl Di-Cinnamate



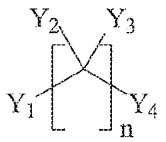
Glyceryl Tri-Cinnamate

[0036] The glyceryl/acid compounds and derivatives and modifications of the same can be prepared by using convention chemical synthesis techniques (*see*, *e.g.*., Organic Chemistry, 5th Ed.).

2. Glycol/Acid Compounds

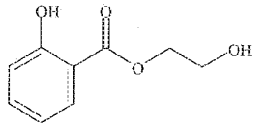
[0037] A glycol/acid compound of the present invention can be derived from a glycol molecule. Glycols are a generic class of dihydric alcohols. Non-limiting examples of glycols that can be used in the context of the present invention include: ethylene glycols (*e.g.*, 1, 2 ethane diol (monoethylene glycol), 2-hydroxyethoxy)ethan-2-ol (diethylene glycol); polyethylene glycols (PEGs); propylene glycols (*e.g.*, 1, 2 propane diol, 1, 3 propane diol, *etc.*); and butylene glycols (*e.g.*, 1, 2 butane diol, 1,3 butane diol, 1, 4 butane diol, *etc.*). Other non-limiting examples of glycols that can be used in the context of the present invention are described in International Cosmetic Ingredient Dictionary and Handbook, 10th Ed., 2004, which is incorporated by reference. It certain aspects, the glycol that is used can have similar physical and chemical characteristics to glycerol.

[0038] The acid portion of the glycol/acid compounds can be attached *via* an ester linkage of the OH group of the glycol molecule and the COOH group of the acid molecule. In non-limiting aspects, a glycol/acid compound can have the following generic chemical structure:

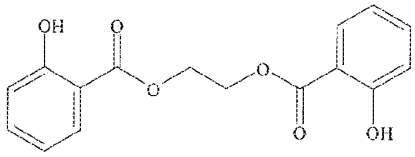


where n can be 2, 3, 4, 5, 6, 7, 8, 9, 10, or more, or any range therein. In certain aspects, n is an integer from 2 to 4. Y_1, Y_2, Y_3, and Y_4, can each independently be OY_5, an H, an acid molecule attached *via* an ester linkage, a hydroxy, a halogen, an oxo (*e.g.*, ether), an alkoxy, a silyloxy, an acyl, an aryl, an acetyl, a carbonyl, a cyano, a heterocyclyl, an amido, an aminocarbonyl, an amino, -NH-alkyl, -N(alkyl)$_2$, -NH-(substituted alkyl), -N-(substituted alkyl)$_2$, -NH-aryl, -N(aryl)$_2$, an azido, a trialkylsilyloxy, an acyloxy, a acylamino, a bis-acylamino, an ester, a NO, a NO_2, or a sulfo (*e.g.*, thioether, thioester, thiocarbonyl, sulfonamido, sulfonyl, *etc.*). In certain aspects, the acid molecule is selected from the group consisting of salicylic acid, cinnamic acid, and benzoic acid, and derivatives and substituted acids thereof. Other non-limiting examples of acids that can be used in the context of the present invention are described in International Cosmetic Ingredient Dictionary and Handbook, 10th Ed., 2004, which is incorporated by reference. Y_5 can be anyone of the groups identified for Y_1, Y_2, Y_3, and Y_4. In certain aspects Y_5 is an acid group. In other

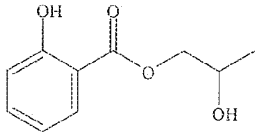
embodiments, at least two of Y_1, Y_2, Y_3, and Y_4 is a hydroxyl group. Non-limiting examples of certain particular glycol/acid compounds of the present invention are illustrated below:



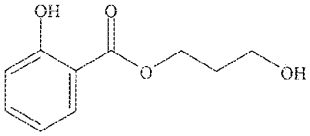
Ethylene Glycol Mono-Salicylate



Ethylene Glycol Di-Salicylate



Propylene Glycol Mono-Salicylate



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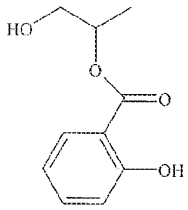

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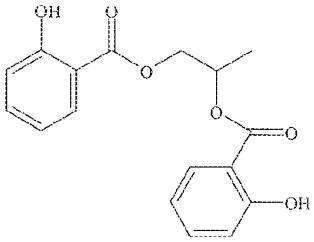
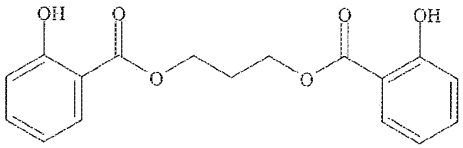
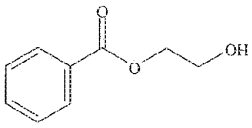


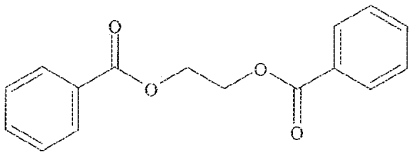
Propylene Glycol Di-Salicylate



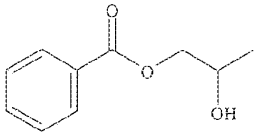
Propylene Glycol Di-Salicylate



Ethylene Glycol Mono-Benzoate



Ethylene Glycol Di-Benzoate



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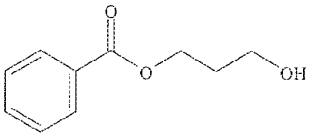
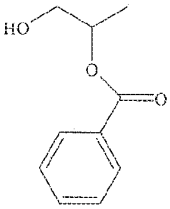
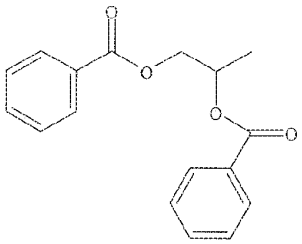


Propylene Glycol Mono-Benzoate



Propylene Glycol Mono-Benzoate



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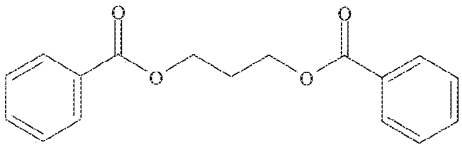
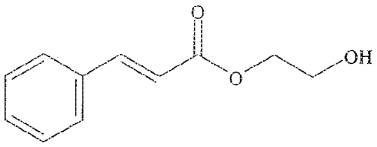
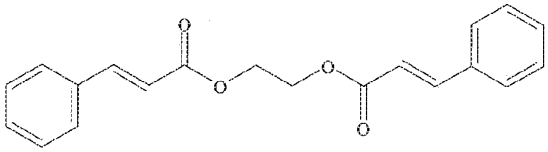


Propylene Glycol Di-Benzoate



Ethylene Glycol Mono-Cinnamate



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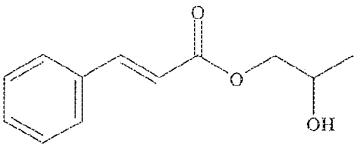

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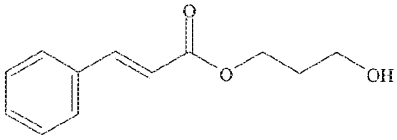

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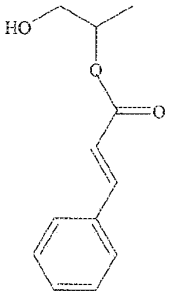
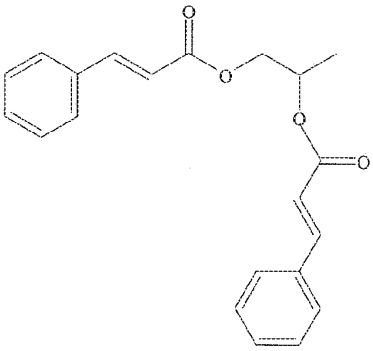
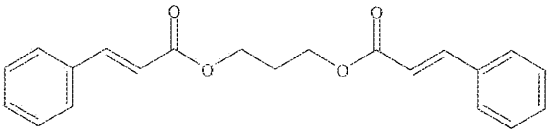


Propylene Glycol Mono-Cinnamate



Propylene Glycol Di-Cinnamate



Propylene Glycol Di-Cinnamate

[0039] The glycol/acid compounds and derivatives and modifications of the same can be prepared by using convention chemical synthesis techniques (*see*, *e.g.*., Organic Chemistry, 5th Ed.).

3. Modifications and Derivatives of Glyceryl/Glycol/Acid Compounds

[0040] Modifications or derivatives of the glyceryl/acid and glycol/acid compounds disclosed throughout this specification are contemplated as being useful with the methods and compositions of the present invention. Derivatives and modifications may be prepared and the properties of such derivatives and modified compounds may be assayed for their desired properties by any method known to those of skill in the art.

[0041] In certain aspects, "derivative" refers to a chemically modified glyceryl/acid or glycol/acid compound that still retains the desired effects of the compound prior to the chemical modification. Such derivatives may have the addition, removal, or substitution of one or more chemical moieties on the glyceryl, glycol, and/or acid portion of the compounds. Non-limiting examples of the modifications that can be made to these portions of the compounds include the addition or removal of alkyl groups, carboxyl groups, carbonyl groups, hydroxyl groups, nitro groups, amino groups, amide groups, azo groups, sulfate groups, sulfonate groups, sulfono groups, sulfhydryl groups, sulfonyl groups, sulfoxido groups, phosphate groups, phosphono groups, phosphoryl groups, and/or halide groups. Additional modifications can include an addition or a deletion of one or more atoms of the atomic framework, for example, substitution of an ethyl by a propyl or substitution of a phenyl by a larger or smaller aromatic group. In a cyclic or bicyclic structure, hetero atoms such as N, S, or O can be substituted into the structure instead of a carbon atom.

B Compositions

[0042] The compounds of the present invention can be incorporated into all types of compositions (*e.g.*, cosmetic and pharmaceutical compositions). A person of ordinary skill would recognize that the compositions can include any number of combinations of glyceryl/acid compounds, glycol/acid compounds, and/or additional ingredients, or derivatives thereof. The concentrations of the glyceryl/acid compounds, glycol/acid compounds, and/or additional ingredients, or derivatives thereof, can vary for a given composition. This variation can oftentimes depend on the desired characteristics of the final composition. In non-limiting embodiments, for example, the compositions may include in

their final form, for example, at least about 0.0001%, 0.0002%, 0.0003%, 0.0004%, 0.0005%, 0.0006%, 0.0007%, 0.0008%, 0.0009%, 0.0010%, 0.0011%, 0.0012%, 0.0013%, 0.0014%, 0.0015%, 0.0016%, 0.0017%, 0.0018%, 0.0019%, 0.0020%, 0.0021%, 0.0022%, 0.0023%, 0.0024%, 0.0025%, 0.0026%, 0.0027%, 0.0028%, 0.0029%, 0.0030%, 0.0031%, 0.0032%, 0.0033%, 0.0034%, 0.0035%, 0.0036%, 0.0037%, 0.0038%, 0.0039%, 0.0040%, 0.0041%, 0.0042%, 0.0043%, 0.0044%, 0.0045%, 0.0046%, 0.0047%, 0.0048%, 0.0049%, 0.0050%, 0.0051%, 0.0052%, 0.0053%, 0.0054%, 0.0055%, 0.0056%, 0.0057%, 0.0058%, 0.0059%, 0.0060%, 0.0061%, 0.0062%, 0.0063%, 0.0064%, 0.0065%, 0.0066%, 0.0067%, 0.0068%, 0.0069%, 0.0070%, 0.0071%, 0.0072%, 0.0073%, 0.0074%, 0.0075%, 0.0076%, 0.0077%, 0.0078%, 0.0079%, 0.0080%, 0.0081%, 0.0082%, 0.0083%, 0.0084%, 0.0085%, 0.0086%, 0.0087%, 0.0088%, 0.0089%, 0.0090%, 0.0091%, 0.0092%, 0.0093%, 0.0094%, 0.0095%, 0.0096%, 0.0097%, 0.0098%, 0.0099%, 0.0100%, 0.0200%, 0.0250%, 0.0275%, 0.0300%, 0.0325%, 0.0350%, 0.0375%, 0.0400%, 0.0425%, 0.0450%, 0.0475%, 0.0500%, 0.0525%, 0.0550%, 0.0575%, 0.0600%, 0.0625%, 0.0650%, 0.0675%, 0.0700%, 0.0725%, 0.0750%, 0.0775%, 0.0800%, 0.0825%, 0.0850%, 0.0875%, 0.0900%, 0.0925%, 0.0950%, 0.0975%, 0.1000%, 0.1250%, 0.1500%, 0.1750%, 0.2000%, 0.2250%, 0.2500%, 0.2750%, 0.3000%, 0.3250%, 0.3500%, 0.3750%, 0.4000%, 0.4250%, 0.4500%, 0.4750%, 0.5000%, 0.5250%, 0.0550%, 0.5750%, 0.6000%, 0.6250%, 0.6500%, 0.6750%, 0.7000%, 0.7250%, 0.7500%, 0.7750%, 0.8000%, 0.8250%, 0.8500%, 0.8750%, 0.9000%, 0.9250%, 0.9500%, 0.9750%, 1.0%, 1.1%, 1.2%, 1.3%, 1.4%, 1.5%, 1.6%, 1.7%, 1.8%, 1.9%, 2.0%, 2.1%, 2.2%, 2.3%, 2.4%, 2.5%, 2.6%, 2.7%, 2.8%, 2.9%, 3.0%, 3.1%, 3.2%, 3.3%, 3.4%, 3.5%, 3.6%, 3.7%, 3.8%, 3.9%, 4.0%, 4.1%, 4.2%, 4.3%, 4.4%, 4.5%, 4.6%, 4.7%, 4.8%, 4.9%, 5.0%, 5.1%, 5.2%, 5.3%, 5.4%, 5.5%, 5.6%, 5.7%, 5.8%, 5.9%, 6.0%, 6.1%, 6.2%, 6.3%, 6.4%, 6.5%, 6.6%, 6.7%, 6.8%, 6.9%, 7.0%, 7.1%, 7.2%, 7.3%, 7.4%, 7.5%, 7.6%, 7.7%, 7.8%, 7.9%, 8.0%, 8.1%, 8.2%, 8.3%, 8.4%, 8.5%, 8.6%, 8.7%, 8.8%, 8.9%, 9.0%, 9.1%, 9.2%, 9.3%, 9.4%, 9.5%, 9.6%, 9.7%, 9.8%, 9.9%, 10%, 11%, 12%, 13%, 14%, 15%, 16%, 17%, 18%, 19%, 20%, 21%, 22%, 23%, 24%, 25%, 26%, 27%, 28%, 29%, 30%, 35%, 40%, 45%, 50%, 60%, 65%, 70%, 75%, 80%, 85%, 90%, 95%, or 99% or any range derivable therein, of at least one of the glyceryl/acid compounds, glycol/acid compounds, and/or additional ingredients, or derivatives thereof. In certain non-limiting aspects, the percentages can be calculated by weight or volume of the total composition. A person of ordinary skill in the art would understand that the concentrations can vary depending on the addition, substitution, and/or subtraction of the glyceryl/acid compounds, glycol/acid compounds, and additional ingredients, or derivatives thereof.

C Additional Ingredients

[0043] In addition to the glyceryl/acid compounds and/or glycol/acid compounds disclosed throughout this specification, compositions of the present invention can include additional ingredients such as cosmetic ingredients and pharmaceutical active ingredients. Non-limiting examples of these additional ingredients are described in the following subsections.

1. Cosmetic Ingredients

[0044] The CTFA International Cosmetic Ingredient Dictionary and Handbook (2004) describes a wide variety of non-limiting cosmetic ingredients that can be used in the context of the present invention. Examples of these ingredient classes include: fragrances (artificial and natural), dyes and color ingredients (*e.g.*, Blue 1, Blue 1 Lake, Red 40, titanium dioxide, D&C blue no. 4, D&C green no. 5, D&C orange no. 4, D&C red no. 17, D&C red no. 33, D&C violet no. 2, D&C yellow no. 10, and D&C yellow no. 11), adsorbents, lubricants, solvents, moisturizers (including, *e.g.*, emollients, humectants, film formers, occlusive agents, and agents that affect the natural moisturization mechanisms of the skin), water-repellants, UV absorbers (physical and chemical absorbers such as paraaminobenzoic acid ("PABA") and corresponding PABA derivatives, titanium dioxide, zinc oxide, *etc.*), essential oils, vitamins (*e.g.* A, B, C, D, E, and K), trace metals (*e.g.* zinc, calcium and selenium), anti-irritants (*e.g.* steroids and non-steroidal anti-inflammatories), botanical extracts (*e.g.* aloe vera, chamomile, cucumber extract, ginkgo biloba, ginseng, and rosemary), anti-microbial agents, antioxidants (*e.g.*, BHT and tocopherol), chelating agents (*e.g.*, disodium EDTA and tetrasodium EDTA), preservatives (*e.g.*, methylparaben and propylparaben), pH adjusters (*e.g.*, sodium hydroxide and citric acid), absorbents (*e.g.*, aluminum starch octenylsuccinate, kaolin, corn starch, oat starch, cyclodextrin, talc, and zeolite), skin bleaching and lightening agents (*e.g.*, hydroquinone and niacinamide lactate), humectants (*e.g.*, sorbitol, urea, and manitol), exfoliants, waterproofing agents (*e.g.*, magnesium/aluminum hydroxide stearate), skin conditioning agents (*e.g.*, aloe extracts, allantoin, bisabolol, ceramides, dimethicone, hyaluronic acid, and dipotassium glycyrrhizate). Non-limiting examples of some of these ingredients are provided in the following subsections.

a. Preservatives

[0045] Non-limiting examples of preservatives that can be used in the context of the present invention include quaternary ammonium preservatives such as polyquaternium-1 and benzalkonium halides (*e.g.*, benzalkonium chloride ("BAC") and benzalkonium bromide), parabens (*e.g.*, methylparabens and propylparabens), phenoxyethanol, benzyl alcohol, chlorobutanol, phenol, sorbic acid, thimerosal or combinations thereof.

b. Moisturizers

[0046] Non-limiting examples of moisturizing agents that can be used with the compositions of the present invention can be found in the International Cosmetic Ingredient Dictionary, 10th Ed., 2004. Examples include amino acids, chondroitin sulfate, diglycerin, erythritol, fructose, glucose, 1,2,6-hexanetriol, honey, hyaluronic acid, hydrogenated honey, hydrogenated starch hydrolysate, inositol, lactitol, maltitol, maltose, mannitol, natural moisturizing factor, salts of pyrollidone carboxylic acid, potassium PCA, sodium glucuronate, sodium PCA, sorbitol, sucrose, trehalose, urea, and xylitol.

c. Emollients

[0047] Non-limiting examples of emollients include, but are not limited to, vegetable oils, mineral oils, silicone oils, synthetic and natural waxes, petrolatum, lanolin, aluminum magnesium hydroxide stearate (which can also function as a water repellent), and fatty acid esters. Non-limiting examples of vegetable oils include safflower oil, corn oil, sunflower seed oil, and olive oil.

d. Antioxidants

[0048] Non-limiting examples of antioxidants include, but are not limited to, acetyl cysteine, ascorbic acid, ascorbic acid polypeptide, ascorbyl dipalmitate, ascorbyl methylsilanol pectinate, ascorbyl palmitate, ascorbyl stearate, BHA, BHT, t-butyl hydroquinone, cysteine, cysteine HCl, diamylhydroquinone, di-t-butylhydroquinone, dicetyl thiodipropionate, dioleyl tocopheryl methylsilanol, disodium ascorbyl sulfate, distearyl thiodipropionate, ditridecyl thiodipropionate, dodecyl gallate, erythorbic acid, esters of ascorbic acid, ethyl ferulate, ferulic acid, gallic acid esters, hydroquinone, isooctyl thioglycolate, kojic acid, magnesium ascorbate, magnesium ascorbyl phosphate, methylsilanol ascorbate, natural botanical anti-oxidants such as green tea or grape seed extracts, nordihydroguaiaretic acid, octyl gallate, phenylthioglycolic acid, potassium ascorbyl tocopheryl phosphate, potassium sulfite, propyl gallate, quinones, rosmarinic acid, sodium

ascorbate, sodium bisulfite, sodium erythorbate, sodium metabisulfite, sodium sulfite, superoxide dismutase, sodium thioglycolate, sorbityl furfural, thiodiglycol, thiodiglycolamide, thiodiglycolic acid, thioglycolic acid, thiolactic acid, thiosalicylic acid, tocophereth-5, tocophereth-10, tocophereth-12, tocophereth-18, tocophereth-50, tocopherol, tocophersolan, tocopheryl acetate, tocopheryl linoleate, tocopheryl nicotinate, tocopheryl succinate, and tris(nonylphenyl)phosphite.

e. Thickening Agents

[0049] Thickening agents, including thickener or gelling agents, include substances which that can increase the viscosity of a composition. Thickeners include those that can increase the viscosity of a composition without substantially modifying the efficacy of the ingredients within the composition. Thickeners can also increase the stability of the compositions of the present invention. Non-limiting examples of additional thickeners that are known to those of ordinary skill in the art can be used in the context of the present invention (*e.g.*, U.S. Patent Nos. 5,087,445; 4,509,949; 2,798,053; International Cosmetic Ingredient Dictionary and Handbook, 10th Ed., 2004). Examples include carboxylic acid polymers, crosslinked polyacrylate polymers, polyacrylamide polymers, polysaccharides, and gums. Examples of carboxylic acid polymers include crosslinked compounds containing one or more monomers derived from acrylic acid, substituted acrylic acids, and salts and esters of these acrylic acids and the substituted acrylic acids, wherein the crosslinking agent contains two or more carbon-carbon double bonds and is derived from a polyhydric alcohol. Examples of commercially available carboxylic acid polymers include carbomers, which are homopolymers of acrylic acid crosslinked with allyl ethers of sucrose or pentaerytritol (*e.g.*, Carbopol™ 900 series from B. F. Goodrich).

f. Silicone Containing Compounds

[0050] In non-limiting aspects, silicone containing compounds include any member of a family of polymeric products whose molecular backbone is made up of alternating silicon and oxygen atoms with side groups attached to the silicon atoms. By varying the -Si-O- chain lengths, side groups, and crosslinking, silicones can be synthesized into a wide variety of materials. They can vary in consistency from liquid to gel to solids.

[0051] The silicone containing compounds that can be used in the context of the present invention include those described in this specification or those known to a person of ordinary skill in the art. Non-limiting examples include silicone oils (*e.g.*, volatile and non-

volatile oils), gels, and solids. The silicon containing compound can be a silicone oil such as a polyorganosiloxane. Non-limiting examples of polyorganosiloxanes include dimethicone, cyclomethicone, polysilicone-11, phenyl trimethicone, trimethylsilylamodimethicone, stearoxytrimethylsilane, or mixtures of these and other organosiloxane materials in any given ratio in order to achieve the desired consistency and application characteristics depending upon the intended application (*e.g.*, to a particular area such as the skin, hair, or eyes). A "volatile silicone oil" includes a silicone oil have a low heat of vaporization, *i.e.* normally less than about 50 cal per gram of silicone oil. Non-limiting examples of volatile silicone oils include: cyclomethicones such as Dow Corning 344 Fluid, Dow Corning 345 Fluid, Dow Corning 244 Fluid, and Dow Corning 245 Fluid, Volatile Silicon 7207 (Union Carbide Corp., Danbury, Conn.); low viscosity dimethicones, *i.e.* dimethicones having a viscosity of about 50 cst or less (*e.g.*, dimethicones such as Dow Corning 200-0.5 cst Fluid). The Dow Corning Fluids are available from Dow Corning Corporation, Midland, Michigan. Cyclomethicone and dimethicone are described in International Cosmetic Ingredient Dictionary, 10th Ed., 2004 as cyclic dimethyl polysiloxane compounds and a mixture of fully methylated linear siloxane polymers end-blocked with trimethylsiloxy units, respectively. Other non-limiting volatile silicone oils that can be used in the context of the present invention include those available from General Electric Co., Silicone Products Div., Waterford, N.Y. and SWS Silicones Div. of Stauffer Chemical Co., Adrian, Michigan.

2. Pharmaceutical Actives

[0052] Pharmaceutical active agents are also contemplated as being useful with the compositions of the present invention. Non-limiting examples of pharmaceutical active agents include anti-acne agents, agents used to treat rosacea, analgesics, anesthetics, anorectals, antihistamines, anti-inflammatory agents including non-steroidal anti-inflammatory drugs, antibiotics, antifungals, antivirals, antimicrobials, anti-cancer actives, scabicides, pediculicides, antineoplastics, antiperspirants, antipruritics, antipsoriatic agents, antiseborrheic agents, biologically active proteins and peptides, burn treatment agents, cauterizing agents, depigmenting agents, depilatories, diaper rash treatment agents, enzymes, hair growth stimulants, hair growth retardants including DFMO and its salts and analogs, hemostatics, kerotolytics, canker sore treatment agents, cold sore treatment agents, dental and periodontal treatment agents, photosensitizing actives, skin protectant/barrier agents, steroids including hormones and corticosteroids, sunburn treatment agents, sunscreens, transdermal

actives, nasal actives, vaginal actives, wart treatment agents, wound treatment agents, wound healing agents, *etc.*

D Vehicles

[0053] Compositions of the present invention can be incorporated into all types of vehicles. Non-limiting examples of suitable vehicles include emulsions (*e.g.*, water-in-oil, water-in-oil-in-water, oil-in-water, oil-in-water-in-oil, oil-in-water-in-silicone, water-in-silicone, silicone-in-water emulsions), creams, lotions, solutions (both aqueous and hydro-alcoholic), anhydrous bases (such as lipsticks and powders), gels, and ointments or by other method or any combination of the forgoing as would be known to one of ordinary skill in the art (*see, e.g.*, Remington's, 1990 and International Cosmetic Ingredient Dictionary and Handbook, 10th Ed., 2004)). Variations and other appropriate vehicles will be apparent to the skilled artisan and are appropriate for use in the present invention. In certain aspects, it is important that the concentrations and combinations of the compounds, ingredients, and agents be selected in such a way that the combinations are chemically compatible and do not form complexes which precipitate from the finished product.

E Cosmetic Products and Articles of Manufacture

[0054] The composition of the present invention can also be used in many cosmetic products including, but not limited to, sunscreen products, sunless skin tanning products, hair products, finger nail products, moisturizing creams, skin benefit creams and lotions, softeners, day lotions, gels, ointments, foundations, night creams, lipsticks, cleansers, toners, masks, or other known cosmetic products or applications. Additionally, the cosmetic products can be formulated as leave-on or rinse-off products. In certain aspects, the compositions of the present invention are stand-alone products.

F Kits

[0055] Kits are also contemplated as being used in certain aspects of the present invention. For instance, emulsion compositions of the present invention can be included in a kit. A kit can include a container. Containers can include a bottle, a metal tube, a laminate tube, a plastic tube, a dispenser, a pressurized container, a barrier container, a package, a compartment, a lipstick container, a compact container, cosmetic pans that can hold cosmetic compositions, or other types of containers such as injection or blow-molded plastic containers

into which the dispersions or compositions or desired bottles, dispensers, or packages are retained. The kit and/or container can include indicia on its surface. The indicia, for example, can be a word, a phrase, an abbreviation, a picture, or a symbol.

[0056] The containers can dispense a pre-determined amount of the emulsion composition. In other embodiments, the container can be squeezed (*e.g.*, metal, laminate, or plastic tube) to dispense a desired amount of the emulsion composition. The emulsion composition can be dispensed as a spray, an aerosol, a liquid, a fluid, or a semi-solid. The containers can have spray, pump, or squeeze mechanisms. A kit can also include instructions for employing the kit components as well the use of any other emulsion compositions included in the container. Instructions can include an explanation of how to apply, use, and maintain the emulsion compositions.

EXAMPLES

[0057] The following examples are included to demonstrate certain non-limiting aspects of the invention. It should be appreciated by those of skill in the art that the techniques disclosed in the examples which follow representative techniques discovered by the inventor to function well in the practice of the invention. However, those of skill in the art should appreciate that changes can be made in the specific embodiments which are disclosed and still obtain a like or similar result without departing from the spirit and scope of the invention.

EXAMPLE 1
Methods of Making Glyceryl/Acid or Glycol Acid Compounds

[0058] An esterification process can be used for producing glyceryl/acid and glycol/acid compounds. A glyceryl or glycol molecule and an acid molecule are added to a multi-necked round bottom flask equipped with a heating mantle, a condenser, a Dean-Stark trap and a thermometer. A solvent is chosen that will allow a high enough reflux temperature to accommodate the reaction. The reaction is run until the calculated amount of water is collected in the trap signifying that the limiting reagent is exhausted. The by-product can be compounds other than water in some processes. For instance, if a methyl salicylate is used in place of salicylic acid, methanol will be the by-product rather than water, and the methanol may escape through the condenser or remain in the reaction flask. The methanol can be removed when the ester is extracted.

EXAMPLE 2
UV Absorption Data for Glyceryl Mono-Salicylate

[0059] UV absorption data for glyceryl mono-salicylate is summarized in Table 1 below:

Table 1 (UV absorption data*)

Glyceryl Mono-Salicylate	Data
Avg. Mol. Wt.	242.95
Molar Absorptivity (λ max 238nm)	12065.7
Molar Absorptivity (λ max 307nm)	6126.4

*Data obtained by using a UV/Vis spectrometer using standard USP 197U testing procedures.

EXAMPLE 3
Compositions

[0060] Non-limiting examples of compositions of the present invention are described in Tables 1-3.

Table 2* (Exfoliation composition)

Ingredient	% Concentration (by weight)
SD Alcohol 40-B	56.00
Glyceryl mono-salicylate**	7.50
Water	29.00
Mineral oil	3.00
Sepigel 305 (thickener)	4.00

*The composition was prepared as follows: Ingredients were cold-mixed and added to a beaker in the listed order prior to the addition of the next ingredient. The pH of the composition was adjusted to approximately 4.3 by using 1N HCl solution.
** Glyceryl mono-salicylate can be substituted with other glyceryl/acid and glycol/acid compounds.

Table 3* (Moisturizer)**

Ingredient	% Concentration (by weight)
Phase A	
Water	66.44
Xanthum gum	0.10
Methyl paraben	0.15
Propyl paraben	0.10
Citric acid	0.01
Phase B	
Cetyl alcohol	4.00
Glyceryl stearate + PEG 100	4.00
Octyl palmitate	4.00
Dimethicone	1.00
Tocopheryl acetate	0.20
Phase C	
SD Alcohol 40-B	15.00
Glyceryl mono-salicylate***	5.00

*The composition was prepared as follows: Phases A and B were heated to approximately 70°C-75°C in separate beakers while mixing. Phase B was added to Phase A when both phases were at approximately 70°C-75°C. The Phase A+B mixture was cooled to <40°C while mixing. Phase C was subsequently added to the Phase A+B mixture, and the mixture was cooled to room temperature (approximately 20°C-25°C) while mixing.
**Formulation showed statistically significant moisturization for 6 hours after application to skin when compared to the baseline control ($p<0.05$) (data not shown).
***Glyceryl mono-salicylate can be substituted with other glyceryl/acid and glycol/acid compounds.

Table 4 (Generic formulation)*

Ingredient	% Concentration (by weight)
Phase A	
Water	84.44
Xanthum gum	0.1
M-paraben	0.15
P-paraben	0.1
Citric acid	0.01
Phase B	
Cetyl alcohol	4.0
Glyceryl stearate + PEG 100	4.0
Octyl palmitate	4.0
Dimethicone	1.0
Tocopheryl acetate	0.2
Phase C	
Glyceryl mono-salicylate**	2.0

*The composition can be prepared as follows: Sprinkle Xanthum gum in water and mix for 10 min. Subsequently, add all ingredients in phase A and heat to 70-75°C. Add all items in phase B to a separate beaker and heat to 70-75°C. Mix phases A and B at 70-75°C. Continue mixing and allow composition to cool to 30°C. Subsequently, add phase C ingredient while mixing.
**Glyceryl mono-salicylate can be substituted with other glyceryl/acid and glycol/acid compounds.

Table 5 (Generic formulation)*

Ingredient	% Concentration (by weight)
Phase A	
Water	78.6
M-paraben	0.2
P-paraben	0.1
Na2 EDTA	0.1
Shea butter	4.5
Petrolatum	4.5
Glycerin	4.0
Propylene Glycol	2.0
Finsolve TN	2.0
Phase B	
Sepigel 305	2.0
Phase C	
Glyceryl mono-salicylate**	2.0

*Add ingredients in phase A to beaker and heat to 70-75°C while mixing. Subsequently, add the phase B ingredient with phase A and cool to 30°C with mixing. Subsequently, add phase C ingredient while mixing.
**Glyceryl mono-salicylate can be substituted with other glyceryl/acid and glycol/acid compounds.

Table 6 (Generic formulation)*

Ingredient	% Concentration (by weight)
Phase A	
Water	84.44
Xanthum gum	0.1
M-paraben	0.15
P-paraben	0.1
Citric acid	0.01
Phase B	
Cetyl alcohol	4.0
Glyceryl stearate + PEG 100	4.0
Octyl palmitate	4.0
Dimethicone	1.0
Tocopheryl acetate	0.2
Phase C	
Glyceryl mono-salicylate**	1.0
Glycol mono-salicylate**	1.0

*The composition can be prepared as follows: Sprinkle Xanthum gum in water and mix for 10 min. Subsequently, add all ingredients in phase A and heat to 70-75°C. Add all items in phase B to separate beaker and heat to 70-75°C. Mix phases A and B at 70-75°C. Continue mixing and allow composition to cool to 30°C. Subsequently, add phase C ingredient while mixing.
**Glyceryl mono-salicylate and/or glycol mono-salicylate can be substituted with other glyceryl/acid and glycol/acid compounds.

Table 7 (Generic formulation)*

Ingredient	% Concentration (by weight)
Phase A	
Water	78.6
M-paraben	0.2
P-paraben	0.1
Na2 EDTA	0.1
Shea butter	4.5
Petrolatum	4.5
Glycerin	4.0
Propylene Glycol	2.0
Finsolve TN	2.0
Phase B	
Sepigel 305	2.0
Phase C	
Glyceryl mono-salicylate**	1.0
Glycol mono-salicylate**	1.0

*Add ingredients in phase A to beaker and heat to 70-75°C while mixing. Subsequently, add the phase B ingredient with phase A and cool to 30°C with mixing. Subsequently, add phase C ingredient while mixing.
**Glyceryl mono-salicylate and/or glycol mono-salicylate can be substituted with other glyceryl/acid and glycol/acid compounds.

EXAMPLE 4
Determining Efficacy of Glyceryl/Acid or Glycol/Acid Compounds and Compositions

[0061] The efficacy of the glyceryl/acid or glycol/acid compounds and compositions containing the same can be determined by methods known to those of ordinary skill in the art. The following are non-limiting procedures that can be used in the context of the present invention. It should be recognized that other testing procedures can be used, including, for example, objective and subjective procedures.

[0062] Skin moisture/hydration can be measured by using impedance measurements with the Nova Dermal Phase Meter. The impedance meter measures changes in skin moisture content. The outer layer of the skin has distinct electrical properties. When skin is dry it conducts electricity very poorly. As it becomes more hydrated increasing conductivity results. Consequently, changes in skin impedance (related to conductivity) can be used to assess changes in skin hydration. The unit can be calibrated according to instrument instructions for each testing day. A notation of temperature and relative humidity can also be made. Subjects can be evaluated as follows: prior to measurement they can equilibrate in a room with defined humidity (*e.g.*, 30-50%) and temperature (*e.g.*, 68-72C). Three separate impedance readings can be taken on each side of the face, recorded, and averaged. The T5 setting can be used on the impedance meter which averages the impedance values of every

five seconds application to the face. Changes can be reported with statistical variance and significance.

[0063] Skin clarity and the reduction in freckles and age spots can be evaluated using a Minolta Chromometer. Changes in skin color can be assessed to determine irritation potential due to product treatment using the a* values of the Minolta Chroma Meter. The a* value measures changes in skin color in the red region. This is used to determine whether a composition is inducing irritation. The measurements can be made on each side of the face and averaged, as left and right facial values. Skin clarity can also be measured using the Minolta Meter. The measurement is a combination of the a*, b, and L values of the Minolta Meter and is related to skin brightness, and correlates well with skin smoothness and hydration. Skin reading is taken as above. In one non-limiting aspect, skin clarity can be described as L/C where C is chroma and is defined as $(a^2+b^2)^{1/2}$.

[0064] Skin dryness, surface fine lines, skin smoothness, and skin tone can be evaluated with clinical grading techniques. For example, clinical grading of skin dryness can be determined by a five point standard Kligman Scale: (0) skin is soft and moist; (1) skin appears normal with no visible dryness; (2) skin feels slightly dry to the touch with no visible flaking; (3) skin feels dry, tough, and has a whitish appearance with some scaling; and (4) skin feels very dry, rough, and has a whitish appearance with scaling. Evaluations can be made independently by two clinicians and averaged.

[0065] Clinical grading of skin tone can be performed *via* a ten point analog numerical scale: (10) even skin of uniform, pinkish brown color. No dark, erythremic, or scaly patches upon examination with a hand held magnifying lens. Microtexture of the skin very uniform upon touch; (7) even skin tone observed without magnification. No scaly areas, but slight discolorations either due to pigmentation or erythema. No discolorations more than 1 cm in diameter; (4) both skin discoloration and uneven texture easily noticeable. Slight scaliness. Skin rough to the touch in some areas; and (1) uneven skin coloration and texture. Numerous areas of scaliness and discoloration, either hypopigmented, erythremic or dark spots. Large areas of uneven color more than 1 cm in diameter. Evaluations were made independently by two clinicians and averaged.

[0066] Clinical grading of skin smoothness can be analyzed *via* a ten point analog numerical scale: (10) smooth, skin is moist and glistening, no resistance upon dragging

finger across surface ; (7) somewhat smooth, slight resistance; (4) rough, visibly altered, friction upon rubbing; and (1) rough, flaky, uneven surface. Evaluations were made independently by two clinicians and averaged.

[0067] Skin smoothness and wrinkle reduction can also be assessed visually by using the methods disclosed in Packman and Gams (1978). For example, at each subject visit, the depth, shallowness and the total number of superficial facial lines (SFLs) of each subject can be carefully scored and recorded. A numerical score was obtained by multiplying a number factor times a depth/width/length factor. Scores are obtained for the eye area and mouth area (left and right sides) and added together as the total wrinkle score.

[0068] Skin firmness can be measured using a Hargens ballistometer, a device that evaluates the elasticity and firmness of the skin by dropping a small body onto the skin and recording its first two rebound peaks. The ballistometry is a small lightweight probe with a relatively blunt tip (4 square mm-contact area) was used. The probe penetrates slightly into the skin and results in measurements that are dependent upon the properties of the outer layers of the skin, including the stratum corneum and outer epidermis and some of the dermal layers.

[0069] Skin softness/suppleness can be evaluated using the Gas Bearing Electrodynamometer, an instrument that measures the stress/strain properties of the skin. The viscoelastic properties of skin correlate with skin moisturization. Measurements can be obtained on the predetermined site on the cheek area by attaching the probe to the skin surface with double-stick tape. A force of approximately 3.5 gm can be applied parallel to the skin surface and the skin displacement is accurately measured. Skin suppleness can then be calculated and is expressed as DSR (Dynamic Spring Rate in gm/mm).

[0070] The appearance of lines and wrinkles on the skin can be evaluated using replicas, which is the impression of the skin's surface. Silicone rubber like material can be used. The replica can be analyzed by image analysis. Changes in the visibility of lines and wrinkles can be objectively quantified *via* the taking of silicon replicas form the subjects' face and analyzing the replicas image using a computer image analysis system. Replicas can be taken from the eye area and the neck area, and photographed with a digital camera using a low angle incidence lighting. The digital images can be analyzed with an image processing program and the are of the replicas covered by wrinkles or fine lines was determined.

[0071] The surface contour of the skin can be measured by using the profilometer/Stylus method. This includes either shining a light or dragging a stylus across the replica surface. The vertical displacement of the stylus can be fed into a computer *via* a distance transducer, and after scanning a fixed length of replica a cross-sectional analysis of skin profile can be generated as a two-dimensional curve. This scan can be repeated any number of times along a fix axis to generate a simulated 3-D picture of the skin. Ten random sections of the replicas using the stylus technique can be obtained and combined to generate average values. The values of interest include Ra which is the arithmetic mean of all roughness (height) values computed by integrating the profile height relative to the mean profile height. Rt which is the maximum vertical distance between the highest peak and lowest trough, and Rz which is the mean peak amplitude minus the mean peak height. Values are given as a calibrated value in mm. Equipment should be standardized prior to each use by scanning metal standards of know values. Ra Value can be computed by the following equation: R_a = Standardize roughness; l_m = the traverse (scan) length; and y = the absolute value of the location of the profile relative to the mean profile height (x-axis).

[0072] In other non-limiting aspects, the efficacy of the compositions of the present invention can be evaluated by using a skin analog, such as, for example, MELANODERM™. Melanocytes, one of the cells in the skin analog, stain positively when exposed to L-dihydroxyphenyl alanine (L-DOPA), a precursor of melanin. The skin analog, MELANODERM™, can be treated with a variety of bases containing the compositions and whitening agents of the present invention or with the base alone as a control. Alternatively, an untreated sample of the skin analog can be used as a control.

[0073] UV absorption of glyceryl/acid or glycol/acid compounds and compositions containing the same can be determined by UV absorption assays that are generally known to those of ordinary skill in the art.

* * * * * * * * * * * * * *

[0074] All of the compounds, compositions, and/or methods disclosed and claimed can be made and executed without undue experimentation in light of the present disclosure. While the compounds, compositions, and methods of this invention have been described in terms of certain embodiments, it will be apparent to those of skill in the art that variations may be applied to the compounds, compositions, and/or methods and in the steps or in the

sequence of steps of the method without departing from the concept, spirit and scope of the invention. More specifically, it will be apparent that certain agents which are both chemically and physiologically related may be substituted for the agents described herein while the same or similar results would be achieved. All such similar substitutes and modifications apparent to those skilled in the art are deemed to be within the spirit, scope and concept of the invention.

REFERENCES

The following references, to the extent that they provide exemplary procedural or other details supplementary to those set forth herein, are specifically incorporated herein by reference.

U.S. Patent 2,798,053

U.S. Patent 4,509,949

U.S. Patent 5,087,445

CTFA International Cosmetic Ingredient Dictionary and Handbook, 10th Ed., (2004).

Organic Chemistry, 5th Ed.

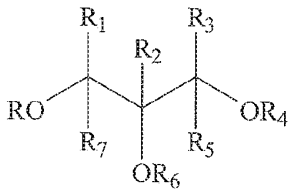
Packman and Gams, *J. Soc. Cos. Chem.*, 29:70-90, 1978.

Remington's Pharmaceutical Sciences, 18th Ed. Mack Printing Company, 1289-1329, 1990.

CLAIMS

1. A topical skin care composition comprising a glyceryl salicylate compound or a glycol salicylate compound.

2. The composition of claim 1, wherein the composition comprises a glyceryl salicylate compound having the following structure:



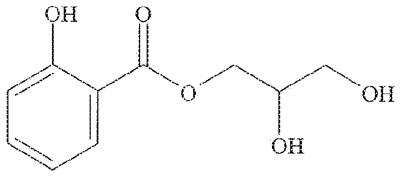
where

R, R_4, and R_6 are each independently an H, a salicylic acid molecule, or an alkyl group, with the proviso that at least one of R, R_4, and R_6 is a salicylic acid molecule; and

R_1, R_2, R_3, R_5, and R_7 are each independently an H or an alkyl group.

3. The composition of claim 2, wherein R is a salicylic acid and R_4 and R_6 are each an H.

4. The composition of claim 2, wherein the compound has the following structure:

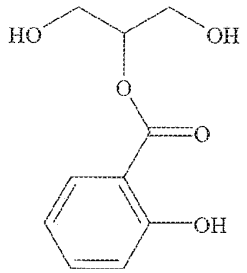


5. The composition of claim 4, wherein the composition further comprises a glyceryl di-salicylate compound or a glyceryl tri-salicylate compound.

6. The composition of claim 5, wherein the composition further comprises a glyceryl di-salicylate compound and a glyceryl tri-salicylate compound.

7. The composition of claim 2, wherein R_6 is a salicylic acid and R and R_4 are each an H.

8. The composition of claim 7, wherein the compound has the following structure:

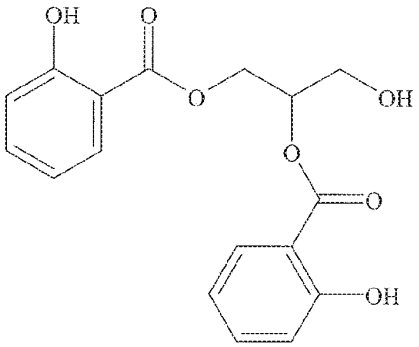


9. The composition of claim 2, wherein R and R_6 are each a salicylic acid and R_4 is H.

10. The composition of claim 9, wherein the composition further comprises a glyceryl di-salicylate compound or a glyceryl tri-salicylate compound.

11. The composition of claim 10, wherein the composition further comprises a glyceryl di-salicylate compound and a glyceryl tri-salicylate compound.

12. The composition of claim 9, wherein the compound has the following structure:

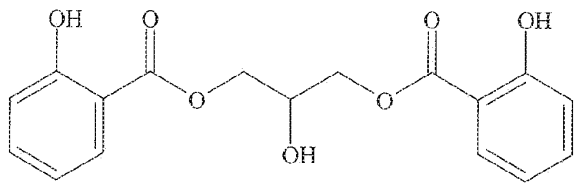


13. The composition of claim 12, wherein the composition further comprises a glyceryl mono-salicylate compound or a glyceryl tri-salicylate compound.

14. The composition of claim 13, wherein the composition further comprises a glyceryl mono-salicylate compound and a glyceryl tri-salicylate compound.

15. The composition of claim 2, wherein R and R_4 are each a salicylic acid and R_6 is H.

16. The composition of claim 15, wherein the compound has the following structure:

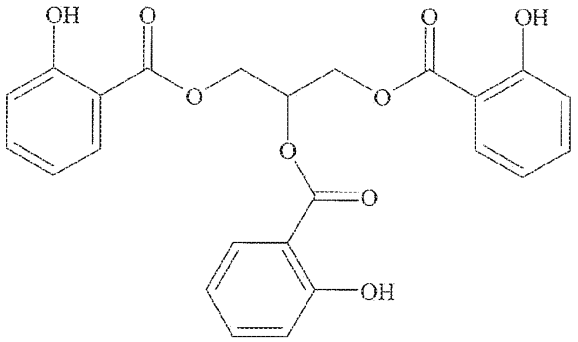


17. The composition of claim 16, wherein the composition further comprises a glyceryl mono-salicylate compound or a glyceryl tri-salicylate compound.

18. The composition of claim 17, wherein the composition further comprises a glyceryl mono-salicylate compound and a glyceryl tri-salicylate compound.

19. The composition of claim 2, wherein R, R_4, and R_6 are each salicylic acid.

20. The composition of claim 19, wherein the compound has the following structure:

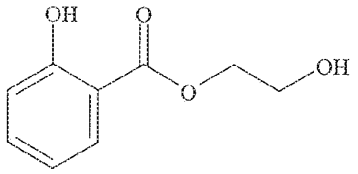


21. The composition of claim 20, wherein the composition further comprises a glyceryl mono-salicylate compound or a glyceryl di-salicylate compound.

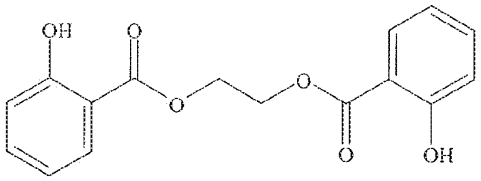
22. The composition of claim 21, wherein the composition further comprises a glyceryl mono-salicylate compound and a glyceryl di-salicylate compound.

23. The composition of claim 1, wherein the composition comprises a glycol salicylate compound selected from the group consisting of an ethylene glycol salicylate and a propylene glycol salicylate.

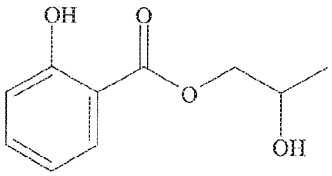
24. The composition of claim 23, wherein the composition comprises an ethylene glycol salicylate compound selected from the group consisting of:



and



25. The composition of claim 23, wherein the composition comprises a propylene glycol salicylate compound selected from the group consisting of:



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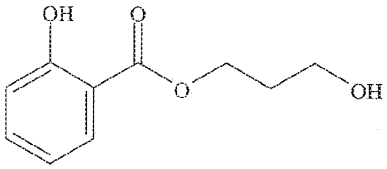
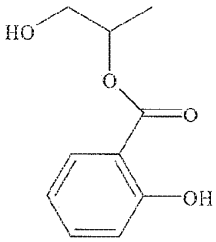
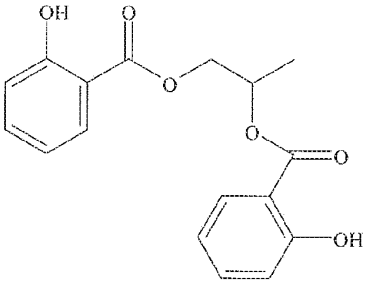
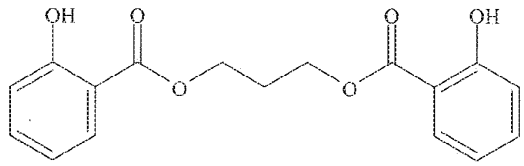




,



and



26. The composition of claim 1, wherein the composition comprises a glyceryl salicylate compound and a glycol salicylate compound.

27. The composition of claim 1, wherein the composition is an emulsion, a cream, a lotion, or an ointment.

28. The composition of claim 1, wherein the composition is an anhydrous composition.

29. The composition of claim 1, wherein the composition comprises from about 0.001% to about 20%, by weight, of the compound.

30. The composition of claim 1, wherein the composition absorbs UV light.

31. A method of treating a skin condition comprising topically applying a composition of claim 1 to skin, wherein the topical application of the composition to skin treats the skin condition.

32. The method of claim 31, wherein the skin condition is fine lines or wrinkles.

33. The method of claim 31, wherein the skin condition is dry skin.

34. A method of reducing the amount of moisture evaporated from skin comprising topically applying a composition of claim 1 to skin, wherein topical application of the composition creates a film on the skin that reduces the amount of moisture evaporated from the skin.

35. A method of protecting skin from UV light comprising topically applying the composition of claim 1 to skin, wherein the composition absorbs UV light.

36. A method of protecting a composition from chemical or physical deterioration induced by UV light comprising adding to the composition an effective amount of a

glyceryl salicylate molecule or a glycol salicylate molecule, wherein the glyceryl salicylate or glycol salicylate molecule absorbs UV light.

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2007/069160

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61K8/37 A61Q17/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A61K A61Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2 081 117 A (R. HALL) 18 May 1937 (1937-05-18) the whole document	1-36
X	EP 1 421 940 A (SEKISUI CHEMICAL CO) 26 May 2004 (2004-05-26) paragraphs [0001], [0005], [0012], [0013], [0040]; claims 1-3; tables 1-4	1-4,8, 23-25, 27-36
X	WO 02/26207 A (PROVINCIA ITALIANA DELLA CONGREGAZIONE DEI FIGLI DELL'IMMACOLATA CONC.) 4 April 2002 (2002-04-04) page 1, lines 1-6; claims; examples 2-10 page 3, lines 28-31 page 4, lines 9-16	1,23-25, 27-36

-/--

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
11 October 2007	23/10/2007
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer Boeker, Ruth

3

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2007/069160

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2 283 173 A (SANSHO SEIYAKU KK [JP]) 3 May 1995 (1995-05-03) page 4, last paragraph; claim 1; examples 5,14,23	1,23,24, 27-36
X	US 2 279 468 A (GUSTAVE LAHOUSSE JOSEPH EDOUAR ET AL) 14 April 1942 (1942-04-14) claims 1,3; example 1	1,23, 27-36
X	US 4 009 254 A (A. RENOLD) 22 February 1977 (1977-02-22) claims 1,4; example 7 column 5, lines 54,55 column 4, lines 37-45	1,2,23, 26-36

3

Form PCT/ISA/210 (continuation of second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2007/069160

Box No. II Observations where certain claims were found unsearchable (Continuation of Item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. [X] Claims Nos.: –
because they relate to subject matter not required to be searched by this Authority, namely:

see FURTHER INFORMATION sheet PCT/ISA/210

2. [ ] Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. [ ] Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of Item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. [ ] As all required additional search fees were timely paid by the applicant, this international search report covers allsearchable claims.

2. [ ] As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. [ ] As only some of the required additional search fees were timely paid by the applicant, this international search reportcovers only those claims for which fees were paid, specifically claims Nos.:

4. [ ] No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

[ ] The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

[ ] The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

[ ] No protest accompanied the payment of additional search fees.

Form PCT/ISA/210 (continuation of first sheet (2)) (April 2005)

International Application No. PCT/US2007 /069160

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.1

Although claims 31 and 35 are directed to a method of treatment of the human/animal body, the search has been carried out and based on the alleged effects of the compound/composition.

Continuation of Box II.1

Claims Nos.: -

Rule 39.1(iv) PCT - Method for treatment of the human or animal body by therapy

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2007/069160

Patent document cited in search report		Publication date	Patent family member(s)			Publication date
US 2081117	A	18-05-1937	NONE			
EP 1421940	A	26-05-2004	WO	03013548	A1	20-02-2003
			US	2004213749	A1	28-10-2004
			US	2007128287	A1	07-06-2007
WO 0226207	A	04-04-2002	AU	9588501	A	08-04-2002
			CA	2423713	A1	04-04-2002
			EP	1322285	A2	02-07-2003
			IT	RM20000520	A1	28-03-2002
			JP	2004509913	T	02-04-2004
			US	2004013618	A1	22-01-2004
GB 2283173	A	03-05-1995	NONE			
US 2279468	A	14-04-1942	FR	859636	A	23-12-1940
US 4009254	A	22-02-1977	NONE			

Form PCT/ISA/210 (patent family annex) (April 2005)

Espacenet

Bibliographic data: JPWO2010110493 (A1) — 2012-10-04

FLAVORING MATERIAL

Inventor(s): 高倉 友紀子, ; 林 和寛, ; 伊賀 まゆこ, ; 増沢 拓也

Applicant(s): 味の素株式会社

Classification: - international: ***A23L1/221; A23L1/226; A23L1/231; A23L1/31; A23L13/00; A23L23/00; A23L27/10; A23L27/20; A23L27/26***
- cooperative: **A23L27/2022**; **A23L27/2024**; **A23L27/2056**

Application number: JP20110506171 20100325 Global Dossier

Priority number (s): JP20090078329 20090327 ; WO2010JP55995 20100325 ; JP20110506171 20100325

Also published as: BRPI1016028 (A2) CN102365033 (A) CN102365033 (B) EP2412249 (A1) EP2412249 (A4) more

Abstract not available for JPWO2010110493 (A1)
Abstract of corresponding document: EP2412249 (A1)

[Summary] [Problem] Provision of a method of imparting aroma or flavor to food. [Solving Means]An aroma or flavor-imparting composition containing methional, dienals and thiazoles in proportions satisfying 0 ¤A ¤100, 0 ¤B ¤100, 0 ¤C ¤60 and A+B+C=100 wherein A shows parts by weight of niethional, B shows parts by weight of dienals and C shows parts by weight of thiazoles.

Electronic Acknowledgement Receipt

EFS ID:	35937603
Application Number:	16238802
International Application Number:	
Confirmation Number:	3877
Title of Invention:	METHODS AND COMPOSITIONS FOR CONSUMABLES
First Named Inventor/Applicant Name:	Marija Vrljic
Customer Number:	26191
Filer:	M. Angela Parsons/Kirsten Neuman
Filer Authorized By:	M. Angela Parsons
Attorney Docket Number:	38767-0010003
Receipt Date:	07-MAY-2019
Filing Date:	03-JAN-2019
Time Stamp:	13:01:26
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	Transmittal.pdf	71946 d21f58fbcdcfb9e1560e0a403ddf63c52ad9f a86	no	2

Warnings:

Information:					
This is not an USPTO supplied IDS fillable form					
2	Information Disclosure Statement (IDS) Form (SB08)	PTO_1449.pdf	319395 03ed555947fa7804f6c9ac7330f1917e00417f05	no	28
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3	Foreign Reference	JP2010523125.pdf	65167 5dc9301fe2633120b9df8d60818e0fd64f6b1f7d	no	1
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4	Foreign Reference	JP2013192528.pdf	83676 3aae66827f89a5df464e63ab388b9a80bd7722b5	no	1
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5	Foreign Reference	WO2007137128A1_Part1.pdf	26111890 b3cd6e407110a988d5f3a91615a0228a21eb49a8	no	24
Warnings:					
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6	Foreign Reference	WO2007137128A1_Part2.pdf	14690699 51784fbcb182c89824ff6498f79100c8c45d4b6f	no	19
Warnings:					
Information:					
7	Foreign Reference	WO2010110493.pdf	88097 769eb4037558e2d57a3b7e80b75329c0fee9b8ff	no	1
Warnings:					
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8	Non Patent Literature	GRAS_Notification_Soybean_Leghemoglobin.pdf	16322875 0be2cfd827f92640e30e9c0c934f712b5526b01e	no	1063
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9	Non Patent Literature	EPO_Opposition_ProprietorsObservations_2019.pdf	13734674 db2fc4d53741aaecca9d2b608f1d310ba51fb287	no	60
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10	Non Patent Literature	Fountoulakis_Lahm_Hydrolysis_1998.pdf	15170087 96fbd4f396796ec1524a02ce4cfbb0985fcb513c	no	26
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11	Non Patent Literature	Konermann_1997.pdf	221943 79022bce00f1fc3c89a6afee6f9e67eb9e51e5dc	no	7
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12	Non Patent Literature	MacMunn_1989.pdf	14671671 82f625767af3d92cff5df1ebc67ea09413e2cc6b	no	7
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Information:					
13	Non Patent Literature	Oelligrath_1998.pdf	695732 f3cf28baef3d2e3b5de83e06ed3ec6ca554469bc	no	3
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Information:					
14	Non Patent Literature	Peterson_1981.pdf	1373582 5b20d2370a3d5e349729df4df742b2183f5db21f	no	27
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15	Non Patent Literature	UnitedStatesEnvironmentalProtectionAgency_1999.pdf	1725437 6afd15e67149337b98268163332cf97011ae901d	no	31
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16	Non Patent Literature	Wisuthiphaet_KongruangProduction_2015.pdf	5531504 803be7fd815c34446abfcfff74d50c9d8fb56557	no	5
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Information:					
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/238,802	01/03/2019	Marija Vrljic	38767-0010003

CONFIRMATION NO. 3877

26191
FISH & RICHARDSON P.C. (TC)
PO BOX 1022
MINNEAPOLIS, MN 55440-1022

PUBLICATION NOTICE

OC000000109412561

Title:METHODS AND COMPOSITIONS FOR CONSUMABLES

Publication No.US-2019-0200658-A1
Publication Date:07/04/2019

NOTICE OF PUBLICATION OF APPLICATION

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Marija Vrljic	Art Unit	:	Unknown
Application No.	:	16/238,802	Examiner	:	Unknown
Filed	:	January 3, 2019	Conf. No.	:	3877
Title	:	METHODS AND COMPOSITIONS FOR CONSUMABLES			

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INFORMATION DISCLOSURE STATEMENT

Please consider the documents listed on the disclosure form submitted with this statement. Copies of the documents are being submitted with this statement to the extent required under 37 CFR § 1.98(a)(2).

This statement is being filed before the receipt of a first Office Action on the merits. Therefore, no fees are believed due. If this is incorrect, please apply any charges applicable under 37 CFR § 1.17(p), or credits, to Deposit Account No. 06-1050, referencing the above-indicated Attorney Docket Number.

Please contact the undersigned if there are any questions regarding this statement.

Respectfully submitted,

Date: August 23, 2019

/M. Angela Parsons/
M. Angela Parsons, Ph.D.
Reg. No. 44,282

Customer Number 26191
Fish & Richardson P.C.
Telephone: (612) 335-5070
Facsimile: (877) 769-7945

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Sheet 1 of 4

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Information Disclosure Statement by Applicant (Use several sheets if necessary)		Applicant Impossible Foods Inc.	
(37 CFR §1.98(b))		Filing Date January 3, 2019	Group Art Unit

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Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	1.	3857970	12/31/1974	Tsumura			
	2.	20190133162	5/9/2019	Varadan et al.			
	3.	20190133163	5/9/2019	Varadan et al.			

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Examiner Initial	Desig. ID	Document Number	Publication Date	Country or Patent Office	Class	Subclass	Translation Yes	Translation No
	4.	GB 1364747	8/29/1974	GB				
	5.	JP 2001/037434	2/13/2001	JP				
	6.	JP 2001/346533	12/18/2001	JP				
	7.	JP 2002/101835	4/9/2002	JP				
	8.	JP 2009/284893	12/10/2009	JP				
	9.	JP H0970272	3/18/1997	JP				
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(37 CFR §1.98(b))		Filing Date January 3, 2019	Group Art Unit

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Sheet _3_ of _4_

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(37 CFR §1.98(b))		Filing Date January 3, 2019	Group Art Unit

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Sheet _4_ of _4_

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(37 CFR §1.98(b))		Filing Date January 3, 2019	Group Art Unit

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PATENT SPECIFICATION

(11) 1364747

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A2C 20CX
A5B 775

(19) THE PATENT OFFICE LONDON

(72) Inventors RICHARD ARNOLD WILSON
MANFRED HUGO VOCK
IRA KATZ and
EDWARD JOSEPH SHUSTER

(54) FLAVORING COMPOSITIONS AND PROCESSES UTILIZING SIX MEMBERED HETEROCYCLIC-POLY-S-COMPOUNDS

(71) We, INTERNATIONAL FLAVORS & FRAGRANCES INC., a corporation organized and existing under the laws of the State of New York, United States of America whose address is 521 West 57th Street, New York, New York 10019, United States of America, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed to be particularly described in and by the following statement:—

This invention has to do with the use of certain trithianes and dithiazines to alter the flavor and aroma of consumable materials.

The term "consumable material" means (1) foodstuffs and beverages, (2) perfumed materials and (3) tobacco.

Examples of foodstuffs to which the present invention may be applied are meats, gravies, soups, convenience foods, nut butters (such as peanut butter) and other spreads, seafoods (including fish, crustaceans and mollusks) confectionery, breakfast foods, baked goods, vegetables, cereals, snack foods and pet foods (such as dog and cat foods).

Examples of beverages to which the invention may be applied are alcoholic and non-alcoholic drinks based on melt, and soft drinks.

Examples of perfumed materials to which the invention may be applied are perfumes, colognes, soaps and after-shave lotions.

The term "tobacco" will be understood herein to mean natural products, for example burley, Turkish tobacco, Maryland tobacco and flue-cured tobacco, and tobacco-based products such as reconstituted or homogenized leaf, as well as tobacco substitutes intended to replace natural tobacco, such as lettuce and cabbage leaves. Examples of tobaccos and tobacco products are those designed or used for smoking such as in cigarette, cigar, and pipe tobacco, as well as such products as snuff and chewing tobacco.

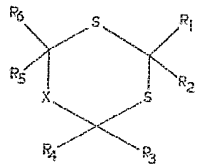
The term "alter" (in its application to foodstuffs and tobacco) in its various forms will be understood herein to mean the supplying or imparting of a flavour character or note to an otherwise bland, relatively tasteless substance, or augmenting an existing flavour characteristic where the natural flavor is deficient in some regard, or supplementing the existing flavor impression to modify the organoleptic character.

There is a continuing search for compositions which can vary, fortify, modify, enhance or otherwise improve (i.e. "alter") the flavor and aroma of a foodstuff. To be fully satisfactory, such compositions should be stable, non-toxic, and blendable with other ingredients to provide their own unique flavor and aroma nuance without detracting from the co-ingredients. Preferably, such compositions should be naturally occurring or present in natural foodstuffs (although unrecognized as flavor components thereof) so that their ingestible safety can be readily recognized. Additionally, these materials should be capable of being synthesized in a simple and economic manner.

Various heterocyclic poly - S - compounds have been shown in the literature to have flavor implications. For example, in United States Letters Patent 3,503,758 to Wada et al, pentathiepane, tetrathiane and tetrathiepane are said to have a flavor and aroma; and Chang in *Chemistry and Industry*, 1639, November 23, 1968, reports 3,5 - dimethyl - 1,2,4 - trithiolane as present in the volatiles of boiled beef. Other investigators have commented that poly alkyl trithianes are odorless or have an intensely putrid odor. See Barch, United States Letters Patent 2,594,379 and Breslav and Skolnik, "Heterocyclic Com-

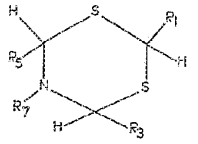
pounds", p. 726, *Interscience* (1966). Pippen in *Journal of Food Science, 34*, p. 443—446 (1969) speculated that H_2S reacted with a carbonyl compound in chicken fat and postulated that 2,4,6 - trimethyl - S - trithiane could be one of the products formed.

It has now been found that the flavor of a foodstuff can be altered by adding thereto at least one heterocyclic poly - S - compound having the formula



wherein X is S or —NR_7—; and (1) when X is S, then R_1, R_3, and R_5 are the same and are alkyl of from 1 to 5 carbon atoms and R_2, R_4, and R_6 are the same and are hydrogen or alkyl from 1 to 5 carbon atoms; or (2) when X is —NR_7—, then R_1, R_3, and R_5 are the same and are alkyl of from 1 to 5 carbon atoms, R_2, R_4, and R_6 are hydrogen, and R_7 is hydrogen or alkyl of from 1 to 5 carbon atoms. The invention also contemplates flavoring compositions containing such heterocyclic poly - S - compounds.

A particularly preferred class of such compounds includes the dithiazines of the formula

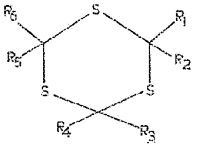


wherein R_1, R_3 and R_5 are the same alkyl radical of 1 to 5 carbon atoms and R_7 is hydrogen or alkyl radical of 1 to 5 carbon atoms. Suitable dithiazines include:

- 2,4,6 - trimethyldihydro - 1,3,5 - dithiazine
- 2,4,5,6 - tetramethyldihydro - 1,3,5 - dithiazine
- 2,4,6 - tri - isopropyldihydro - 1,3,5 - dithiazine
- 2,4,6 - tri - n - butyldihydro - 1,3,5 - dithiazine
- 2,4,6 - tri - isobutyldihydro - 1,3,5 - dithiazine
- 2,4,6 - tri - n - pentyldihydro - 1,3,5 - dithiazine

and mixtures thereof. The dithiazines have a pleasant sweet cereal, nutty taste and are especially suitable for beef, meat, nut and burnt flavors.

Another class of preferred heterocyclic poly - S - compounds include the trithianes having the formula



wherein R_1, R_3, and R_5 are the same and are alkyl of from 1 to 5 carbon atoms and R_2, R_4, and R_6 are the same and are hydrogen or alkyl from 1 to 5 carbon atoms. Suitable trithianes are:

- 2,4,6 - trimethyl - s - trithiane
- 2,2,4,4,6,6 - hexamethyl - s - trithiane
- 2,4,6 - triethyl - s - trithiane
- 2,4,6 - triethyl - 2,4,6 - trimethyl - s - trithiane
- 2,4,6 - tri - t - butyl - s - trithiane
- 2,4,6 - tri - n - butyl - s - trithiane
- 2,4,6 - tri - isopropyl - s - trithiane
- 2,4,6 - tri - n - propyl - s - trithiane
- 2,2,4,4,6,6 - hexaethyl - s - trithiane
- 2,2,4,4,6,6 - hexaisopropyl - s - trithiane
- 2,4,6 - triethyl - 2,4,6 - tri - n - pentyl - s - trithiane

The trithianes have a sweet nutty aroma and taste and are suitable for fruit (gooseberry, black currant, grape, raspberry) nut and meat flavors.

The structural formulae given herein contemplate and include cis- and trans- and other conformational isomers.

The dithiazines are prepared by using conventional processes, such as the methods shown in Beilstein, *27*, pp. 460—462 and 2d *Suppl.*, p. 524. The trithianes are similarly known compounds and can be prepared in a known manner such as that described by Campaigne, *Chem. Reviews, 39*, No. 1, pp. 1—77, August 1946.

Such heterocyclic - poly - S - compounds are useful in flavoring compositions and to alter the flavor of foodstuffs. They are especially adapted for adding sweet, meaty and nut nuances to consumable materials and in rounding out and improving the character and quality of meat flavors.

When the heterocyclic poly - S - compounds according to this invention are used in a flavouring composition, they can be combined with conventional flavouring materials or adjuvants. Such co-ingredients or flavouring adjuvants are well known in the art for such use and have been extensively described in the literature. Apart from the requirement that any such adjuvant material be ingestibly acceptable, and thus non-toxic or otherwise non-deleterious, conventional materials can be

used and broadly include other flavor materials, vehicles, stabilizers, thickeners, surface active agents, conditioners and flavor intensifiers.

Such conventional flavoring materials include saturated and unsaturated fatty and amino acids, alcohols, including primary and secondary alcohols; esters, carbonyl compounds including ketones and aldehydes; lactones, other cyclic organic materials including benzene derivatives, alicyclics, heterocyclics such as furans, pyridines and pyrazines; sulfur-containing materials including thiols, sulfides and disulfides; proteins; lipids; carbohydrates; so-called flavor potentiators such as mono-sodium glutamate, guanylates, and inosinates; natural flavoring materials such as cocoa, vanilla and caramel; essential oils and extracts such as anise oil and clove oil; artificial flavoring materials such as vanillin. Particularly useful flavoring agents and adjuncts are cyclopentane thiol, protein hydrolysate, such as hydrolyzed vegetable protein, cysteine, salts of cysteine such as cysteine hydrochloride, thiamine, salts of thiamine, 2,5 - dimethyl - 3 - hydroxy - 4 - oxo - 4,5 - dihydrofuran, and products resulting from heating a mixture of at least two differing materials of the foregoing and high pressure reaction products of H_2S and 2,5 - dimethyl - 3 - hydroxy - 4 - oxo - 4,5 - dihydrofuran.

Stabilizers include preservatives such as sodium chloride; antioxidants such as calcium and sodium ascorbate, ascorbic acid, butylated hydroxyanisole, butylated hydroxytoluene and propyl gallate; sequestrants such as citric acid, EDTA and phosphates.

Thickeners include carriers, binders, protective colloids, suspending agents and emulsifiers, such as agar-agar, carrageenan, cellulose and cellulose derivatives such as carboxymethyl cellulose and methyl cellulose, natural and synthetic gums such as gum arabic and gum tragacanth, and other proteinaceous materials, lipids, carbohydrates, starches and pectins.

Surface active agents include emulsifying agents such as mono- and/or diglycerides of fatty acids such as caproic acid, caprylic acid, palmitic acid, myristic acid and oleic acid; lecithin; defoaming and flavor-dispersing agents such as sorbitan monostearate, potassium stearate and hydrogenated tallow alcohol.

Conditioners include compounds such as bleaching and maturing agents such as benzoyl peroxide, calcium peroxide and hydrogen peroxide; starch modifiers such as peracetic acid, sodium chlorite, sodium hypochlorite, propylene oxide and succinic anhydride; buffers and neutralizing agents such as sodium acetate, sodium diacid phosphate, ammonium bicarbonate, ammonium phosphate, citric acid, lactic acid and vinegar; colorants such as carminic acid, cochineal, turmeric, curcumin and approved food and drug dyes; firming agents such as aluminum sodium sulfate, calcium chloride and calcium gluconate; texturizers; anti-caking agents such as aluminum calcium sulfate and tribasic calcium phosphate; enzymes, yeast foods such as calcium lactate and calcium sulfate; nutrient supplements such as iron salts (e.g. ferric phosphate, ferric pyrophosphate and ferrous gluconate), riboflavin, vitamins; zinc sources such as zinc chloride and zinc sulfate.

The heterocyclic - poly - S - compounds, or the compositions incorporating them, as mentioned above, can be combined with one or more vehicles or carriers for adding them to the particular product. Vehicles can be edible or otherwise suitable materials such as ethyl alcohol, propylene glycol and water. Carriers include materials such as gum arabic, carrageenan and other gums. The heterocyclic - poly - S - compounds can be incorporated with the carriers by conventional means such as spray-drying and drum drying. Such carriers can also include materials for coacervating the heterocyclic - poly - S - compounds (and other flavoring ingredients, as present) to provide encapsulated products. When the carrier is an emulsion, the flavoring composition can also contain emulsifiers such as mono- and diglycerides of fatty acids. With these carriers or vehicles, the desired physical form of the composition can be prepared.

It will be understood by those skilled in the art that the heterocyclic - poly - S - compounds can be added to the materials to be flavored at any convenient point in the production of the finished product. Thus, when they are used to alter or otherwise vary the flavor of a foodstuff, they can be added in the original mixture (e.g. dough, emulsion or batter), prior to any cooking or heating operation. Alternatively, they can be added at a later stage of processing if volatilization losses would be excessive during the earlier processing.

When the materials are used to treat tobacco products, for example, the additive can be applied in a suitable manner by spraying, dipping or otherwise. The heterocyclic - poly - S - compounds can be applied during the "casing" or final spray treatment of the tobacco, or they can be applied at some earlier stage of curing. The quantity of heterocyclic - poly - S - compounds or mixtures thereof utilized should be sufficient to impart the desired flavor characteristic to the product, but on the other hand, the use of an excessive amount of the heterocyclic - poly - S - compounds is not only wasteful and uneconomical but in some instances too large a quantity may unbalance the flavor or other organoleptic property of the product to be consumed. The quantity used will vary depending upon the ultimate foodstuff, tobacco product, or other consumable product; the

amount and type of flavor initially present in the product; the further process or treatment steps to which the product will be subjected; regional and other preference factors; the type of storage, if any, to which the product will be subjected; and the pre-consumption treatment, such as baking, frying, and so on, given to the product by the ultimate consumer.

It is accordingly preferred that the foodstuff, beverage or tobacco after addition of the compounds used according to the invention should contain from 0.02 parts per million (ppm) to 100 ppm of the heterocyclic - poly - S - compounds. More particularly, in foodstuffs and beverages it is desirable to use from 0.02 to 20 ppm and in certain preferred embodiments of the invention, from 0.1 to 15 ppm of the heterocyclic - poly - S - compounds are included in the finished foodstuff or beverage. On the other hand, tobaccos can contain as little as 0.02 ppm and as much as 100 ppm, depending upon whether a cigarette tobacco, a pipe tobacco, a cigar tobacco, a chewing tobacco, or snuff is being prepared.

All parts, proportions, percentages, and ratios herein are by weight unless otherwise indicated.

The amount of heterocyclic - poly - S - compounds to be utilized in flavoring or flavor-enhancing compositions can be varied over a wide range depending upon a particular quality to be added to the foodstuff, beverage or tobacco. Thus, amounts of one or more heterocyclic - poly - S - compounds according to the present invention from 0.1 up to 80 or 90% can be incorporated in such compositions. It is generally found to be desirable to include from 0.5 to 25% of the heterocyclic - poly - S - compounds in such compositions.

The heterocyclic poly - S - compounds of this invention can also be added to perfume compositions in their pure form or they can be added to mixtures of materials in fragrance-imparting compositions to provide a desired fragrance character to a finished perfume material. The perfume and fragrance compositions obtained according to this invention are suitable in a wide variety of perfumed articles and can also be used to improve, enhance, modify, alter or reinforce fragrance materials. It will thus be appreciated that the heterocyclic poly - S - compounds and mixtures thereof of this invention are useful as olfactory agents and fragrances.

The term "perfume composition" is used herein to mean a mixture of compounds, including for example, natural oils, synthetic oils, alcohols, aldehydes, ketones, esters, lactones, and frequently hydrocarbons which are admixed so that the combined odors of the individual components produce a pleasant or desired fragrance. Such perfume compositions usually contain: (a) the main note or the "bouquet" or foundation-stone of the composition; (b) modifiers which round-off and accompany the main note; (c) fixatives which include odorous substances which lead a particular note to the perfume throughout all stages of evaporation, and substances which retard evaporation; and (d) top-notes which are usually low-boiling, fresh-smelling materials. Such perfume compositions or the novel materials of this invention can be used in conjunction with a perfume base, generally comprising one or more carriers, vehicles, solvents, dispersants, emulsifiers, surface-active agents and/or aerosol propellants. In perfume compositions, the individual components contribute their particular olfactory characteristics, but the overall effect of the perfume composition will usually at least be the sum of the effect of each ingredient. Thus, the heterocyclic poly - S - compounds of this invention can be used to alter the aroma characteristics of a perfume composition, for example, by highlighting or moderating the olfactory reaction contributed by another ingredient of the composition.

The amount of one or more compounds of this invention which will be effective in perfume compositions depends on many factors, including the other ingredients, their amounts and the effects which are desired. It has been found that perfume compositions containing as little as 1.0% by weight of the compounds of this invention, or even less can be used to intensify or augment and enhance various types of fragrance compounds, the odors of which may be desired to be imparted to colognes, perfumes, bath oils and other cosmetic products. The amount employed will depend on considerations of cost, nature of the end product, the effect desired in the finished product, and the particular fragrance sought. Higher concentrations (e.g. 2% by weight) of the heterocyclic - poly - S - compounds of this invention will intensify the green leafy note and green nutty notes of the compositions.

The heterocyclic poly - S - compounds disclosed herein can be used in a composition as an olfactory component of a fragrance which in turn can be used in perfumes, colognes, bath preparations (such as bath oils and bath salts) and the like. When the heterocyclic poly - S - compounds of this invention are used in finished perfumed articles, such as the foregoing, they can be used in amounts of 0.04% by weight or lower.

The following examples are given to illustrate embodiments of the invention as it is presently preferred to practise it. It will be understood that these examples are illustrative, and the invention is not to be considered as restricted thereto except as indicated in the appended claims.

EXAMPLE I

The following materials are homogeneously mixed at 25°C:

Ingredients	Parts
Vegetable shortening	622.7
Salt	321.7
Glutamic acid	5.1
L-Cysteine hydrochloride	10.3
Glycine	5.1
β-Alanine	1.3
Taurine	20.0
Mixture of di-sodium inosinate and di-sodium guanylate	3.3

The mixture is heated at 300°F for thirty seconds. After cooling to 100°F, 0.12 part of diacetyl and 0.10 part of hexanal are added. After aging the resulting mixture for three hours, 0.1 part of 2,4,6 - trimethyldihydro - 1,3,5 - dithiazine is added.

The resulting mixture is aged for ten hours to provide a material having an excellent chicken aroma.

EXAMPLE II

Ingredients	Parts
Vegetable shortening	622.7
Salt	321.7
Glutamic acid	5.1
L-Cysteine hydrochloride	10.3
β-Alanine	1.3
Taurine	20.0
Mixture of di-sodium inosinate and di-sodium guanylate	3.3
2,4,6-trimethyl-s-trithiane	0.1

The mixture is heated to 300°F for thirty seconds. After cooling to 100°F, 0.12 part of diacetyl and 0.10 part of hexanal are added.

The resulting mixture has an excellent chicken aroma.

EXAMPLE III

The following ingredents are homogeneously mixed at 25°C:

Ingredients	Parts
Vegetable shortening	622.7
Salt	321.7
Glutamic acid	5.1
L-Cysteine hydrochloride	10.3
Glycine	5.1
β-Alanine	1.3
Taurine	20.0
Mixture of di-sodium inosinate and di-sodium guanylate	3.3

The mixture is heated to 300°F for thirty seconds. After cooling to 100°F, 0.12 part of diacetyl, 0.10 part of hexanal, and 0.1 part of 2,4,5,6 - tetramethyl - dihydro - 1,3,5 - dithiazine are added.

The resulting mixture has an excellent chicken aroma.

EXAMPLE IV

The following ingredients are homogeneously mixed at 25°C:

Ingredients	Parts
Vegetable shortening	622.7
Salt	321.7
Glutamic acid	5.1
L-Cysteine hydrochloride	10.3
Glycine	5.1
β-Alanine	1.3
Taurine	20.0
Mixture of di-sodium inosinate and di-sodium guanylate	2.0

The mixture is heated to 300°F for sixty seconds. After cooling to 100°F, 0.12 part of diacetyl and 0.10 part of hexanal are added. After aging the mixture for a period of three hours at a temperature of 65°F, 0.1 part of 2,4,6 - triethyl - 2,4,6 - tri - n - pentyl - s - trithiane are added. The resulting mixture is then aged for ten hours to yield a composition having an excellent chicken aroma and flavor.

EXAMPLE V

Cysteine hydrochloride in the amount of 8.8 g is refluxed at 215°F under atmospheric pressure for four hours with a mixture of 309 g of hydrolyzed vegetable protein and 674 g of water. Subsequent to the reflux, the mixture is cooled and 0.05 g of 2,4,6 - trimethyldihydro - 1,3,5 - dithiazine is added and intimately admixed with the composition. The mixture has an excellent beef flavor.

EXAMPLE VI

Cyclopentane thiol and 2,2,4,4,6,6 - hexamethyl - s - trithiane (1:1 mole ratio) in the amount of 0.05 g. are refluxed at 215°F under atmospheric pressure for four hours with the following premix composition:

Ingredients	Amount
Hydrolyzed vegetable protein (Maggi 4BE)	309 g
Water	674 g
Thiamine-HCl	8.8 g
Cysteine-HCl	8.8 g

(The word "Maggi" is a Registered Trade Mark).

Subsequent to the reflux period, the resulting mixture is aged for 72 hours at 60—75°C. The mixture has an excellent beef aroma.

EXAMPLE VII

2,4,6 - Trimethyl - s - trithiane in the amount of 0.05 g is refluxed at 215°F under atmospheric pressure for four hours with the following pre-mix composition:

Ingredients	Amount
Hydrolyzed vegetable protein (Maggi 4BE)	309 g
Cysteine-HCl	8.8 g
Thiamine-HCl	8.8 g
Water	674 g

Subsequent to the reflux, the resulting mixture is aged for 72 hours at 60—75°C. The mixture has an excellent beef aroma.

EXAMPLE VIII

The composition prepared in Example I is dissolved in propylene glycol to provide a 0.1% solution. This solution in the amount of 0.966 g is added to 7.3 g of a soup base consisting of:

Ingredients	Parts
Fine ground sodium chloride	35.62
Hydrolyzed vegetable protein	27.40
Monosodium glutamate	17.81
Sucrose	10.96
Beef fat	5.48
Sethness caramel color (powder B & C)	2.73

The resulting mixture is added to 12 ounces of boiling water to obtain a soup having an excellent chicken flavor.

The composition of Example VI (0.005 g) when added to the above soup base also provides a soup having good meat flavor.

EXAMPLE IX

The composition prepared in Example V is dissolved in propylene glycol to provide a 0.1% solution. This solution in the amount of 0.966 g is added to 7.3 g of a soup base consisting of:

Ingredients	Parts
Fine ground sodium chloride	35.62
Hydrolyzed vegetable protein (Maggi 4BE)	27.40
Monosodium glutamate	17.81
Sucrose	10.96
Beef fat	5.48
Caramel color, bakers and confectioner's powder grade	2.73

The resulting mixture is added to 12 ounces of boiling water to obtain a soup having an excellent chicken flavor.

The composition of Example II (0.005 g) when added to the above soup base also provides a soup having good meat flavor.

EXAMPLE X

One-half gram of the soup base mixture of Example VIII is emulsified in a solution containing 100 g gum arabic and 300 g water. The emulsion is spray-dried with a Bowen Lab Model Drier utilizing 250 cfm of air with an inlet temperature of 500°F, an outlet temperature of 200°F, and a wheel speed of 50,000 rpm.

Twelve grams of the spray-dried material is mixed with 29.2 g of the soup base set forth in Example VIII. The resulting mixture is then added to 12 ounces of boiling water, and an excellent meat flavored soup is obtained.

EXAMPLE XI

Example I is repeated except that the dithiazine is replaced by .003 part of a mixture comprising the following ingredients:

Ingredients	Parts
2,4,6-trimethyl dihydro-1,3,5-dithiazine	10
2,4,6-trimethyl-s-trithiane	26
Corn Oil	50
Gum arabic	20

The resulting mixture has an excellent meat flavor.

EXAMPLE XII

Preparation of Perfume Composition Containing 2,4,6 - Trimethyl - S - Trithiane

The following composition is prepared:

Ingredients	Parts by Weight
2,4,6-trimethyl-s-trithiane	4
Benzyl butyrate	4
Bois de Rose	10
Citronellyl formate	30
Citronellyl acetate	20
Geraneol coeur	200
Citronellol coeur	300
Menthone	5
Menthol natural	5
Rose oxide	10
Geranyl acetate	30
Dimethyl Benzylcarbinyl-acetate	2
	620

The addition of the 2,4,6 - trimethyl - s - trithiane in the quantity given imparts a green leafy note similar to that of natural geranium Bourbon to the composition without detracting from the quality of the odor.

EXAMPLE XIII

The following formulations are produced:

Formulation A

1.9 gm Natural black currant juice, concentrate
0.1 gm Natural black currant esters
10.0 ml Sugar Syrup 32°Be
q.s. 100 ml Spring water

Formulation B
1.9 gm Natural black currant juice, concentrate
0.1 gm Buchu leaf oil 0.1% (ethanol 95%)
10.0 ml Sugar Syrup 32°Be
q.s. 100 ml Spring water

Formulation C
1.9 gm Natural black currant juice, concentrate
0.1 gm Niribine* 10% (ethanol 95%)
10.0 ml Sugar Syrup 32°Be
q.s. 100 ml Spring water

*Niribine is produced by distilling an alcoholic macerate of black currant buds.

Formulation D
1.9 gm Natural black currant juice, concentrate
0.1 gm 2,4,6 - trimethyl - s - trithiane 0.1% (ethanol 95%)
10.0 ml Sugar Syrup 32°Be
q.s. 100 ml Spring water

Formulation E
1.9 gm Natural black currant juice, concentrate
0.1 gm 2,4,6 - trimethyl - s - trithiane 0.01% (ethanol 95%)
q.s. 100 ml Spring water

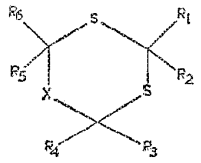
Formulation F
1.9 gm Natural black currant juice, concentrate
10.0 ml Sugar Syrup 32°Be
q.s. 100 ml Spring water

Each of the above-mentioned formulations is compared with one another by a panel composed of 10 tasters. Formulation F is generally considered by the panel to be flat and not very characteristic for fresh black currant. Formulations B, C, D and E are considered as having substantially fresh and more pleasant notes than formulation F. In summary, formulations D and E were preferred as the best black currant juice formulations. In conclusion, for use in black currant flavor, the material 2,4,6 - trimethyl - s - trithiane can be used at rates of one-tenth of that of Buchu leaf oil in black currant juice.

It is further to be concluded that 2,4,6 - trimethyl - s - trithiane can successfully replace Buchu leaf oil, Niribine and/or natural black currant esters wherever the ingredient is used in reinforced black currant juices, substituted black currant juices and imitation black currant flavors.

WHAT WE CLAIM IS:—

1. A method for altering the flavour or aroma of a consumable material which comprises adding to the consumable material a compound of the general formula:—



in which X is S or —NR_7; and

(1) when X is S, then R_1, R_3 and R_5 are the same and are alkyl groups of from 1 to 5 carbon atoms and R_2, R_4 and R_6 are the same and are hydrogen atoms or alkyl groups of from 1 to 5 carbon atoms; or

(2) when X is NR_7, then R_1, R_3 and R_5 are the same and are alkyl groups of from 1 to 5 carbon atoms, R_2, R_4 and R_6 are hydrogen atoms, and R_7 is a hydrogen atom or an alkyl group of from 1 to 5 carbon atoms.

2. A method according to claim 1 in which X is —NH and each of R_1, R_3 and R_5 is an alkyl group having from 1 to 5 carbon atoms.

3. A method according to claim 2 in which R_1, R_3 and R_5 are methyl groups.

4. A method according to claim 1 in which X is S, and each of R_2, R_4 and R_6 is an alkyl group having from 1 to 5 carbon atoms.

5. A method according to claim 4 in which X is S; R_1, R_3 and R_5 are methyl groups and R_2, R_4 and R_6 are hydrogen atoms.

6. A method according to claim 4 in which R_1, R_2, R_3, R_4, R_5 and R_6 are all methyl groups.

7. A method according to claim 1 in which X is S and R_2, R_4 and R_6 are hydrogen atoms.

8. A method according to claim 1 in which the compound is one of those hereinbefore specifically mentioned.

9. A method according to any preceding claim in which the final concentration of the said compound in the material is 0.02 to 100 ppm.

10. A method according to claim 9 in which the final concentration of the said compound of the material is 0.1 to 15 ppm.

11. A method according to any preceding claim in which the material is a foodstuff.

12. A method according to any preceding claim in which the foodstuff is one of those hereinbefore specifically mentioned.

13. A method according to claim 11 or 12 in which the foodstuff is a reinforced, substituted or imitation black currant juice and the compound is 2,4,6 - trimethyl - S - trithiane.

14. A method according to claim 11 or 12 in which the foodstuff comprises hydrolysed vegetable protein.

15. A method according to any of claims 1 to 10 in which the material is tobacco.

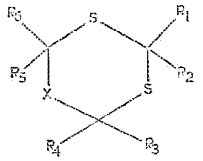
16. A method according to any of claims 1 to 10 in which the material is a perfume base.

17. The method of any of claims 1 to 10 in which the material is a toilet preparation.

18. A method according to claim 1 for altering the flavour or aroma of a consumable material substantially as hereinbefore described in the Examples.

19. Consumable materials having a flavour or aroma altered by the method of any preceding claim.

20. A flavouring composition containing an organoleptically modifying amount of a compound of the general formula:—



in which X is S or —NR_7; and

(1) when X is S, then R_1, R_3 and R_5 are the same and are alkyl groups of from 1 to 5 carbon atoms and R_2, R_4 and R_6 are the same and are hydrogen atoms or lower alkyl groups of from 1 to 5 carbon atoms; or

(2) when X is —NR_7, then R_1, R_3 and R_5 are the same and are alkyl groups of from 1 to 5 carbon atoms, R_2, R_4 and R_6 are hydrogen atoms, and R_7 is a hydrogen atom or an alkyl group of from 1 to 5 carbon atoms; and an auxiliary flavouring adjuvant.

21. A composition according to claim 20 in which X is —NH— and each of R_1, R_3 and R_5 is an alkyl group having from 1 to 5 carbon atoms.

22. A flavouring composition according to claim 21 in which R_1, R_3 and R_5 are methyl groups.

23. A flavouring composition according to claim 20 in which X is S and each of R_1, R_3 and R_5 is an alkyl group having from 1 to 5 carbon atoms.

24. A flavouring composition according to claim 23 in which R_1, R_2, R_3, R_4, R_5 and R_6 are all methyl groups.

25. A flavouring composition according to claim 23 in which R_1, R_3 and R_5 are methyl groups and R_2, R_4 and R_6 are hydrogen atoms.

26. A flavouring composition according to claim 20 in which X is S and R_2, R_4 and R_6 are hydrogen atoms.

27. A flavouring composition according to claim 20 in which the compound is one of those hereinbefore specifically mentioned.

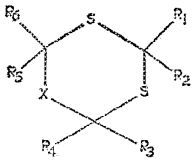
28. A composition according to any of claims 20 to 27 in which the adjuvant is a further flavouring material, a vehicle, a stabiliser, a thickener, a surfactant, a conditioner or a flavour intensifier.

29. A composition according to claim 28 in which the adjuvant is one of those hereinbefore specifically mentioned.

30. Flavouring compositions according to claim 20 substantially as hereinbefore described in the Examples.

31. A method according to any of claims 1 to 19 in which the compound is added in the form of a flavouring composition according to any of claims 20 to 30.

32. A perfume composition containing an organoleptically modifying amount of a compound of the general formula:—



in which X is S or —NR_7—; and

(1) when X is S, then R_1, R_3 and R_5 are the same and are alkyl groups of from 1 to 5 carbon atoms and R_2, R_4 and R_6 are the same and are hydrogen atoms or alkyl groups of from 1 to 5 carbon atoms; or

(2) when X is —NR_7—; then R_1, R_3 and R_5 are the same and are alkyl groups of from 1 to 5 carbon atoms, R_2, R_4 and R_6 are hydrogen atoms, and R_7 is a hydrogen atom or an alkyl group of from 1 to 5 carbon atoms; and an auxiliary perfume adjuvant.

33. A composition according to claim 32 in which the compound is one of those hereinbefore specifically mentioned.

34. A composition according to claim 32 or 33 in which the adjuvant is one of those hereinbefore specifically mentioned.

35. Perfume compositions according to claim 34 substantially as hereinbefore described in the Examples.

For the Applicants,
CARPMAELS & RANSFORD,
Chartered Patent Agents,
43 Bloomsbury Square,
London, WC1A 2RA.

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Espacenet

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PASTA AND METHOD FOR PRODUCING THE SAME

Inventor(s): NISHIWAKI KEISUKE; ISHIBASHI HIDEAKI ± (NISHIWAKI KEISUKE, ; ISHIBASHI HIDEAKI)

Applicant(s): NIPPON FLOUR MILLS ± (NIPPON FLOUR MILLS CO LTD)

Classification: **- international:** ***A23L7/109;*** (IPC1-7): A23L1/16
- cooperative:

Application number: JP20000166646 20000602

Priority number(s): JP20000166646 20000602

Abstract of JP2001346533 (A)

PROBLEM TO BE SOLVED: To obtain pasta with good palate feeling. SOLUTION: The method for producing pasta is characterized by comprising the following process: a chip-like dough is produced by extruding a dough 25-45 wt.% in water content after kneading under a reduced pressure, i.e., >=55 kPa less than the atmospheric pressure, and the chip-like dough thus produced is kneaded again and extruded.

Espacenet

Bibliographic data: JP2001037434 (A) — 2001-02-13

FROZEN COOKED FOOD AND ITS PRODUCTION

Inventor(s): ISHII SHOJI ± (ISHII SHOJI)

Applicant(s): FUJI SHOKUHIN KK ± (FUJI SHOKUHIN:KK)

Classification: **- international:** ***A23L23/00; A23L3/36; A23L35/00; A23L7/10; A23L7/109;*** (IPC1-7): A23L1/10; A23L1/16; A23L1/39; A23L1/48; A23L3/36
- cooperative:

Application number: JP19990211469 19990727

Priority number(s): JP19990211469 19990727

Abstract of JP2001037434 (A)

PROBLEM TO BE SOLVED: To obtain a frozen cooked food producible in high efficiency and having the appearance and palatability of newly cooked food by bringing a cooked main food material into contact with a gelatinous seasoning liquid added with gelatin and filling the mixture in a package. SOLUTION: (A) A main food material such as cooked noodle, pasta or rice is filled in a package in a state contacting with (B) a gelatinous seasoning liquid obtained by adding gelatin to a seasoning liquid such as sauce or soup. When the objective food is e.g. chow mein, the steamed noodle for chow mein is prepared first, the noodle is mixed with a seasoning sauce, ingredients, oil, etc., and the mixture is heat-treated to sufficiently fry the noodle and cooled to normal temperature. Separately, a sauce same as or similar to the above seasoning sauce is incorporated with gelatin and cooled to solidify the sauce in gelatinous state. A prescribed amount of the cooked chow mein 4 is brought into contact with a prescribed amount of the gelatinous sauce 5, filled in a package 1 and frozen to obtain the objective frozen food.

Espacenet

Bibliographic data: JP2002101835 (A) — 2002-04-09

METHOD FOR PRODUCING NOODLES AND NOODLE QUALITY IMPROVER

Inventor(s): KAWAI TAKANORI; HANEKI TAKASHI; KONDO KEIICHI; YOKOTA YUURI; SAKIDA SHUICHIRO; MORIMOTO ERIKO; KAWAI AKIFUSA; YAMAZAKI NAGAHIRO ± (KAWAI TAKANORI, ; HANEKI TAKASHI, ; KONDO KEIICHI, ; YOKOTA YUURI, ; SAKIDA SHUICHIRO, ; MORIMOTO ERIKO, ; KAWAI AKIFUSA, ; YAMAZAKI NAGAHIRO)

Applicant(s): TAIYO KAGAKU KK ± (TAIYO KAGAKU CO LTD)

Classification: **- international:** ***A23L7/109;*** (IPC1-7): A23L1/16
- cooperative:

Application number: JP20010226061 20010726

Priority number(s): JP20010226061 20010726 ; JP20000224717 20000726

Abstract of JP2002101835 (A)

PROBLEM TO BE SOLVED: To provide a method for producing noodles good in taste of the noodles, having a moderate hardness, elasticity (viscoelasticity), chewiness and smoothness (smooth feeling) with texture good in throat passage and scarcely losing firmness with hot water and by boiling without deteriorating the taste of the noodles and to obtain a quality improver for the noodles and the noodles capable of maintaining the texture even during the production or after storage thereof not only in the noodles eaten just after cooking but also in cooked noodles, raw type instant noodles (hereinafter referred to LL noodles), frozen noodles or instant noodles. SOLUTION: A vegetable protein or a milk protein having <=20 [mu]m average particle diameter is added.

Espacenet

Bibliographic data: JP2009284893 (A) — 2009-12-10

SEASONING LIQUID IMPARTING BAKING FLAVOR, STEAMED NOODLE COATED WITH THE SAME, AND METHOD FOR PRODUCING THE SAME

Inventor(s): SHIIBASHI YUSUKE; KAWADA RYOICHI; HIRAKAWA TOSHIAKI; NASU YASUNOBU; OTA KEIJI ± (SHIIBASHI YUSUKE, ; KAWADA RYOICHI, ; HIRAKAWA TOSHIAKI, ; NASU YASUNOBU, ; OTA KEIJI)

Applicant(s): SHIMADAYA CORP ± (SHIMADAYA CORP)

Classification: **- international:** ***A23L27/00; A23L7/109***
- cooperative:

Application number: JP20080167927 20080530 Global Dossier

Priority number(s): JP20080167927 20080530

Also published as: JP4993216 (B2)

Abstract of JP2009284893 (A)

PROBLEM TO BE SOLVED: To provide steamed noodles coated with a seasoning liquid, making a nice-smelling baking flavor by heating in a microwave oven compatible with a smooth texture of just boiled raw noodles. ;SOLUTION: The top surface of a lump of steamed noodles is coated with a whipped seasoning liquid obtained by dissolving a reducing sugar activating an aminocarbonylation reaction by being heated, and gelatin as a gelling agent in a seasoning liquid containing a protein hydrolyzate and heating, and then whipping while cooling. Since flowing down into gaps of the noodles is hardly caused even after heating and melting, and heat is readily generated by heating in a microwave oven to obtain the nice-smelling baking flavor in a short time, the steamed noodles are not excessively heated. ;COPYRIGHT: (C)2010,JPO&INPIT

Espacenet

Bibliographic data: JPH0970272 (A) — 1997-03-18

INSTANT NOODLE

Inventor(s): INAOKA TOKIJIROU; FUKITA TOMOHIRO; SHIIBA DAISUKE; KAMEO YOJI; GENJI MIWA; KOMIKADO MASANORI ± (INAOKA TOKIJIROU, ; FUKITA TOMOHIRO, ; SHIIBA DAISUKE, ; KAMEO YOJI, ; GENJI MIWA, ; KOMIKADO MASANORI)

Applicant(s): KAO CORP ± (KAO CORP)

Classification: **- international:** ***A23L7/109; A23L7/113;*** (IPC1-7): A23L1/16; A23L1/162
- cooperative:

Application number: JP19950226323 19950904

Priority number(s): JP19950226323 19950904

Abstract of JPH0970272 (A)

PROBLEM TO BE SOLVED: To obtain instant noodle having excellent instant cookability and resembling genuine noodle in taste and palatability by adding a diglycerol disaturated fatty acid ester to raw material flour, kneading the mixture, forming to noodle form and gelatinizing the noodle. SOLUTION: Raw material flour produced by mixing wheat flour with potato starch in the form of powder is incorporated with a diglycerol fatty acid ester composition containing >=80wt.% of a diglycerol saturated fatty acid ester having a structure obtained by esterifying either one of a terminal hydroxyl group or adjacent hydroxyl group of diglycerol and either one of the other terminal hydroxyl group or adjacent hydroxyl group with a saturated fatty acid, the mixture is kneaded after the addition of salt and water, the prepared noodle dough is formed by a roll mill, the obtained noodle strip is slit to noodle strings with a disk blade and the strings are gelatinized and dried to obtain the objective instant noodles having excellent instant cookability and resembling genuine noodles in the taste and palatability.

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(71) 出願人 (米国を除く全ての指定国について): 日清フーズ株式会社(NISSHIN FOODS INC.) [JP/JP]; 〒1018441 東京都千代田区神田錦町一丁目２５番地 Tokyo (JP).

(72) 発明者; および
(75) 発明者/出願人 (米国についてのみ): 味谷 陽一郎(MIYA, Youichirou) [JP/JP]; 〒3568511 埼玉県ふじみ野市鶴ケ岡五丁目３番１号 日清フーズ株式会社 開発センター 食品研究所内 Saitama (JP). 山口 ひとみ(YAMAGUCHI, Hitomi) [JP/JP]; 〒3568511 埼玉県ふじみ野市鶴ケ岡五丁目３番１号 日清フーズ株式会社 開発センター 食品研究所内 Saitama (JP). 鍛治尾 房樹(KAJIO, Fusaki) [JP/JP]; 〒1038544 東京都中央区日本橋小網町１９番１２号 日清フーズ株式会社 開発センター 食品研究所内 Tokyo (JP).

(74) 代理人: 特許業務法人アルガ特許事務所(THE PATENT CORPORATE BODY ARUGA PATENT OFFICE); 〒1030013 東京都中央区日本橋人形町１丁目３番８号 沢の鶴人形町ビル Tokyo (JP).

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添付公開書類:
— 国際調査報告（条約第21条(3)）

(54) Title: FROZEN PASTA

(54) 発明の名称 : 冷凍パスタ

(57) Abstract: Provided is a frozen pasta in which the original flavor of the pasta is retained. A frozen pasta characterized by having a ground product of a pasta and/or a durum wheat flour attached thereon. A process for producing a frozen pasta, characterized by comprising cooling a cooked pasta, attaching a ground product of a pasta and/or a durum wheat flour on the surface of the pasta, and then freezing the resultant product.

(57) 要約: パスタ本来の風味が保持されている冷凍パスタの提供。パスタ粉砕物及び／又はデュラム小麦粉が付着していることを特徴とする冷凍パスタ。茹で処理したパスタを冷却した後、その表面にパスタ粉砕物及び／又はデュラム小麦粉を付着させて、冷凍することを特徴とする冷凍パスタの製造方法。

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明　細　書

発明の名称 ： 冷凍パスタ

技術分野

[0001]　本発明は、パスタ本来の風味が保持されている冷凍パスタ及びその製造方法に関する。

背景技術

[0002]　従来、冷凍パスタとしては、茹で上げた乾燥パスタを冷却し、その後冷凍することにより製造されたものが一般に提供されている。斯かる従来の冷凍パスタの製造過程においては、茹で上げたパスタを、通常水で冷却しているが、この場合、冷却の際に、パスタからパスタの風味が抜けてしまうことがあり、特に十分な冷却が求められる冷凍パスタにおいては、それが顕著であった。そのため、従来の冷凍パスタは、これを解凍して喫食しても、茹で上げたパスタと比較して、パスタ本来の風味に劣るという問題があった。

[0003]　パスタの風味を増強する方法としては、例えば、粉砕デンプン生成物、デンプン、乳化剤、ゲル化剤及び風味付け組成物と軟水を含む混合物を押し出し加工してパスタに成形し、これをカルシウム水溶液に接触させ、ついで乾燥させることを特徴とする、風味付けパスタの製造法などが提案されている（特許文献１）。

[0004]　しかしながら、上記特許文献１の方法で製造されたパスタも、風味付け組成物が麺生地として混合されているため、これを用いて冷凍パスタを製造すると、やはり水冷中にパスタの風味が抜けてしまうことが避けられなかった。そのため、製造した冷凍パスタを解凍して喫食すると、茹で上げたパスタと比較して、パスタ本来の風味に劣り、満足のいくものが得られないのが実状であった。

先行技術文献

特許文献

[0005] 特許文献1：特開平４－２６２７５４号公報

発明の概要

[0006] 本発明は、パスタ粉砕物及び／又はデュラム小麦粉が付着していることを特徴とする冷凍パスタを提供する。

また本発明は、茹で処理したパスタを冷却する工程と、該パスタの表面にパスタ粉砕物及び／又はデュラム小麦粉を付着させる工程と、該パスタを冷凍する工程とを含む、冷凍パスタの製造方法を提供する。

発明を実施するための形態

[0007] 本発明は、解凍して喫食するときに、茹で立てのパスタのようなパスタ本来の風味を保持している冷凍パスタを提供する。

[0008] 本発明者らは、種々研究を重ねた結果、茹で処理したパスタを冷却した後、その表面に、パスタ粉砕物及び／又はデュラム小麦粉を付着させて、冷凍すれば、極めて良い結果が得られることを見出し、本発明を完成した。

[0009] 本発明によれば、解凍して喫食するときに、茹で立てのパスタのようなパスタ本来の風味を保持している冷凍パスタを提供することができる。

[0010] 本発明の冷凍パスタ類の製造方法においては、まず、パスタを茹で処理する。ここに用いられるパスタとしては、デュラム小麦粉を原料とするパスタであれば、特に制限されず、スパゲティ等のロングパスタ；マカロニ、ペンネ等のショートパスタ；ラザニア；ラビオリ等のあらゆる種類のパスタが挙げられる。当該パスタは、乾燥パスタでも、半生パスタでも、生パスタでもよく、また、必要に応じて、肉や野菜等の具材、又は調味料等が包み込まれているか、あるいは練り込まれているものであってもよい。

[0011] パスタの茹で処理は、茹でた後のパスタが、茹でる前のパスタ１００質量部に対して、乾燥パスタの場合は２２０～２４５質量部（いわゆる歩留まり２２０～２４５％）程度になるように、半生パスタ又は生パスタの場合は２００～２３０質量部（いわゆる歩留まり２００～２３０％）程度になるように茹でると、喫食時の食感が向上するため好ましい。さらに、パスタを茹でる際には、食塩を添加して茹でたほうが、パスタの組織が引き締まり、パスタの食感がさらに向上するため好ましい。

[0012] 次に、茹で処理したパスタを冷却する。冷却は、水冷、風冷等の任意の方法により行うことができるが、冷却されたパスタ類の喫食時の食感がより向上するため、水冷が好ましい。水冷の際には、１５～２５℃程度の常温の水で冷却しても問題ないが、０℃～１０℃程度の冷水で冷却したほうが、パスタの組織が引き締まることにより喫食時の食感が向上するため、好ましい。パスタを冷却する時間は、パスタの組織を引き締めて喫食時の食感を向上させる観点から、３０～２４０秒程度が好ましい。

[0013] 次いで、冷却されたパスタの表面に、パスタ粉砕物及び／又はデュラム小麦粉を付着させる。パスタ粉砕物は、パスタを粉砕することにより得ることができる。当該パスタ粉砕物としては、デュラム小麦粉を原料とするパスタの粉砕物であれば、特に制限されず、スパゲティ等のロングパスタ；マカロニ、ペンネ等のショートパスタ；ラザニアなどのあらゆる種類のパスタの粉砕物が挙げられる。当該パスタ粉砕物は、乾燥パスタの粉砕物でも、生パスタ若しくは半生パスタの粉砕物でもよいが、パスタ本来の風味を保持する上で、乾燥パスタを粉砕したものが好ましい。粉砕物の粒径は、１ｍｍ以下であることが、パスタ表面への付着性の点から見て好ましい。

また、デュラム小麦粉としては、特に制限はなく、公知のデュラム小麦粉を用いることができる。

[0014] 上記パスタ粉砕物とデュラム小麦粉は、そのいずれか一方だけを含んでいてもよく、あるいは両方を含んでもよいが、パスタ本来の風味を保持する上で、少なくともパスタ粉砕物を含んでいるのが好ましい。また好ましくは、上記パスタ粉砕物とデュラム小麦粉は、α化されている。

[0015] 上記パスタ粉砕物及び／又はデュラム小麦粉をパスタ表面に付着させる手段は、特に限定されないが、水と上記パスタ粉砕物及び／又はデュラム小麦粉とを混合して調製したコーティング液を用いるのが、特に簡便で効果的であるため好ましい。

好ましくは、当該コーティング液は、水とパスタ粉砕物及び／又はデュラム小麦粉とを混合し、加熱することにより調製される。この加熱により、当

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該コーティング液に含まれるパスタ粉砕物及び／又はデュラム小麦粉をα化させてもよい。

上記コーティング液中のパスタ粉砕物及び／又はデュラム小麦粉の含有量は、コーティング液の全質量に対して、１～１５質量％が好ましく、５～１０質量％がより好ましい。含有量が１質量％未満であると、多くのコーティング液を付着させなければならず、結果としてパスタが液を吸って柔らかくなり、風味及び食感が低下する。他方、含有量が１５質量％を超えると、コーティング液の粘性が高くなるため操作性が低下したり、コーティング液が量が少ないためパスタ全体に付着させにくくなることがある。

また、当該コーティング液中には、更に食塩、糖類等を配合してもよい。

[0016] 斯かるコーティング液をパスタ表面に付着させる手段としては、パスタ表面全体にコーティング液を付着させることができる手段であれば特に限定されず、噴霧、塗布、浸漬等の任意の手段が挙げられる。このうち、経済性及び簡便性の点からは、噴霧が好ましい。

[0017] パスタ粉砕物及び／又はデュラム小麦粉をパスタ表面に付着させる量としては、冷凍前の茹でパスタ１００質量部に対して、０．１～２．０質量部、好ましくは０．２５～２．０質量部、より好ましくは０．５～２．０質量部を付着させればよい。付着させる量が０．１質量部未満であると、解凍して喫食した際の風味に劣り、他方、２．０質量部を超えると、パスタの食感が悪くなることがある。

上記コーティング液を用いる場合、パスタに付着させるべきパスタ粉砕物及び／又はデュラム小麦粉の量と、コーティング液中のそれらの含有量とを考慮して、使用すべきコーティング液の量を決定する。茹でパスタ１００質量部に対して１～２０質量部、好ましくは１～１５質量部程度の液量となるように、コーティング液の濃度を調整することが望ましい。

[0018] 次いで、パスタ粉砕物及び／又はデュラム小麦粉を付着させたパスタを冷凍することにより、本発明の冷凍パスタを製造することができる。パスタを冷凍する温度は、約－１０℃以下であればよい。あるいはさらに、このよう

にして得られた冷凍パスタに水を噴霧し、その後再冷凍してもよい。当該水の噴霧及び再冷凍により、電子レンジで再加熱調理をする際にパスタの過加熱を防止することができるとともに、付着させたパスタ粉砕物及び／又はデュラム小麦粉をパスタ表面に閉じ込めて脱落を防ぐことができるので、パスタ本来の風味をより向上させることができる。噴霧する水の量は、茹でパスタ１００質量部に対して１～２０質量部、好ましくは１～１５質量部程度であればよい。

[0019] 本発明の製造方法により得られた冷凍パスタは、解凍し、必要に応じて味付けして、喫食されるものである。解凍の方法は、湯せん、電子レンジ加熱等、特に限定されないが、電子レンジ加熱が簡便であり好ましい。斯くして解凍された冷凍パスタを喫食すれば、茹で立てのパスタのようなパスタ本来の風味を味わうことができる。

実施例

[0020] 以下、実施例を挙げて、本発明をさらに詳細に説明するが、本発明はこれらの実施例にのみ限定されるものではない。

[0021] 製造例　コーティング液

デュラム小麦粉（日清製粉（株）製「デュエリオ」）、又は乾燥パスタ（日清フーズ（株）製「ブルー」：直径１．７ｍｍ、長さ２５０ｍｍ）を粒径が１ｍｍ以下になるように粉砕して得られたパスタ粉砕物を、水と混合した。得られた混合物を１００℃になるまで加熱して、デュラム小麦粉又はパスタ粉砕物をα化させた。加熱した混合物に水を添加して混合物中におけるデュラム小麦粉又はパスタ粉砕物の含有量が以下の表１に記載の量になるように調整し、コーティング液を得た。

[0022] [表1]

含有量（質量%）	コーティング液				
	1	2	3	4	5
デュラム小麦粉	0	5	10	0	0
パスタ粉砕物	0	0	0	5	10

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[0023] 試験例１

（１）乾燥パスタ（日清フーズ（株）製「ブルー」：直径１．７ｍｍ、長さ２５０ｍｍ）２００ｇを２Ｌの沸騰水に入れ、９分間茹でた後、５℃に冷却して、歩留まり２４０％の茹でパスタを調製した。次いで、該茹でパスタ２００ｇを容器に充填し、その上から上記コーティング液１～５のいずれかを１０ｇ噴霧して、該パスタの表面全体に該コーティング液を満遍なく付着させた後、該パスタを－３０℃の冷凍庫に入れて完全に凍結させ、冷凍パスタを製造した（実験例１～５）。

[0024] （２）比較のため、上記と同じ乾燥パスタ（日清フーズ（株）製「ブルー」）２００ｇを２Ｌの沸騰水に入れて９分間茹で、茹で直後のパスタを製造した（参考例１）。

[0025] （３）実験例１～５の冷凍パスタを１晩冷凍庫で保存した後、電子レンジ（５００Ｗ）で７０℃まで加熱解凍し、調理後の風味を以下の評価基準で評価した。同じ評価基準で参考例１の茹で直後のパスタの風味も評価した。評価結果を表２に示す。なお、評価の数値は、１０名のパネラーによる平均値で示した。

[0026] 評価基準

風味

５：茹でた直後のパスタの風味が感じられる

４：茹でた直後のパスタとほぼ同等の風味が感じられる

３：茹でた直後のパスタの風味がやや感じられる

２：茹でた直後のパスタの風味がほのかに感じられる

１：茹でた直後のパスタの風味があまり感じられない

[0027]

[表2]

実験例	コーティング液	デュラム小麦粉又はパスタ粉砕物（茹でパスタ100質量部当りの質量部）		評価項目 風味
1	1	–	0	1.3
2	2	デュラム小麦粉	0.25	3.3
3	3	デュラム小麦粉	0.50	3.8
4	4	パスタ粉砕物	0.25	4.3
5	5	パスタ粉砕物	0.50	4.6
参考例1（茹で直後）	–	–	–	5.0

[0028] 試験例２

表３の組成で製造例と同様の手順により調製したコーティング液を用いて、試験例１（１）と同様の手順で冷凍パスタ（実験例６～１１）を製造した。製造した冷凍パスタを試験例１（３）と同様の手順で評価した。評価結果を表４に示す。尚、表４中には、試験例１における実験例１、４及び５、ならびに参考例１の評価結果を併せて記した。

[0029] [表3]

コーティング液（パスタ粉砕物10質量%含有）	6	7	8	9	10	11
噴霧量(g/茹でパスタ100g)	1	2.5	7.5	10	15	20

[0030] [表4]

実験例	コーティング液	デュラム小麦粉又はパスタ粉砕物（茹でパスタ100質量部当りの質量部）		評価項目 風味
1	1	–	0	1.3
6	6	パスタ粉砕物	0.10	4.0
7	7	パスタ粉砕物	0.25	4.2
4	4	パスタ粉砕物	0.25	4.3
5	5	パスタ粉砕物	0.50	4.6
8	8	パスタ粉砕物	0.75	4.6
9	9	パスタ粉砕物	1.00	4.7
10	10	パスタ粉砕物	1.50	4.8
11	11	パスタ粉砕物	2.00	4.8
参考例1（茹で直後）	–	–	–	5.0

[0031] 試験例３

試験例１（１）と同様の手順でコーティング液４及び５をそれぞれ付着させた冷凍パスタを製造した。その後、該冷凍パスタに水５ｇを噴霧し、－３０℃の冷凍庫にて再冷凍して、再冷凍パスタを製造した（実験例１２～１３）。

これらの再冷凍パスタを、試験例１（３）と同様の手順で評価した。結果を表５に示す。尚、表５中には、試験例１における実験例４、５及び参考例１の評価結果を併せて記した。

[0032] [表5]

実験例	コーティング液	デュラム小麦粉又はパスタ粉砕物（茹でパスタ100質量部当りの質量部）		評価項目
				風味
4	4	パスタ粉砕物	0.25	4.3
5	5	パスタ粉砕物	0.50	4.6
12(再冷凍)	4	パスタ粉砕物	0.25	4.4
13(再冷凍)	5	パスタ粉砕物	0.50	4.7
参考例1(茹で直後)	–	–	–	5.0

請求の範囲

［請求項1］　パスタ粉砕物及び／又はデュラム小麦粉が付着していることを特徴とする冷凍パスタ。

［請求項2］　前記パスタ粉砕物及び／又はデュラム小麦粉の付着量が、冷凍前の前記パスタ１００質量部に対して０．１～２．０質量部である、請求項１に記載の冷凍パスタ。

［請求項3］　前記パスタ粉砕物及び／又はデュラム小麦粉を含むコーティング液が付着しており、該コーティング液は、水とパスタ粉砕物及び／又はデュラム小麦粉とを混合し、加熱して調製される、請求項１又は２に記載の冷凍パスタ。

［請求項4］　前記コーティング液の付着量が、冷凍前の前記パスタ１００質量部に対して１～２０質量部である、請求項３に記載の冷凍パスタ。

［請求項5］　茹で処理したパスタを冷却する工程と、該パスタの表面にパスタ粉砕物及び／又はデュラム小麦粉を付着させる工程と、該パスタを冷凍する工程とを含む、冷凍パスタの製造方法。

［請求項6］　前記パスタ粉砕物及び／又はデュラム小麦粉の付着量が、冷凍前の前記パスタ１００質量部に対して０．１～２．０質量部である、請求項５に記載の方法。

［請求項7］　前記付着させる工程が、前記パスタの表面に前記パスタ粉砕物及び／又はデュラム小麦粉を含むコーティング液を付着させる工程であり、該コーティング液は、水とパスタ粉砕物及び／又はデュラム小麦粉とを混合し、加熱して調製される、請求項５又は６に記載の方法。

［請求項8］　前記コーティング液の付着量が、冷凍前の前記パスタ１００質量部に対して１～２０質量部である、請求項７に記載の方法。

［請求項9］　さらに、冷凍されたパスタに水を噴霧し、再冷凍することを特徴とする、請求項５～８のいずれか１項に記載の方法。

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2012/062097

A. CLASSIFICATION OF SUBJECT MATTER
A23L1/16(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A23L1/16-1/162

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho	1922-1996	Jitsuyo Shinan Toroku Koho	1996-2012
Kokai Jitsuyo Shinan Koho	1971-2012	Toroku Jitsuyo Shinan Koho	1994-2012

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
CA/BIOSIS/MEDLINE/WPIDS(STN), JSTPlus/JMEDPlus/JST7580(JDreamII),
G-Search

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 54-084047 A (Kabushiki Kaisha Shimadaya Honten), 04 July 1979 (04.07.1979), (Family: none)	1-9
A	JP 62-294054 A (Nisshin Flour Milling Co., Ltd.), 21 December 1987 (21.12.1987), (Family: none)	1-9
A	JP 02-245152 A (Kenji UEKI), 28 September 1990 (28.09.1990), (Family: none)	1-9

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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"&" document member of the same patent family

Date of the actual completion of the international search 02 August, 2012 (02.08.12)	Date of mailing of the international search report 14 August, 2012 (14.08.12)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2012/062097

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 08-224066 A (Sunrise Kasei Kabushiki Kaisha), 03 September 1996 (03.09.1996), (Family: none)	1-9
A	JP 09-075023 A (Nisshin Flour Milling Co., Ltd.), 25 March 1997 (25.03.1997), (Family: none)	1-9
A	JP 2000-032938 A (Showa Sangyo Co., Ltd.), 02 February 2000 (02.02.2000), (Family: none)	1-9
A	JP 2001-299255 A (Kikkoman Corp.), 30 October 2001 (30.10.2001), (Family: none)	1-9
A	JP 2004-357659 A (Daitoh Shokken Co., Ltd.), 24 December 2004 (24.12.2004), (Family: none)	1-9
A	JP 2006-000030 A (Nisshin Foods Inc.), 05 January 2006 (05.01.2006), (Family: none)	1-9
A	JP 2007-049972 A (Nisshin Foods Inc.), 01 March 2007 (01.03.2007), (Family: none)	1-9
A	JP 2007-306841 A (Nissin Food Products Co., Ltd.), 29 November 2007 (29.11.2007), (Family: none)	1-9
A	JP 2010-068717 A (Matsuyoshi UEMA), 02 April 2010 (02.04.2010), (Family: none)	1-9

国際調査報告

国際出願番号　ＰＣＴ／ＪＰ２０１２／０６２０９７

Ａ．　発明の属する分野の分類（国際特許分類（ＩＰＣ））

Int.Cl.　A23L1/16(2006.01)i

Ｂ．　調査を行った分野

調査を行った最小限資料（国際特許分類（ＩＰＣ））

Int.Cl.　A23L1/16-1/162

最小限資料以外の資料で調査を行った分野に含まれるもの

日本国実用新案公報	１９２２－１９９６年
日本国公開実用新案公報	１９７１－２０１２年
日本国実用新案登録公報	１９９６－２０１２年
日本国登録実用新案公報	１９９４－２０１２年

国際調査で使用した電子データベース（データベースの名称、調査に使用した用語）

CA/BIOSIS/MEDLINE/WPIDS(STN), JSTPlus/JMEDPlus/JST7580(JDreamII), G-Search

Ｃ．　関連すると認められる文献

引用文献のカテゴリー＊	引用文献名　及び一部の箇所が関連するときは、その関連する箇所の表示	関連する請求項の番号
A	JP 54-084047 A (株式会社島田屋本店) 1979.07.04. (ファミリーなし)	1-9
A	JP 62-294054 A (日清製粉株式会社) 1987.12.21. (ファミリーなし)	1-9
A	JP 02-245152 A (植木健治) 1990.09.28. (ファミリーなし)	1-9

☑　Ｃ欄の続きにも文献が列挙されている。　☐　パテントファミリーに関する別紙を参照。

＊　引用文献のカテゴリー
「Ａ」特に関連のある文献ではなく、一般的技術水準を示すもの
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国際調査を完了した日 ０２．０８．２０１２	国際調査報告の発送日 １４．０８．２０１２
国際調査機関の名称及びあて先 日本国特許庁（ＩＳＡ／ＪＰ） 郵便番号１００－８９１５ 東京都千代田区霞が関三丁目４番３号	特許庁審査官（権限のある職員）　４Ｂ　３９６４ 戸来　幸男 電話番号　０３－３５８１－１１０１　内線　３４４８

様式ＰＣＴ／ＩＳＡ／２１０（第２ページ）（２００９年７月）

国際調査報告　　国際出願番号　ＰＣＴ／ＪＰ２０１２／０６２０９７

Ｃ（続き）．　関連すると認められる文献

引用文献のカテゴリー＊	引用文献名　及び一部の箇所が関連するときは、その関連する箇所の表示	関連する請求項の番号
A	JP 08-224066 A（サンライズ化成株式会社）1996.09.03. (ファミリーなし)	1-9
A	JP 09-075023 A（日清製粉株式会社）1997.03.25. (ファミリーなし)	1-9
A	JP 2000-032938 A（昭和産業株式会社）2000.02.02. (ファミリーなし)	1-9
A	JP 2001-299255 A（キッコーマン株式会社）2001.10.30. (ファミリーなし)	1-9
A	JP 2004-357659 A（大東食研株式会社）2004.12.24. (ファミリーなし)	1-9
A	JP 2006-000030 A（日清フーズ株式会社）2006.01.05. (ファミリーなし)	1-9
A	JP 2007-049972 A（日清フーズ株式会社）2007.03.01. (ファミリーなし)	1-9
A	JP 2007-306841 A（日清食品株式会社）2007.11.29. (ファミリーなし)	1-9
A	JP 2010-068717 A（上間松吉）2010.04.02. (ファミリーなし)	1-9

Electronic Acknowledgement Receipt

EFS ID:	36961679
Application Number:	16238802
International Application Number:	
Confirmation Number:	3877
Title of Invention:	METHODS AND COMPOSITIONS FOR CONSUMABLES
First Named Inventor/Applicant Name:	Marija Vrljic
Customer Number:	26191
Filer:	M. Angela Parsons/Kirsten Neuman
Filer Authorized By:	M. Angela Parsons
Attorney Docket Number:	38767-0010003
Receipt Date:	23-AUG-2019
Filing Date:	03-JAN-2019
Time Stamp:	12:47:58
Application Type:	Utility under 35 USC 111(a)

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	Transmittal.pdf	71402 34ef0a2eb0c420267d525defc7f5f9f88f26c8ae	no	1

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2	Information Disclosure Statement (IDS) Form (SB08)	PTO_1449.pdf	161430 851aeb9e3ab896315924de7ffb9f5de6be90445f	no	4
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3	Foreign Reference	GB1364747.pdf	14005514 bc27893d382e598f5cc3caebca6f023a4a60ad4a	no	8
Warnings:					
Information:					
4	Foreign Reference	JP2001346533.pdf	68789 d9ad3ca14b217f1bbf4288d86dd63c554316559c	no	1
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5	Foreign Reference	JP2001037434.pdf	71014 b264c4f8261b07712c1afffe0a00d99627fa50ae	no	1
Warnings:					
Information:					
6	Foreign Reference	JP2002101835.pdf	72001 dec47c7b728bf1049b3a1c59100ab79738f41ee2	no	1
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Information:					
7	Foreign Reference	JP2009284893.pdf	73488 6b41e5f1780d12785f824648cfce9ae8eae93935	no	1
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Information:					
8	Foreign Reference	JPH0970272.pdf	70793 1a52f070961ea0bbb0106fdde25a8de9c18873aa	no	1
Warnings:					

Information:					
9	Foreign Reference	WO2012157544.pdf	1004187 a4ed9ecb38beb1ed9687da3c5acb5a98fbaf3f29	no	14
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Information:					
10	Non Patent Literature	HappyCow_2019.pdf	1390173 f6b9477d8a377b577101b14745004acf30bb754f	no	5
Warnings:					
Information:					
11	Non Patent Literature	PacificHarvest_REDSEAWEEDS_2016.pdf	550586 9184097d650bd3a1394b7f9f7b43b6982b02f536	no	11
Warnings:					
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12	Non Patent Literature	Sprouts_TheMiracleFood_Vitality_Magazine_2005.pdf	1323194 2001a9daa3815540732d461ccaabf927fa26b69f	no	10
Warnings:					
Information:					
13	Non Patent Literature	Jackkruse_BrainGut_2012.pdf	241715 6854c3b8e4c3dd659d88b800afe6fc5bc2fd4fd3	no	12
Warnings:					
Information:					
14	Non Patent Literature	Maraseaweed_SmokedDulse_2019.pdf	135745 093f16a2c50901621838522f7b63b5a930814cf4	no	3
Warnings:					
Information:					
15	Non Patent Literature	RedSeaweed_MyLiquidSupplements_2013.pdf	1973631 68e976a54fceaed24332546ff6eb3999ff195a1f	no	10
Warnings:					
Information:					

16	Non Patent Literature	TomKitchin_TheScotsman_2012.pdf	1171107 83ac13da07521cd440567eb93612a8c8b4049ed0	no	12
Warnings:					
Information:					
17	Non Patent Literature	ShopHealthyHealing_WhatAreSeaVeg_2012.pdf	157625 5be2389a52619ef08bb9914f9f957e785d8f633c	no	5
Warnings:					
Information:					
18	Non Patent Literature	Sprouts_2019.pdf	688864 250e75361485087f3f1d0454a2d3f8ba47217af4	no	9
Warnings:					
Information:					
19	Non Patent Literature	TeriyakiWeed_WildFoodPlants_2007.pdf	186610 6ed6c45eb0ca50218ac1fc4a00c982fc96b9e07b	no	2
Warnings:					
Information:					
20	Non Patent Literature	ABOU_EL_ELLA_1980.pdf	3794697 665eed31292f7dfc906b190de9a8a47e8779455b1	no	2
Warnings:					
Information:					
21	Non Patent Literature	Ames_VolatileComponentsOfaYeastExtract_1985.pdf	1580912 2e85fa270673a8cbca5794ddbd6e0765161e2dab	no	7
Warnings:					
Information:					
22	Non Patent Literature	Ames_VolatileSulfurCompounds_1994.pdf	11802386 d98c5895cdd482562954cd2c4687c33c1dfdcf6c	no	13
Warnings:					
Information:					

23	Non Patent Literature	Anderson_ANewHemoglobin_1996.pdf	9493360 e4b3be2a1f1fb0e6feac93210faaa326aa197ba3	no	6
Warnings:					
Information:					
24	Non Patent Literature	Baek_AromaExtractDilutionAnalysis_2001.pdf	191643 86ef9a92f67eca9c6545c69a90008a2df49b43aa	no	4
Warnings:					
Information:					
25	Non Patent Literature	Bodnar_2011X_Part1.pdf	24957250 181aab4b6a41ca5f3a70e89909d8ceecb3a056a1	no	59
Warnings:					
Information:					
26	Non Patent Literature	Bodnar_2011X_Part2.pdf	25065454 9fba7274b23ce04014b688f72314a31b494debd9	no	58
Warnings:					
Information:					
27	Non Patent Literature	Bodnar_2011X_Part3.pdf	16527310 7277f0c85bda88329889309ec01750823b7b1921	no	30
Warnings:					
Information:					
28	Non Patent Literature	Buttery_ThiaminOdorAndBis_1984.pdf	4178230 71d084690bffc4e01c4335aba086b814b24d504e	no	3
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29	Non Patent Literature	Buttery_FlavorChemistryAndOdor_1999.pdf	837719 ed0bb079b3d398add5ea96f1874cf619d8dfddc4	no	13
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30	Non Patent Literature	Chohan_CatalyticEffect_1997.pdf	224302 16d1c18baa8b6bee0ee055c0b68080d612c8956a	no	3
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31	Non Patent Literature	Collman_RegioselectiveAndEnantioselective_1993.pdf	15390429 3ac9da5b770d93bacf8d1875ddd0bd910b53c926	no	9
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32	Non Patent Literature	DERWENT_1979.pdf	112493 eed7e03ba4e0faf167774d75bfe7513dd25d1d27	no	1
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33	Non Patent Literature	Duff_HaemoglobinExpression_1998.pdf	9364303 364421d35ab8f2217ed518d019e64fb324344431	no	6
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34	Non Patent Literature	Erickson_LipidOxidationOfMuscleFoods_2002.pdf	3824444 37f93c0fbac59c7ff029f85dfa5b46e135c9afc0	no	48
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35	Non Patent Literature	Evers_FuransSubstitutedAtThe_1976.pdf	12140427 0cd740eb690b99045088c159d934910b2e828cb5	no	10
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36	Non Patent Literature	Everse_HemeProteins_2004.pdf	174546 197075c7b7efda428351823fcce0a3ddd31d8bd4	no	8
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37	Non Patent Literature	EESR_18203176_May31_2019.pdf	10345855 60dcde41d5cd52bd38819353412d99dabad6a98e	no	11
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38	Non Patent Literature	Farmer_InteractionOfLipid_1990.pdf	24086639 df570ee6641870006ede90ae2bf8e09b1579c561	no	21
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39	Non Patent Literature	Gasser_IdentificationOfVolatileFlavour_1988.pdf	4072358 16e3574feab3e6c68b6aa3a51932ec4698c262bb	no	6
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41	Non Patent Literature	Grove_AsymmetricHydroxylationEpoxidation_1990.pdf	8676698 98f7f72f5d3fc36dc47de34b64cc134da7bcb030	no	7
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42	Non Patent Literature	Guntert_IdentificationAndFormationOfSome_1990.pdf	10445363 6f049ddf6193c8df01a87e92eba8a1617be6c2de	no	15
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46	Non Patent Literature	Hofmann_EvaluationOfTheKey_1995.pdf	8848276 33c246e8144a48292caa86d19ac19a3f50ea73df	no	8
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49	Non Patent Literature	Jin_AromaPropertiesOfSome_1984.pdf	4524470 d234b09cd36a6a8d1667160cb49e268fb11e4286	no	4
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53	Non Patent Literature	Lu_C-Hfunctionalisation_2011.pdf	542756 7997d8137bd84ef3336aac0946c33c8d0c53b38a	no	12
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54	Non Patent Literature	MacLeod_TheScientific_1986.pdf	19290758 90447893fa1b39bc0fcb0bc758e6219dc2648b27	no	36
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55	Non Patent Literature	Meunier_Metal-oxoSpecies_2002.pdf	379502 bc787c5a9c27e54da25cadf9b8d02ad121453bfd	no	8
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57	Non Patent Literature	Mottram_FlavorCompoundsFormed_1993.pdf	24955254 21081927ca77c1bc281e31a35439e2e6bd70aacf	no	23
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58	Non Patent Literature	Mouritsen_SeaweedsForUmami_2012.pdf	1197753 c0a6047f9cf3ccf62c140654ca0680a589b99ea0	no	12
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59	Non Patent Literature	Pittet_ComparativeStudy_1974.pdf	6623345 2eea2141cb61f409772ab310259c48403c41d066	no	6
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60	Non Patent Literature	Shaw_Bioavailability_2000X.pdf	2358892 21ea58039228de98480a745f7a1cf0c37e88602a	no	4
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Information:					
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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

<u>New Applications Under 35 U.S.C. 111</u>
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
<u>National Stage of an International Application under 35 U.S.C. 371</u>
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
<u>New International Application Filed with the USPTO as a Receiving Office</u>
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Electronic Acknowledgement Receipt

EFS ID:	36961732
Application Number:	16238802
International Application Number:	
Confirmation Number:	3877
Title of Invention:	METHODS AND COMPOSITIONS FOR CONSUMABLES
First Named Inventor/Applicant Name:	Marija Vrljic
Customer Number:	26191
Filer:	M. Angela Parsons/Kirsten Neuman
Filer Authorized By:	M. Angela Parsons
Attorney Docket Number:	38767-0010003
Receipt Date:	23-AUG-2019
Filing Date:	03-JAN-2019
Time Stamp:	12:51:11
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Non Patent Literature	Strelec_AminopeptidasesOfGerminated_2009.pdf	162344 dae355aa678f81873cfebe0972ba4fec385e89b0	no	8

Warnings:

Information:					
2	Non Patent Literature	VanDenOuweland_ComponentsContributing_1975.pdf	4290345 352cf9429e896a841ad3b110d16d0226a2a68598	no	5
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3	Non Patent Literature	Vernin_MechanismsOfFormation_1982.pdf	14955103 554a11fb2c1b1e5f186d82b9cbf49617ac048278	no	57
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4	Non Patent Literature	Wajcman_Lhemoglobine_2002.pdf	1796026 086a4f9c020abffc361abc85e4bb9bc4a8ea6b69	no	16
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Information:					
5	Non Patent Literature	Weenen_ProcessFlavorings_1998.pdf	20318474 d8be91848ed3ca47655dbaa7cc5792dc01c06e94	no	28
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6	Non Patent Literature	Weinberger_2007.pdf	5153838 fa5c7c0fc15afc90f06df46372a5d212c98e3408	no	8
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7	Non Patent Literature	Werkhoff_IsolationAndCharacterization_1990.pdf	13934296 11aea54f88d2cb68ead58db4d52a72d7049b4958	no	15
Warnings:					
Information:					
8	Non Patent Literature	Whitfield_EffectOfPhospholipid_1988.pdf	14570915 fb2f311f1a91e7d248874cdeb685c0931680d8b4	no	12
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9	Non Patent Literature	Wu_CharacterizationOfTheAroma_2002.pdf	760584 08c0c952620465fdb035340ce5443aac10235cad	no	8
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10	Non Patent Literature	Yaylayan_MicrowaveAndThermally_1993.pdf	9187341 8e987a83149c493b666d3bc7ea43e74c0bf4a4c8	no	8
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11	Non Patent Literature	Zampronio_CatalyticOxidation_2005.pdf	84043 55d6e173730c95feba12fd5258858aec467766a6	no	4
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12	Non Patent Literature	Zhang_ComparisonOfTheVolatile_1991.pdf	4806022 22096755aeea8ce4663a08cadd1057790075ff69	no	4
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			Total Files Size (in bytes):	90019331	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

<u>New Applications Under 35 U.S.C. 111</u>
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<u>National Stage of an International Application under 35 U.S.C. 371</u>
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<u>New International Application Filed with the USPTO as a Receiving Office</u>
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Sheet _1_ of _1_

Substitute Disclosure Form	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 38767-0010003	Application No. 16/238,802
Information Disclosure Statement by Applicant (Use several sheets if necessary)		Applicant Impossible Foods Inc.	
(37 CFR §1.98(b))		Filing Date January 3, 2019	Group Art Unit

U.S. Patent Documents

Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate

Foreign Patent Documents or Published Foreign Patent Applications

Examiner Initial	Desig. ID	Document Number	Publication Date	Country or Patent Office	Class	Subclass	Translation Yes	Translation No

Other Documents (include Author, Title, Date, and Place of Publication)

Examiner Initial	Desig. ID	Document
	1.	Analysis of soy hydrolysate, Avomen Analytical Services Laboratory Test Results, July 25, 2019
	2.	Biede, et al., "Swiss cheese flavor: I. chemical analysis," Journal of Dairy Science, 1979, 62:227-237
	3.	Declaration of Dr. Jorge Ruiz-Carrascal, dated 7/29/2019, 72 pages
	4.	EP Opposition Letter from Opponent in EP Appln. No. 14737766.7 dated 8/6/2019, 55 pages
	5.	Estevez, et al., "Analysis of volatiles in meat from Iberian pigs and lean pigs after refrigeration and cooking by using SPME-GC-MS," Journal of Agricultural and Food Chemistry, 2003, 51:3429-3435
	6.	Friedman and Brandon, "Nutritional and health benefits of soy proteins," J. Agric. Food Chem., 2001, 49(3):1069-1086
	7.	Ibrahim, et al., "Mechanism of the CO-sensing heme protein CooA: new insights from the truncated heme domain and UVRR spectroscopy," Journal of Inorganic Biochemistry," 2007, 101:1776-1785
	8.	Kendrick and Watts, "Acceleration of inhibition of lipid oxidation by heme compounds," Lipids, 1969, 4:454-458
	9.	Mahajan, et al., "Aroma compounds in sweet whey powder," Journal of Dairy Science, 2004, 87:4057-4063
	10.	Meisinger, et al., Flavor relationships among muscles from the beef chuck and round," Journal of Animal Science, 2006, 84:2826-2833
	11.	Singh, et al., "Functional and edible uses of soy protein products," Comp. Rev. Food Sci. Food Safety, 2008, 7:14-28
	12.	Vaghefi, et al., "Influence of the extent of hemoglobin hydrolysis on the digestive absorption of heme iron. An in vitro study," Journal of Agricultural and Food Chemistry, 2002, 50:4969-4973
	13.	Yeast Metabolom Database, "Heme (YMDB0041)," (http://www.ymdb.ca/compounds/YMDB00041)
	14.	Young and Pellett, "Plant proteins in relation to human protein and amino acid nutrition," Am. J. Clin. Nutr., 1994, 59(Suppl):1203S-1212S

Examiner Signature	Date Considered
EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.	

Substitute Disclosure Form

Attorney Docket No.: 38767-0010003 / M2CON-Track 1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Marija Vrljic	Art Unit	:	Unknown
Application No.	:	16/238,802	Examiner	:	Unknown
Filed	:	January 3, 2019	Conf. No.	:	3877
Title	:	METHODS AND COMPOSITIONS FOR CONSUMABLES			

MAIL STOP AMENDMENT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT

Please consider the documents listed on the disclosure form submitted with this statement. Copies of the documents are being submitted with this statement to the extent required under 37 CFR § 1.98(a)(2).

This statement is being filed before the receipt of a first Office Action on the merits. Therefore, no fees are believed due. If this is incorrect, please apply any charges applicable under 37 CFR § 1.17(p), or credits, to Deposit Account No. 06-1050, referencing the above-indicated Attorney Docket Number.

Please contact the undersigned if there are any questions regarding this statement.

Respectfully submitted,

Date: September 26, 2019

/M. Angela Parsons/
M. Angela Parsons, Ph.D.
Reg. No. 44,282

Customer Number 26191
Fish & Richardson P.C.
Telephone: (612) 335-5070
Facsimile: (877) 769-7945

62108378.doc

Electronic Acknowledgement Receipt

EFS ID:	37281933
Application Number:	16238802
International Application Number:	
Confirmation Number:	3877
Title of Invention:	METHODS AND COMPOSITIONS FOR CONSUMABLES
First Named Inventor/Applicant Name:	Marija Vrljic
Customer Number:	26191
Filer:	M. Angela Parsons/Kristyn Waldhauser
Filer Authorized By:	M. Angela Parsons
Attorney Docket Number:	38767-0010003
Receipt Date:	26-SEP-2019
Filing Date:	03-JAN-2019
Time Stamp:	11:05:24
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
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Information:					
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4	Non Patent Literature	Declaration_Ruiz-Carrascal.pdf	9031205 9657d9746192176d7a421c1d5fb28f8edd344652	no	72
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6	Non Patent Literature	Estevez_2003.pdf	6749422 d13f88c1629f15d2a28ef081ea67c10ca8b5bd24	no	7
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7	Non Patent Literature	Friedman_2001.pdf	7212563 9f4e84168c097c4ca9e410fba50a4c4cb69fc52c	no	18
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8	Non Patent Literature	Ibrahim_2007.pdf	8893186 cb15590ca53b7f3b20ba5c32f503443ee5189a9c	no	20
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9	Non Patent Literature	Kendrick_1969.pdf	780876 c1956f816d7cc0861b46a84a8e1ce22515be4d26	no	5
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12	Non Patent Literature	Singh_2008.pdf	6205037 730fc27f0a90e45aff7a77f486ecc35c53d80a4f	no	15
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13	Non Patent Literature	Vaghefi_2002.pdf	11277886 9a0128f3635dd396c2958c923dcf55f0480a3988	no	5
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14	Non Patent Literature	YeastMetabolomDatabase.pdf	562654 d8dd87e6717fd4f9920a14dc3ffad72b279a78cf	no	7
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New International Application Filed with the USPTO as a Receiving Office
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Sheet _1_ of _2_

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Information Disclosure Statement by Applicant (Use several sheets if necessary)		Applicant Impossible Foods Inc.	
(37 CFR §1.98(b))		Filing Date January 3, 2019	Group Art Unit

U.S. Patent Documents

Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate

Foreign Patent Documents or Published Foreign Patent Applications

Examiner Initial	Desig. ID	Document Number	Publication Date	Country or Patent Office	Class	Subclass	Translation Yes	Translation No

Other Documents (include Author, Title, Date, and Place of Publication)

Examiner Initial	Desig. ID	Document
	1.	Charkin, et al., "Fragmentation of heme and hemin+ with sequential loss of carboxymethyl groups: A DFT and mass-spectrometry study," Chemical Physics Letters, 2005, 415:362–369
	2.	FDA Statement and Response, GRAS Notice 540, dated May 29, 2015, 13 pages
	3.	FDA Statement, "Structural comparison of plant hemoglobins and animal myoglobins," annex to communication in opposition to EP Patent No. 2943072, 2019, 5 pages
	4.	Fyrestam and Ostman, "Determination of heme in microorganisms using HPLC-MS/MS and cobalt(III) protoporphyirin IX inhibition of heme acquisition in Escherichia coli," Anal. Bioanal. Chem., 2017, 409:6999-7010
	5.	GenBank Accession No. AFB70892.1, Sariam, "Non-symbiotic hemoglobin [Vigna radiata]," dated 2/26/2012, 1 page
	6.	Gledhill, "The detection of iron protoporphyrin (heme b) in phytoplankton and marine particulate material by electrospray ionisation mass spectrometry - comparison with diode array detection," Anal. Chim. Acta., 2014, 841:33-43
	7.	Impossible Foods Response to Opponent's Reply in opposition to EP Patent No. 2943072, dated 11/21/2019, 28 pages
	8.	Jenschke, et al., "Unsaturated fatty acids and sodium affect the liver-like off-flavor in cooked beef," J. Anim. Sci., 2007, 85:3072-3078
	9.	Jianjun Jiang, et al., "Food technology (Volume 1)," Higher Education Press, 2002, 1:31-32, English translation
	10.	Kohler, et al., "Physiological Characterization of a Heme-Deficient Mutant of Staphylococcus aureus by a Proteomic Approach," Journal of Bacteriology 2003, 185:6928-6937
	11.	Lane and Nursten, "The Variety of Odors Produced in Maillard Model Systems and How They Are Influenced by Reaction Conditions," in: The Maillard Reaction in Foods and Nutrition, Waller and Feather, eds., ACS Symposium Series, 1983, No. 215, pp. 141-158
	12.	Opponent's Reply Letter in opposition to EP Patent. No. 2943072, dated 11/21/2019, 15 pages
	13.	Pashynska, et al., "Characterization of Noncovalent Complexes of Antimalarial Agents of the Artemisinin-Type and FE(III)-Heme by Electrospray Mass Spectrometry and Collisional Activation Tandem Mass Spectrometry," J. Am. Soc. Mass Spectrom., 2004, 15:1181-1190
	14.	Song, et al., "Agricultural and sideline products processing value-added technology II: Processing of soybean products," Henan Science and Technology Press, 2009, 1:64-69, English translation
	15.	Wang and Wang, "Principles and techniques of food nutrition and health care," China Light Industry Press, 1998, 1:446-449, English translation

Examiner Signature	Date Considered

EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute Disclosure Form

Sheet _2_ of _2_

Substitute Disclosure Form U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 38767-0010003	Application No. 16/238,802
Information Disclosure Statement by Applicant (Use several sheets if necessary)	Applicant Impossible Foods Inc.	
(37 CFR §1.98(b))	Filing Date January 3, 2019	Group Art Unit

Examiner Signature	Date Considered
EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.	

Substitute Disclosure Form

Attorney Docket No.: 38767-0010003 / M2CON-Track 1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Marija Vrljic	Art Unit	:	Unknown
Application No.	:	16/238,802	Examiner	:	Unknown
Filed	:	January 3, 2019	Conf. No.	:	3877
Title	:	METHODS AND COMPOSITIONS FOR CONSUMABLES			

MAIL STOP AMENDMENT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT

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This statement is being filed within three months of the filing date of the application or before the receipt of a first action on the merits; therefore, no fee is believed due.

Please apply any necessary charges or credits applicable under 37 C.F.R. § 1.17(p) to deposit account 06-1050, referencing the above attorney docket number.

Please contact the undersigned if there are any questions regarding this statement.

Respectfully submitted,

Date: November 26, 2019

/Kimberly M. Maize, Reg. No. 76,370/
Kimberly M. Maize
Reg. No. 76,370

Customer Number 26191
Fish & Richardson P.C.
Telephone: +1 (612) 638-5707
Facsimile: (877) 769-7945

62179396.doc

Electronic Acknowledgement Receipt

EFS ID:	37862473
Application Number:	16238802
International Application Number:	
Confirmation Number:	3877
Title of Invention:	METHODS AND COMPOSITIONS FOR CONSUMABLES
First Named Inventor/Applicant Name:	Marija Vrljic
Customer Number:	26191
Filer:	Kimberly M. Maize/Emma Johnson
Filer Authorized By:	Kimberly M. Maize
Attorney Docket Number:	38767-0010003
Receipt Date:	26-NOV-2019
Filing Date:	03-JAN-2019
Time Stamp:	12:38:20
Application Type:	Utility under 35 USC 111(a)

Payment information:

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	IDS.pdf	712068 119fb3a642c76c1e3f02d7cffcb6f910d4578bde	no	3

Warnings:

Information:					
This is not an USPTO supplied IDS fillable form					
2	Non Patent Literature	Charkin_2005.pdf	15857159 027a60c152ce4cefc02fa9b7012926accbbd1ec9	no	9
Warnings:					
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3	Non Patent Literature	FDA_StructuralComparison_2019.pdf	399885 5c9947729f93f78d4d99bd58f57b5d36f6ae5e30	no	5
Warnings:					
Information:					
4	Non Patent Literature	FDAGRAS540_2015.pdf	2759298 7196ccf4c06ea47f2f82958ffacf388fb0cc3636	no	13
Warnings:					
Information:					
5	Non Patent Literature	Fyrestam_2017.pdf	20253648 2d146cbd5398f0a9f197b458853f368f44a9472d	no	12
Warnings:					
Information:					
6	Non Patent Literature	GenBank_AFB70892.pdf	238853 2f3b2fcc2dda484744cb1a612267998be08d7e1f	no	1
Warnings:					
Information:					
7	Non Patent Literature	Gledhill_2014.pdf	17477662 895841cdcb772052435effa7e848b6bfb6ce065b	no	11
Warnings:					
Information:					
8	Non Patent Literature	IFResponse_Nov2019.pdf	15080883 888fb2b8f819a3e42424fb2dab8070740250f40b	no	28
Warnings:					
Information:					

9	Non Patent Literature	Jenschke_2007.pdf	1804943 069c8c745350c4048538cf436d2684da359a2502	no	9
Warnings:					
Information:					
10	Non Patent Literature	Jiang_2002.pdf	1464753 696a74d9534afc7df83417771d533fa602be651a	no	9
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Information:					
11	Non Patent Literature	Kohler_2003.pdf	19210094 c9f695399a514fb02e8758ff9bd6cc59ac77cd6a	no	10
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12	Non Patent Literature	Lane_1983.pdf	3653190 e15264fa5e424723a91fc0d9fe520b8102beab65	no	18
Warnings:					
Information:					
13	Non Patent Literature	OpponentReply_Nov2019.pdf	1753374 d056e49510687b1fe89e8d69be8e107983015b42	no	15
Warnings:					
Information:					
14	Non Patent Literature	Pashynska_2004.pdf	5862214 aad47fa38a35c167bc4936b04b815e1e64e0a721	no	10
Warnings:					
Information:					
15	Non Patent Literature	Song_2009.pdf	3025448 93281af68d7fe7efb208204a14c26d3c3b5c54c8	no	16
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Information:					

16	Non Patent Literature	Wang_1998.pdf	1929545 cda7112a2c044ac6a6b1698b4567d290de6c193e	no	12
Warnings:					
Information:					
			Total Files Size (in bytes):	111483017	

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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Sheet _1_ of _1_

Substitute Disclosure Form	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 38767-0010003	Application No. 16/238,802
Information Disclosure Statement by Applicant (Use several sheets if necessary)		Applicant Impossible Foods Inc.	
(37 CFR §1.98(b))		Filing Date January 3, 2019	Group Art Unit

U.S. Patent Documents

Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Filing Date If Appropriate	Class	Subclass

Foreign Patent Documents or Published Foreign Patent Applications

Examiner Initial	Desig. ID	Document Number	Publication Date	Country or Patent Office	Translation	Class	Subclass
	1.	JP H08-289761	11/5/1996	JP	Abstract		

Other Documents (include Author, Title, Date, and Place of Publication)

Examiner Initial	Desig. ID	Document
	2.	"Peas, green raw," FoodData Central, US Department of Agriculture, retrieved from URL <https:/fdc.nal.usda.gov/fdc-app.html#/food-details/170419/nutrients>, April 1, 2019, 8 pages
	3.	Berrios, et al., "Carbohydrate composition of raw and extruded pulse flours," Food Research International, 2010, 43:531-536
	4.	EP Opposition, in Application No. 14737766.7, dated July 4, 2019, 8 pages
	5.	Jahreis, et al., "Legume flours: nutritionally important sources of protein and dietary fiber," Ernahrungs Umschau, 2016, 63(2):36-42
	6.	Liu, "Comparison of lipid content and fatty acid composition and their distribution within seeds of 5 small grain species," J. Food Sco., 2011, 76(2):C334-C342
	7.	Macnicol, "Developmental changes in the free amino acid pool and total protein amino acids of pea cotyledons (Pisum sativum L.)," Plant Physiol., 1983, 72:492-497
	8.	Oldach, "Biochemistry of a Burger: Impossible Foods does science, makes food and tries to change the world," ASBMB Today, retrieved from URL <https://www.asbmb.org/asbmb-today/industry/100119/biochemistry-of-a-burger>, October 1, 2019, 12 pages
	9.	Opponent's Reply Letter in opposition to EP Patent. No. 2943072, dated 1/20/2020, 18 pages
	10.	Rebuttal Declaration of Dr. Jorge Ruiz-Carrascal and Supporting Exhibits, dated January 20, 2020, 12 pages
	11.	Warendorf, et al., "The flavour of bouillon: 2. Sensory analysis of non-volatiles and imitation of a bouillon," Z. Lebensm. Unters. Forsch., 1992, 195(3):215-223, English Abstract
	12.	Wood, et al., "Fatty deposition, fatty acid composition and meat quality: a review," Meat Science, 2008, 78:343-358

Examiner Signature	Date Considered
EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.	

Substitute Disclosure Form

Attorney Docket No.: 38767-0010003 / M2CON-Track 1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Marija Vrljic	Art Unit	:	Unknown
Application No.	:	16/238,802	Examiner	:	Unknown
Filed	:	January 3, 2019	Conf. No.	:	3877
Title	:	METHODS AND COMPOSITIONS FOR CONSUMABLES			

MAIL STOP AMENDMENT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT

Please consider the documents listed on the disclosure form submitted with this statement. Copies of the documents are being submitted with this statement to the extent required under 37 C.F.R. § 1.98(a)(2).

The applicant wishes to make the Examiner aware of the following related applications. The prosecution histories for these applications and patents are available on PAIR, and are not provided with this statement.

Application No.	Filing Date	First Named Inventor	Attorney Docket No.
14/796,970	7/10/2015	Marija Vrljic	38767-0010001
15/786,776	10/18/2017	Marija Vrljic	38767-0010002
16/238,769	1/3/2019	Marija Vrljic	38767-0010004
14/152,499	1/10/2014	Patrick O'Reilly Brown M.D., Ph.D.	38767-0012001
14/752,540	6/26/2015	Patrick O'Reilly Brown M.D., Ph.D.	38767-0012002
15/985,694	5/21/2018	Patrick O'Reilly Brown M.D., Ph.D.	38767-0012003
14/797,006	7/10/2015	Rachel Fraser	38767-0015001
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13/941,211	7/12/2013	Patrick O'Reilly Brown M.D., Ph.D.	38767-0019001
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16/238,698	1/3/2019	Ranjani Varadan	38767-0026002

16/238,749	1/3/2019	Ranjani Varadan	38767-0026003

This statement is being filed before the receipt of a first action on the merits. Therefore, no fee is believed due.

Please apply any necessary charges or credits applicable under 37 C.F.R. § 1.17(p) to deposit account 06-1050, referencing the above attorney docket number.

Please contact the undersigned if there are any questions regarding this statement.

Respectfully submitted,

Date: March 19, 2020

/Kimberly M. Maize, Reg. No. 76,370/
Kimberly M. Maize
Reg. No. 76,370

Customer Number 26191
Fish & Richardson P.C.
Telephone: +1 (612) 638-5707
Facsimile: (877) 769-7945

62274489.doc

Electronic Acknowledgement Receipt

EFS ID:	38915076
Application Number:	16238802
International Application Number:	
Confirmation Number:	3877
Title of Invention:	METHODS AND COMPOSITIONS FOR CONSUMABLES
First Named Inventor/Applicant Name:	Marija Vrljic
Customer Number:	26191
Filer:	Kimberly M. Maize/Emma Johnson
Filer Authorized By:	Kimberly M. Maize
Attorney Docket Number:	38767-0010003
Receipt Date:	19-MAR-2020
Filing Date:	03-JAN-2019
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Application Type:	Utility under 35 USC 111(a)

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	IDS.pdf	713164 1aa4b01a79aabe2acadffeb54813d69deca846b4	no	3

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Information:					
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Information:					
3	Non Patent Literature	Declaration_Ruiz-Carrascal_2020.pdf	1081930 a3a45a8b94df24079a5f9e3b8c7f3a8fb1c4b1ed	no	12
Warnings:					
Information:					
4	Non Patent Literature	EPOpposition_Jul2019.pdf	886594 0ca03421ec8337bc89658bf6f33716686dc5217b	no	8
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5	Non Patent Literature	FDC_Peas_2019.pdf	447751 ff6912035605e561f6d36d2ed609d1a45339a261	no	8
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6	Non Patent Literature	Jahreis_2016.pdf	1679291 371b6c437500458e17857bfb6bc5b191b43b3bf0	no	7
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7	Non Patent Literature	Liu_2011.pdf	3092927 69d32c9c9cb4b018f70a5b94d7757dc742188f71	no	10
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8	Non Patent Literature	Macnicol_1983.pdf	1272411 fd732b082bac569a66b89af903fe19fee7c624ac	no	6
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9	Non Patent Literature	Oldach_2019.pdf	2344528 9348d3d5f3485a9ffc543567d979bb65a99f302a	no	12
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10	Non Patent Literature	OpponentsReply_Jan2020.pdf	1963806 92a5250c51ae5275524b0b03874cde7e7951cfcb	no	18
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Information:					
11	Non Patent Literature	ProprietorsResponse_Nov2019.pdf	3230574 643132547efc5279620009dcf6ca51a8ae9c0554	no	28
Warnings:					
Information:					
12	Non Patent Literature	Wood_2008.pdf	3224649 6a8b90238575b68b30248627657a7348a5c3c84e	no	16
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			Total Files Size (in bytes):	21191082	

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Espacenet

JPH08289761A AGENT FOR IMPARTING THICK TASTE

Applicants: AJINOMOTO KK

Inventors: OMURA HARUKI,SHIBUYA KOUJI

Classifications:

IPC ***A23L17/00; A23L27/20; A23L27/22; A23L27/23;*** (IPC1-7): A23L1/226; A23L1/228; A23L1/229; A23L1/325;

Priorities: JP9706595A 1995-04-21

Application: JP9706595A·1995-04-21

Publication: JPH08289761A· 1996-11-05

Published as: JPH08289761A;**JP3467901B2**

AGENT FOR IMPARTING THICK TASTE

Abstract

PURPOSE: To obtain an inexpensive agent for imparting thick taste, containing a sulfone-containing compound as the exclusive component or the compound in combination with betaine and/or a phosphoric acid salt as active components and imparting thick delicious taste to a food or drink by using in combination with a tasty substance. CONSTITUTION: This thick taste imparting agent contains a sulfone-containing compound (preferably taurine) as the exclusive component or in combination with betaine (e.g. glycine betaine) and/or a phosphoric acid salt (secondary sodium orthophosphate) as active components. The amounts of the active components to be compounded to a tasty substance are e.g. 0.01-20 pts.wt. each of taurine, disodium phosphate and glycine betaine based on 1 pt.wt. of sodium glutamate used as the tasty substance.

(19)日本国特許庁（ＪＰ）　(12) 公開特許公報（Ａ）　(11)特許出願公開番号

特開平8－289761

(43)公開日　平成８年(1996)11月５日

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	1/228				1/228		
	1/229				1/229	Ａ	
	1/325	１０１			1/325	１０１Ｄ	

審査請求　未請求　請求項の数９　ＯＬ　（全 ８ 頁）

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(71)出願人　000000066
味の素株式会社
東京都中央区京橋１丁目15番１号

(72)発明者　渋谷　晧治
神奈川県川崎市川崎区鈴木町１－１　味の素株式会社食品総合研究所内

(72)発明者　大村　晴樹
神奈川県川崎市川崎区鈴木町１－１　味の素株式会社食品総合研究所内

(74)代理人　弁理士　川口　義雄　（外２名）

(54)【発明の名称】　こく味付与剤

(57)【要約】
【構成】　旨味物質に加えてスルホン基含有化合物およびリン酸塩を利用して、またはこれらに加えてベタインを利用して飲食品の調味を行なう。
【効果】　飲食品に容易にこく味を付与することができる。

【特許請求の範囲】
【請求項１】　スルホン基含有化合物を単独にもしくはスルホン基含有化合物およびベタインを併用して、またはスルホン基含有化合物およびリン酸塩を併用してもしくはスルホン基含有化合物、リン酸塩およびベタインを併用して有効成分とすることを特徴とするこく味付与剤。
【請求項２】　旨味物質とスルホン基含有化合物、リン酸塩および／またはベタインとを有効成分とすることを特徴とするこく味調味料。
【請求項３】　スルホン基含有化合物がタウリンであることを特徴とする請求項１または２記載のこく味付与剤またはこく味調味料。
【請求項４】　請求項１～３のいずれかに記載のこく味付与剤またはこく味調味料でこく味を付与することを特徴とする飲食品の調味方法。
【請求項５】　旨味物質、スルホン基含有化合物およびリン酸塩を有効成分としてこく味を付与されたことを特徴とする飲食品。
【請求項６】　旨味物質、スルホン基含有化合物、リン酸塩およびベタインを有効成分としてこく味を付与されたことを特徴とする飲食品。
【請求項７】　タウリンとリン酸塩、魚骨粉および／またはベタインとを有効成分として含有することを特徴とする練製品用こく味付与剤。
【請求項８】　旨味物質に加えて請求項７記載の練製品用こく味付与剤を使用して調味をすることを特徴とする練製品の調味方法。
【請求項９】　旨味物質に加えてスルホン基含有化合物とリン酸塩および／または魚骨粉とベタインとを有効成分としてこく味を付与されたことを特徴とする練製品。
【発明の詳細な説明】
【０００１】
【産業上の利用分野】本発明は、旨味物質、スルホン基（－SO_3H）含有化合物およびリン酸塩の３者の併用作用により、またはこれら３者にベタインを加えた４者の併用作用により発現するこくのある旨味を活用するこく味付与剤およびこく味調味料、ならびにこのようなこく味付与剤またはこく味調味料を使用する飲食品の調味方法、およびこのようにして調味された飲食品に関する。
【０００２】
【従来の技術】Ｌ－グルタミン酸モノソーダ（コンブの味）を代表とする特有の味は、旨味（Flavor-enhancer）と称される。甘酸苦塩味を四原味と称するが、旨味は電気生理学的にもこれとは異なる味であることが証明されている。旨味を呈する物質としては、このほかに、アスパラギン酸、オキシグルタミン酸、イボテン酸、トリコロミン酸、イノシン酸ソーダ（かつお節の味）、グアニル酸ソーダ（椎茸の味）等の核酸関連物質、コハク酸ソーダ（二枚貝の味）も、それぞれ個性をもった旨味をもっている。また、グルタミン酸と核酸系旨味物質との間にはきわめて強い相乗効果を呈することが知られている。このことを利用した調味料が実際に市販されている。欧米では旨味に相当する言葉がなく、Ｕｍａｍｉで通用するようになってきている。以上、日本食品工業学会編「食品工業総合辞典」（（株）光琳発行（昭和５４年））。
【０００３】そして、グルタミン酸ナトリウム、イノシン酸ナトリウムおよびグアニル酸ナトリウムで代表される旨味は、国際的にもＵｍａｍｉと命名されるに至り、今日まで数多くの研究がなされてきており、また、これらの旨味物質を配合した多種多様の調味料が市販されている。
【０００４】しかしながら、このような調味料は、なるほど旨味の付与性は充分であるが、ビーフエキス、ポークエキス、チキンエキス、魚介エキス、酵母エキスなどの天然エキスあるいは蛋白加水分解物（ＨＡＰ、ＨＶＰなど）等の調味料が有するこく味の付与性はなお充分でなく、この点が問題点とされ、これを改善する手段の開発提供が強く望まれている。
【０００５】因みに、スルホン基含有化合物の１種であるタウリンは、ウシの胆汁およびイカ、タコ、貝類などの軟体動物の肉エキス中に多量に存在し、その薬理作用については、胆汁の分泌を促し、脂肪の吸収をよくし、また制汗作用のあることが知られている（共立出版（株）「化学大辞典」（昭和３６年）参照）。しかしながら、従来、タウリンの飲食品分野における実用用途にはみるべきものがなく、僅かに上記薬理作用を利用した健康飲料の用途（特開平４－２６２７６７）等が知られているに過ぎない。特にその呈味性については、水産物エキスの呈味試験の結果は、タウリンとアルギニンは量的に多いが、味とは無関係であると言われ（「調理科学」 Vol.5, No.1, p.p. 2～7 (1982)）、従ってこれを調味料として実際に使用した例のないことはもちん、その調味料としての用途が示唆されることもなかった。
【０００６】
【発明が解決しようとする課題】前項記載の従来技術の背景下に、本発明は、こく味を付与または強化する調味料の開発を目的とする。
【０００７】
【課題を解決するための手段】本発明者は、前項記載の目的を達成すべく鋭意研究の結果、従来味とは無関係であると考えられていたタウリンが極めて驚くべきことにリン酸塩との併用作用により旨味を前提とした、すなわち旨味のこく味付与剤となり得ること、また、タウリンと同様にスルホン基を有する他の化合物にもタウリンと同様の作用があること、さらにはスルホン基含有化合物およびリン酸塩による旨味に対するこく味付与効果がベタインにより顕著に改善されることを見出し、このよう

な知見に基いて本発明を完成した。

【０００８】以下、本発明を逐次詳細に説明する。

【０００９】本発明の具体的態様の１つは、スルホン基含有化合物を単独にもしくはスルホン基含有化合物およびベタインを併用して、またはスルホン基含有化合物およびリン酸塩を併用してもしくはスルホン基含有化合物、リン酸塩およびベタインを併用して有効成分とすることを特徴とするこく味付与剤である。

【００１０】このようなこく味付与剤の成分であるスルホン基含有化合物は、可食性でなければならないことはもちろんであり、タウリンの他に、脱炭酸を受けてタウリンを生成するシステイン酸、またナフタリン－１，５－ジスルホン酸およびチアミンのナフタリン－１，５－ジスルホン酸塩などのその塩類を例示することができる。また、これらの化合物は必ずしも純品である必要はなく、例えば、スルホン基含有化合物を含む天然物からの抽出物の形態であってもよい。

【００１１】他の成分であるリン酸塩も、同じく可食性でなければならないことはもちろんであり、いわゆる正リン酸の第一、第二または第三ナトリウム塩、カリウム塩、カルシウム塩などを例示することができる。また、カルシウム塩は、例えば、魚骨粉の形態であってもよい。本発明者の確認したところによれば、ポリリン酸塩は、スルホン基含有化合物と併用してもこく味を呈さない。

【００１２】ベタインとしてはグリシンベタインなどのベタインを挙げることはできる。ベタインは必ずしも純品である必要はなく、ビートモラセス、ケインモラセスなどの廃糖蜜からのベタインの高濃度画分やその濃縮物の形態であってもよい。

【００１３】本発明者の確認したところによれば、リン酸塩は、スルホン基化合物と併用しただけではこく味を呈さない。旨味物質にリン酸塩およびスルホン基含有化合物を同時に使用して初めてこくのある旨味となるのである。そして、ベタインにより、このこくのある旨味が強化される。

【００１４】このようなこく味付与剤の製造方法自体には、有効成分としてスルホン基含有化合物を単独に使用するかまたはスルホン基含有化合物およびリン酸塩を併用して配合するか、あるいはこれらにそれぞれベタインを併用して配合することを除いては、特別の制限はなく、適宜公知の調味料の製造方法を採用することができる。従って、本発明のこく味付与剤は、例えば、適当な賦形剤などの添加剤を使用して、液体および粉状、顆粒状などの固体の商品形態（流通形態）に製造することができる。

【００１５】先に説明したように、本発明は、スルホン基含有化合物およびリン酸塩の２者が、またはこれらの２者に加えてベタインの３者が同時に作用して旨味をこくのある旨味に変えること、を見出したことに基ずくものである。すなわち、３要素または４要素の併用作用による。従って、このような本発明のこく味付与剤の使用方法は、これらを考えると当業者に自から明らかであるが、若干例示する。

【００１６】例えば、スルホン基含有化合物、リン酸塩および旨味物質の３要素によりこくのある旨味を得ようとするとき、スルホン基含有化合物を単独に配合したこく味付与剤の場合は、旨味物質を既に原材料として使用されている飲食品（旨味調味料そのものを含む）に別途調達したリン酸塩と併用してこく味を呈せしめることができ、また旨味物質およびリン酸塩が既に原材料として使用されている飲食品の場合は、このようなこく味付与剤を使用するだけで飲食品にこく味を付与することができる。そして、スルホン基含有化合物とリン酸塩とを併用したこく味付与剤の場合は、旨味物質を含有するがスルホン基含有物質もリン酸塩も含有しない飲食品にこく味を呈せしめるのに有効に使用することができる。本発明者の新たなる知見に係わる、こくのある旨味を発現すべき３要素中、リン酸塩は既に含有するが他の２要素は含有しない原材料の場合は、スルホン基含有化合物を単独に有効成分とするこく味付与剤と別途調達した旨味物質とを併用することで、または旨味物質とスルホン基含有化合物とを有効成分とする本発明のこく味調味料（後述）を使用することで、こくのある旨味を発現せしめることができる。

【００１７】また、前記４要素、すなわちスルホン基含有化合物、リン酸塩、ベタインおよび旨味物質の４者により顕著にこく味の強化された旨味を得ようとするときも、上に説明したところに準じて使用することで、すなわち、飲食品中においてこれら４者が共存するように使用することで目的を達成することができる。

【００１８】スルホン基含有化合物およびリン酸塩を併用したこく味付与剤またはこれらにベタインの追加されたこく味付与剤における有効成分の配合割合は、こく味を付与すべき対象の飲食品が定まれば、当業者であれば簡単な事前の呈味試験により極めて容易に定めることができる。

【００１９】このようなこく味付与剤を使用することにより、飲食品にこく味が付与され、または強化される。

【００２０】本発明の具体的態様のその２は、旨味物質とスルホン基含有化合物、リン酸塩および／またはベタインとを有効成分とすることを特徴とするこく味調味料である。

【００２１】先に説明したように、スルホン基含有化合物およびリン酸塩は、それぞれ単独に旨味物質とともに使用してもこれにこく味を付与せず、これらを併用して旨味物質とともに使用することにより、すなわち３要素の併用作用により初めてこく味をし、しかもこのこく味はベタインを使用することで顕著に強化されるのである。従って、本発明の、このような具体的態様による、

スルホン基含有化合物、リン酸塩および／またはベタインを、旨味物質とともに有効成分とするこく味調味料は、例えば、既に旨味物質およびリン酸塩は含有するがスルホン基含有化合物は含まない、同様に既に旨味物質およびスルホン基含有化合物は含有するがリン酸塩は含有しない、または旨味物質は含有するがリン酸塩もスルホン基含有化合物も含有しない原材料の飲食品の調味に使用すると、このような飲食品にこく味が付与されまたは強化されるので、こく味調味料と称するのがふさわしい。ベタインの関与する場合も同様である。

【００２２】このようなこく味調味料の製造法および商品形態にも特別の制限はなく、先に説明したこく味付与剤の製造法および商品形態に準ずることができる。有効成分の配合割合も、要するに、こく味調味料としての目的を達成し得るものであればよく、例えば、グルタミン酸ナトリウム１重量部に対し、タウリン０．０１～２０重量部およびリン酸二ナトリウム０．０１～２０重量部の割合とすることができる。ベタインを併用する場合は、グルタミン酸ナトリウム１重量部に対し、グリシンベタイン０．０１～２０重量部の割合とすることができる。

【００２３】また、使用法にも特別の困難はなく、先に説明した３要素または４要素の併用によるこくのある旨味の発現ということを考えて、例えば、既にリン酸塩を含有する原材料からの、またはリン酸塩を含有しない原材料からの場合は、それぞれ、適宜本発明のリン酸塩を配合していないこく味調味料、またはこれと別途調達したリン酸塩とを併用して飲食品を製造する、適宜の工程で使用することにより、こく味が付与されまたは強化された飲食品を容易に製造することができる。

【００２４】本発明の具体的態様のその３は、上に説明したこく味付与剤またはこく味調味料を使用してこくのある旨味を付与することを特徴とする飲食品の調味方法である。

【００２５】このような調味方法は、こく味を付与しまたは強化するために、調味料として上に説明した本発明のこく味付与剤またはこく味調味料を使用することを除いては、特別の制限はなく、従来公知の調味方法を適宜採用することで行なうことができる。飲食品にこく味を付与しまたはこれを強化するには、例えば、飲食品製造の原材料の一部として本発明のこく味付与剤またはこく味調味料を使用することもできるし、既に製品となっている飲食品にこく味を付与しまたはこれを強化するために本発明のこく味付与剤またはこく味調味料を使用することもできることはもちろんである。

【００２６】本発明の具体的態様のその４は、旨味物質、スルホン基含有化合物およびリン酸塩の３者をまたはこれにベタインを加えた４者を有効成分としてこく味を付与されたことを特徴とする飲食品である。尚、これらの飲食品には、調味料、畜肉エキス、家禽エキス、その他の各種エキス類、各種加工食品類が含まれる。

【００２７】このような飲食品には、例えば、旨味物質に加えてスルホン基含有化合物およびリン酸塩の両者を使用して、またはこれらに加えてベタインを使用してこく味を付与した飲食品が含まれることは言うまでもないが、更に、例えば、原材料などに既に旨味物質に加えてスルホン基含有化合物およびリン酸塩のいずれか一方が含有されている場合に、残りの一方を添加使用してこく味を付与した飲食品も含まれることはもちろんである。要するに、３成分（３要素）または４成分（４要素）の少なくも１つを外来物質として使用してこくのある旨味を発現せしめた飲食品は、全て本発明の、このような飲食品の範囲に包含される。

【００２８】なお、上に説明した本発明のこく味付与剤もしくはこく味調味料または調味方法に関しては、本発明の目的とするこく味の発現の妨げとならない限りは、旨味物質、例えばグルタミン酸ナトリウムをはじめとするアミノ酸系および／またはイノシン酸ナトリウムやグアニル酸ナトリウムをはじめとする核酸系旨味物質の他に、有機酸、無機酸、これらの塩類、糖類等の、従来使用されている添加物を適宜併用できることはもちろんである。

【００２９】本発明の具体的態様の最後は、タウリンとリン酸塩および／または魚骨粉を、およびこれらに加えてベタインを有効成分として含有することを特徴とする練製品用こく味付与剤である。ここに、練製品には、かまぼこ、竹輪などの水産練製品、ハム、ソーセージなどの魚畜肉練製品等が含まれる。

【００３０】魚骨粉にはリン酸がそのカルシウム塩の形態で存在している。本発明の練製品用こく味付与剤においては、リン酸塩に加えてまたはこれに代えて魚骨粉を併用配合することができる。この場合、練製品のナトリウム量を減少でき、かつカルシウムを強化できる。

【００３１】このような練製品用こく味付与剤における有効成分の含有量比は、これを使用してこく味を付与すべき対象の練製品が定まれば、先に説明した場合と同じく、当業者であれば容易に定めることができる。また、先に説明した本発明者の知見に係わる３要素または４要素の併用作用によるこくのあるまたはこくの強化された旨味の発現ということを考えると、このようなこく味付与剤の商品形態、使用方法なども、先に説明した場合と同様にできる。

【００３２】また、旨味物質に加えて、スルホン基含有化合物とリン酸塩および／または魚骨粉とベタインとを有効成分としてこく味を付与されたことを特徴とする練製品の範囲も、先に説明した本発明の具体的態様のその４の場合に準じて考えることができる。

【００３３】

【実施例】以下、本発明を実施例により更に説明する。なお、実施例において、％は重量％を意味する。

【0034】実施例1（3要素の併用作用の検査）
スルホン基含有化合物、リン酸塩および旨味物質として、それぞれ、タウリン、燐酸二ナトリウムおよびグルタミン酸ナトリウムを選び、これら3要素の併用によるこくのある旨味の発現を検査した。

【0035】（a）すなわち、下記第1表に示す評価系（各種の水溶液）を試飲温度50～60℃での官能検査に付した。なお、官能検査は、熟練した5名よりなるパネルにより行ない、その結果も同表に併記する。評価系（2）以降において、本発明の3要素によるこく味の発現が見られる。

【0036】

【表1】

第　1　表

	評　価　系	呈味の特徴
(1)	ベース： タウリン　0.2 % 燐酸二ナトリウム　0.2 % 食　塩　0.5 % 蒸留水　残 余	塩味＋燐酸塩の味、少し旨味様の味有り
(2)	(1)＋0.5%（上乗せ）グルタミン酸ナトリウム	塩味＋旨味、こく味発現
(3)	(2)　＋0.4%（同上）50%乳酸ナトリウム	(2) の呈味からさらにエキス様の呈味に変化
(4)	(3)＋0.2%（同上）結晶ブドウ糖	(3) の呈味に少し甘味が加わる
(5)	(4)　＋0.1%（同上）グリシン	(4) の呈味にさらにエキス様の呈味が増す
(6)	(5)　＋0.1%（同上）アラニン	(5) の呈味にさらにエキス感が強まる

【0037】さらに比較のために、（b）タウリン及び燐酸塩をともに抜いた場合、（c）燐酸塩を抜いた場合、（d）タウリンを抜いた場合、そして（e）グルタミン酸ナトリウムを抜いた場合のそれぞれについて同様の検査を行なった。

【0038】評価系と官能検査の結果（呈味の特徴）をそれぞれ下記第2～5表に示す。これらの結果から、3要素の1つでも欠けるとこく味の発現が見られないことが判る。

【0039】

【表2】

第　2　表

	評　価　系	呈味の特徴
(1)	ベース： 食　塩　0．5% 蒸留水　残 余	塩味のみ
(2)	(1)＋0.5%（上乗せ）グルタミン酸ナトリウム	塩味 ＋ 旨味（こくのある旨味発現せず）

【0040】

【表3】

第　3　表

評価系		呈味の特徴
(1)	ベース： タウリン　0．2% 食　塩　0．5% 蒸留水　残余	ソフトな塩味
(2)	(1)+0.5%（上乗せ）グルタミン酸ナトリウム	ソフトな旨味と塩味（こくのある旨味発現せず）

【0041】

【表4】

第　4　表

評価系		呈味の特徴
(1)	ベース： 燐酸二ナトリウム　0.2 % 食　塩　0.5 % 蒸留水　残余	塩味中心の弱いこく味
(2)	(1)+0.5%（上乗せ）グルタミン酸ナトリウム	グルタミン酸ナトリウムのソフトな旨味と塩味（こくのある旨味発現せず）

【0042】

【表5】

第　5　表

評価系		呈味の特徴
(1)	ベース： タウリン　0.2 % 燐酸二ナトリウム　0.2 % 食　塩　0.5 % 蒸留水　残余	柔らかい塩味
(2)	(1)+0.4%（上乗せ）50%乳酸ナトリウム	(1) の呈味とほぼ同じ呈味
(3)	(2)+0.2%（上乗せ）結晶ブドウ糖	(2) の呈味よりいくらか濃厚感あり
(4)	(3)+0.1%（上乗せ）グリシン	甘味系のこく味少しでてくるも、旨味系のこく味発現せず
(5)	(4) +0.1%（上乗せ）アラニン	甘味系のこく味が (4) の呈味より強まるが、旨味系のこく味なし

【0043】実施例2（ヴィヨン系における評価）
ビーフヴィヨン（これにはもちろん旨味物質は含まれている。）に対するこく味の付与の検査を実施例1におけると同じ試飲温度で検査した。

【0044】評価系と評価結果を下記第6および7表に示す。これらの表から、本発明によれば、ビーフヴィヨンは、配合系および天然系をとわず、こく味の強化されることが判る。そして、配合系の場合、ベタインの併用により天然感の強化されることが判る。

【0045】

【表6】

Case No.: IPR2023-00207
U.S. Patent No. 11,013,250

第　6　表

評　価　系		呈味の特徴
(1)	ベース： 濃度１％の配合系ヴイヨン	水っぽいビーフヴイヨンの味
(2)	(1)＋0.2%（上乗せ）タウリン ＋0.2%（上乗せ）燐酸二ナトリウム	濃厚感、こく味のかなり強まったビーフヴイヨンの味に変化
(3)	(2)＋1%　（上乗せ）ベタイン	甘味を伴い、厚みが強まり、まろやかで天然感のあるエキス感が強まる

【0046】

【表7】

第　7　表

評　価　系		呈味の特徴
(1)	ベース： 濃度１％の天然系ヴイヨン	水っぽいビーフヴイヨンの味
(2)	(1)＋0.2%（上乗せ）タウリン ＋0.2%（上乗せ）燐酸二ナトリウム	濃厚感、こく味、厚味の著しく強化されたビーフヴイヨンの味に変化

【0047】実施例３（蒲鉾系における評価）
（ａ）常法により、下記第８表に示す原材料の配合により蒲鉾（対照）を試作した（試作品Ａ）。

【0048】

【表8】

第　8　表

原　材　料	配合量（g）
助宗すり身ＳＡ級	1000
グルタミン酸ナトリウム	10
食　塩	30
砂　糖	30
でんぷん	50
みりん	20
水	500

【0049】試作品Ａの呈味の特徴は、試食温度２０℃においてグルタミン酸ナトリウムの旨味のみ感じる、というものであった。

【0050】（ｂ）原材料の配合を第８表に示す原材料にタウリンおよび燐酸二ナトリウムを各３ｇ加えたものとした以外は（ａ）におけると全く同様にして蒲鉾を試作した（試作品Ｂ）。

【0051】試作品Ｂの呈味の特徴は、旨味の強さは、対照（試作品Ａ）より弱まり自然なこく味系の味に変化するが、味全体は弱めに感じる、というものであった。

【0052】（ｃ）原材料の配合を（ｂ）における原材料にＨＡＰ由来オリゴペプチド（平均分子量４００）３ｇを加えたものとした以外は、（ｂ）におけると全く同様にして蒲鉾を試作した（試作品Ｃ）。

【0053】試作品Ｃの呈味の特徴は、噛んでいるうちに味がでて来る、グルタミン酸ナトリウムのシャープな旨味はない、直接食べるには丁度良い手ごろなこく味系の味である、というものであった。

【0054】（ｄ）原材料の配合を（ｂ）における原材料をタウリンおよび燐酸二ナトリウムについて、これらを各２倍とした、すなわち、両者を各６ｇとしたものとした以外は、（ｂ）におけると全く同様にして蒲鉾を試作した（試作品Ｄ）。

【0055】試作品Ｄの呈味の特徴は、試作品Ｂに較べて先味は強くないが、こくのある旨味を呈し、すっきりした味で美味しい蒲鉾である、というものであった。

【0056】（ｅ）原材料の配合を（ｃ）における原材料をタウリン、燐酸二ナトリウムおよびオリゴペプチドについて、これらを各２倍とした、すなわち、これら３者を各６ｇとしたものとした以外は、（ｃ）おけると全く同様にして蒲鉾を試作した（試作品Ｅ）。

【0057】試作品Ｅの呈味の特徴は、オリゴペプチドの使用量を増やしたことによるものと思われるが、試作品Ｃに較べて味が強すぎて、くどくなり過ぎであるが、こくのある旨味の付与されていることは変わりはない、というものであった。

【0058】

【発明の効果】本発明により、こく味付与剤が安価に容易に提供することが可能となり、また飲食品にこくのある旨味を付与することが容易に行なうことができるようになった。

Electronic Acknowledgement Receipt

EFS ID:	38915955
Application Number:	16238802
International Application Number:	
Confirmation Number:	3877
Title of Invention:	METHODS AND COMPOSITIONS FOR CONSUMABLES
First Named Inventor/Applicant Name:	Marija Vrljic
Customer Number:	26191
Filer:	Kimberly M. Maize/Emma Johnson
Filer Authorized By:	Kimberly M. Maize
Attorney Docket Number:	38767-0010003
Receipt Date:	19-MAR-2020
Filing Date:	03-JAN-2019
Time Stamp:	16:03:13
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Foreign Reference	JPH08289761.pdf	3683614 b65ff947571c4a686c6ed66332fdf3921e71f28b	no	9

Warnings:

Information:	
Total Files Size (in bytes):	3683614

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/238,802	01/03/2019	Marija Vrljic	38767-0010003	3877

26191 7590 05/13/2020
FISH & RICHARDSON P.C. (TC)
PO BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER
GWARTNEY, ELIZABETH A

ART UNIT	PAPER NUMBER
1796	

NOTIFICATION DATE	DELIVERY MODE
05/13/2020	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATDOCTC@fr.com

PTOL-90A (Rev. 04/07)

Office Action Summary	Application No. 16/238,802	Applicant(s) Vrljic et al.	
	Examiner ELIZABETH A GWARTNEY	Art Unit 1796	AIA (FITF) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 2-25 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 2-25 is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☑ The drawing(s) filed on 03 January 2019 is/are: a)☑ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112(a):

> (a) IN GENERAL.—The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

The following is a quotation of the first paragraph of pre-AIA 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. **Claims 2-14 are rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor or a joint inventor, or for pre-AIA the inventor(s), at the time the application was filed, had possession of the claimed invention.**

New **claim 2** recites "wherein, upon cooking of the meat replica matrix, at least two volatile compounds are generated that are associated with a meat-like aroma." While there is support in the specification to claim at least two volatile compounds are generated that are associated with a beef-like flavor (page 9/L13-15), there is no support to claim "meat-like flavor" generally.

Double Patenting

4. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting provided the reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file provisions of the AIA as explained in MPEP § 2159. See MPEP §§ 706.02(l)(1) - 706.02(l)(3) for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the

form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

7. **Claims 2, 3, 6-9, 12-16 and 19-21 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1, 2, 4, 12-14 and 16-20 of U.S. Patent No. 10,327,464. Although the claims at issue are not identical, they are not patentably distinct from each other.**

Claim 31 of U.S. Patent No. **10,327,464** is directed to a food product comprising heme-containing protein, a compound selected from glucose, ribose, fructose, lactose, xylose, arabinoise, glucose-6-phosphate, maltose and galactose, and mixtures of two or more thereof; and at least 1.5 mM of a compound selected from cysteine, cysteine, thiamine, methionine and mixtures of two or more thereof, one or plant proteins, wherein the food product contains no animal product that contain heme;; and wherein upon cooking the food product results in the production of at least two volatile compounds selected from a group of meat-associated aromas (claim 1). While the present claims are directed to a meat-replica matrix, given a food product would encompass a meat-replica matrix, the claimed subject matter of the present claim set is considered obvious from claims 1, 2, 4, 12-14 and 16-20 of U.S. Patent No. 10,327,464.

8. **Claims 2, 3, 6-8, 13-16 and 19-21 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1, 3, 10-13 and 16-19 of U.S. Patent No.**

9,826,772. Although the claims at issue are not identical, they are not patentably distinct from each other.

U.S. Patent No. **9,826,772** is directed to a ground beef-like food product comprising heme-containing protein, a compound selected from glucose, ribose, fructose, lactose, xylose, arabinoise, glucose-6-phosphate, maltose and galactose, and mixtures of two or more thereof; and at least 10 mM of a compound selected from cysteine, cysteine, selenocysteine, thiamine, methionine and mixtures of two or more thereof, one or plant proteins, wherein the ground beef like food product contains no animal product; and wherein upon cooking the ground beef-like food product results in the production of at least two volatile compounds which have a beef-associated aroma (claim 1). While the present claims are directed to a meat replica matrix, given a ground beef-like product is a type of meat replica matrix, the claimed subject matter of the present claim set is considered obvious from claims **1, 3, 10-13 and 16-19** of U.S. Patent No. 9,826,772.

9. **Claims 2, 3, 6-8, 13-16 and 19-21 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1, 2, 4, 11-14 and 17-20 of U.S. Patent No. 9,808,029. Although the claims at issue are not identical, they are not patentably distinct from each other.**

U.S. Patent No. **9,808,029** is directed to a ground beef-like food product comprising heme-containing protein, a compound selected from glucose, ribose, fructose, lactose, xylose, arabinoise, glucose-6-phosphate, maltose and galactose, and mixtures of two or more thereof; and at least 10 mM of a compound selected from cysteine, cysteine, selenocysteine, thiamine, methionine and mixtures of two or more thereof, one or plant proteins,

wherein the ground beef like food product contains no animal product; and wherein upon cooking the ground beef-like food product results in the production of at least two volatile compounds which have a beef-associated aroma (claim 1). While the present claims are directed to a meat replica matrix, given a ground beef-like product is a type of meat replica matrix, the claimed subject matter of the present claim set is considered obvious from claims 1, 2, 4, 11-14 and 17-20 of U.S. Patent No. 9,808,029.

10. **Claim 2, 3, 6-8, 13, 14-16 and 19-21 are provisionally rejected on the ground of nonstatutory double patenting as being unpatentable over claims 31-34, 43, 44 and 46-50 of copending Application No. 15/913,018. Although the claims at issue are not identical, they are not patentably distinct from each other.**

Claim 31 of copending Application No. 15/913,018 is directed to a meat-like food product comprising, one or more plant proteins; and a source of a heme-containing protein, a compound selected from glucose, ribose, fructose, lactose, xylose, arabinose, glucose-6-phosphate, maltose, and galactose, and mixtures of two or more thereof; a compound selected from cysteine, cysteine, thiamine, methionine, and mixtures of two or more thereof in a concentration of at least 1.5 mM; and wherein cooking the meat-like food product results in the product of at least two volatile compounds which have a meat-associated aroma. This reference makes obvious the claimed meat-like composition of the present application (claim 2) which requires substantially the same components and a final product exhibiting similar flavor characteristics.

.

This is a provisional nonstatutory double patenting rejection because the patentably indistinct claims have not in fact been patented.

11. **Claims 31, 33, 34 and 46-53 are provisionally rejected on the ground of nonstatutory double patenting as being unpatentable over claims 31, 37-41 and 49-53 of copending Application No. 15/913,090. Although the claims at issue are not identical, they are not patentably distinct from each other.**

Claim 31 of copending Application No. 15/913,090 is directed to a meat-like food product comprising, one or more plant proteins; and a source of a heme-containing protein, a compound selected from glucose, ribose, fructose, lactose, xylose, arabinose, glucose-6-phosphate, maltose, and galactose, and mixtures of two or more thereof; a compound selected from cysteine, cysteine, thiamine, methionine, and mixtures of two or more thereof in a concentration of at least 1.5 mM; and wherein cooking the meat-like food product results in the product of at least two volatile compounds which have a meat-associated aroma. This reference makes obvious the claimed meat-like composition of the present application (claim 2) which requires substantially the same components and a final product exhibiting similar flavor characteristics.

This is a provisional nonstatutory double patenting rejection because the patentably indistinct claims have not in fact been patented.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ELIZABETH A GWARTNEY whose telephone number is (571)270-3874. The examiner can normally be reached on M-F: 8 a.m. - 4 p.m..

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald (Larry) Tarazano can be reached on 571-272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see https://ppair-my.uspto.gov/pair/PrivatePair. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ELIZABETH A. GWARTNEY
Primary Examiner
Art Unit 1791

/ELIZABETH GWARTNEY/
Primary Examiner, Art Unit 1796

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/238,802	Vrljic et al.
	Examiner	**Art Unit**
	ELIZABETH A GWARTNEY	1796

CPC - Searched*		
Symbol	**Date**	**Examiner**
A23J3/227	05/06/2020	EG

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	**Date**	**Examiner**
Inventor search completed	05/07/2020	EG
A23J3/227 (text limted by heme)	05/06/2020	EG
Review of 15/786,776 and 14/796,970 - parent application prosecution history	05/07/2020	EG

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/238,802	Vrljic et al.
	Examiner	**Art Unit**
	ELIZABETH A GWARTNEY	1796

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	05/08/2020								
	1	-								
	2	✓								
	3	✓								
	4	✓								
	5	✓								
	6	✓								
	7	✓								
	8	✓								
	9	✓								
	10	✓								
	11	✓								
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	14	✓								
	15	✓								
	16	✓								
	17	✓								
	18	✓								
	19	✓								
	20	✓								
	21	✓								
	22	✓								
	23	✓								
	24	✓								
	25	✓								

Receipt date: 05/07/2019

Substitute Disclosure Form	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 38767-0010003	Application No. 16/238,802
Information Disclosure Statement by Applicant (Use several sheets if necessary)		Applicant Impossible Foods Inc.	
(37 CFR §1.98(b))		Filing Date January 3, 2019	Group Art Unit

U.S. Patent Documents

Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	1.	2934435	4/26/1960	May			
	2.	2934436	4/26/1960	May			
	3.	2934437	4/26/1960	Morton et al.			
	4.	2955041	10/4/1960	Broderick			
	5.	3157516	11/17/1964	Huber			
	6.	3271167	9/6/1966	Perret			
	7.	3316099	4/25/1967	Hoersch			
	8.	3365306	1/23/1968	Perret			
	9.	3394015	7/23/1968	Giacino et al.			
	10.	3394016	7/23/1968	Bidmead			
	11.	3394017	7/23/1968	Giacino et al.			
	12.	3480447	11/25/1969	Hack			
	13.	3493395	2/3/1970	Soeters			
	14.	3519437	7/7/1970	Giacino et al.			
	15.	3524747	8/18/1970	O'Hara			
	16.	3532514	10/6/1970	May			
	17.	3532515	10/6/1970	Broderick			
	18.	3578465	5/11/1971	van der Zijden			
	19.	3615600	10/26/1971	Zevenaar			
	20.	3620772	11/16/1971	Nagayoshi			
	21.	3642497	2/15/1972	Gunther			
	22.	3645753	2/29/1972	Gasser			
	23.	3645754	2/29/1972	Wiener			
	24.	3658550	4/25/1972	Hawley			
	25.	3660114	5/2/1972	Thomas			
	26.	3689289	9/5/1972	Perret			

Examiner Signature	Date Considered
/ELIZABETH GWARTNEY/	05/08/2020

EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute Disclosure Form

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /E.G./

Receipt date: 05/07/2019

Substitute Disclosure Form	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 38767-0010003	Application No. 16/238,802
Information Disclosure Statement by Applicant (Use several sheets if necessary)		Applicant Impossible Foods Inc.	
(37 CFR §1.98(b))		Filing Date January 3, 2019	Group Art Unit

U.S. Patent Documents

Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	27.	3693533	9/26/1972	Liepa			
	28.	3697295	10/10/1972	van der Ouweland			
	29.	3716379	2/13/1973	de la Potterie			
	30.	3716380	2/13/1973	de la Potterie			
	31.	3719499	3/6/1973	Hai et al.			
	32.	3741775	6/26/1973	Lee			
	33.	3761287	9/25/1973	Jaeggi et al.			
	34.	3804953	4/16/1974	Bentz et al.			
	35.	3829582	8/13/1974	Guadagni et al.			
	36.	3840674	10/8/1974	Joseph et al.			
	37.	3870801	3/11/1975	Tombs			
	38.	3879561	4/22/1975	Smith et al.			
	39.	3881022	4/29/1975	Gasser			
	40.	3928643	12/23/1975	Ishiguro et al.			
	41.	3930046	12/30/1975	Baugher			
	42.	3966985	6/29/1976	Jonas			
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	44.	4045587	8/30/1977	Katz et al.			
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(37 CFR §1.98(b))		Filing Date January 3, 2019	Group Art Unit

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Sheet 2 of 2

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Attorney Docket No.: 38767-0010003 / M2CON-Track 1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Marija Vrljic	Art Unit	:	Unknown
Application No.	:	16/238,802	Examiner	:	Unknown
Filed	:	January 3, 2019	Conf. No.	:	3877
Title	:	METHODS AND COMPOSITIONS FOR CONSUMABLES			

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT

Please consider the documents listed on the disclosure form submitted with this statement. Copies of the documents are being submitted with this statement to the extent required under 37 C.F.R. § 1.98(a)(2).

This statement is being filed within three months of the filing date of the application or before the receipt of a first action on the merits; therefore, no fee is believed due.

Please apply any necessary charges or credits applicable under 37 C.F.R. § 1.17(p) to deposit account 06-1050, referencing the above attorney docket number.

Please contact the undersigned if there are any questions regarding this statement.

Respectfully submitted,

Date: November 26, 2019

/Kimberly M. Maize, Reg. No. 76,370/
Kimberly M. Maize
Reg. No. 76,370

Customer Number 26191
Fish & Richardson P.C.
Telephone: +1 (612) 638-5707
Facsimile: (877) 769-7945

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Examiner Signature /ELIZABETH GWARTNEY/	Date Considered 05/08/2020
EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.	

Substitute Disclosure Form

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /E.G./

Receipt date: 03/19/2020

Sheet 1 of 1

Substitute Disclosure Form	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 38767-0010003	Application No. 16/238,802
Information Disclosure Statement by Applicant (Use several sheets if necessary)		Applicant Impossible Foods Inc.	
(37 CFR §1.98(b))		Filing Date January 3, 2019	Group Art Unit

U.S. Patent Documents

Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Filing Date If Appropriate	Class	Subclass

Foreign Patent Documents or Published Foreign Patent Applications

Examiner Initial	Desig. ID	Document Number	Publication Date	Country or Patent Office	Translation	Class	Subclass
	1.	JP H08-289761	11/5/1996	JP	Abstract		

Other Documents (include Author, Title, Date, and Place of Publication)

Examiner Initial	Desig. ID	Document
	2.	"Peas, green raw," FoodData Central, US Department of Agriculture, retrieved from URL <https:/fdc.nal.usda.gov/fdc-app.html#/food-details/170419/nutrients>, April 1, 2019, 8 pages
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Examiner Signature	Date Considered
/ELIZABETH GWARTNEY/	05/08/2020

EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute Disclosure Form

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /E.G./

Receipt date: 03/19/2020

Attorney Docket No.: 38767-0010003 / M2CON-Track 1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Marija Vrljic	Art Unit	:	Unknown
Application No.	:	16/238,802	Examiner	:	Unknown
Filed	:	January 3, 2019	Conf. No.	:	3877
Title	:	METHODS AND COMPOSITIONS FOR CONSUMABLES			

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT

Please consider the documents listed on the disclosure form submitted with this statement. Copies of the documents are being submitted with this statement to the extent required under 37 C.F.R. § 1.98(a)(2).

The applicant wishes to make the Examiner aware of the following related applications. The prosecution histories for these applications and patents are available on PAIR, and are not provided with this statement.

Application No.	Filing Date	First Named Inventor	Attorney Docket No.
14/796,970	7/10/2015	Marija Vrljic	38767-0010001
15/786,776	10/18/2017	Marija Vrljic	38767-0010002
16/238,769	1/3/2019	Marija Vrljic	38767-0010004
14/152,499	1/10/2014	Patrick O'Reilly Brown M.D., Ph.D.	38767-0012001
14/752,540	6/26/2015	Patrick O'Reilly Brown M.D., Ph.D.	38767-0012002
15/985,694	5/21/2018	Patrick O'Reilly Brown M.D., Ph.D.	38767-0012003
14/797,006	7/10/2015	Rachel Fraser	38767-0015001
15/398,479	1/4/2017	Rachel Fraser	38767-0015002
15/624,505	6/15/2017	Rachel Fraser	38767-0015003
15/624,513	6/15/2017	Rachel Fraser	38767-0015004
15/839,994	12/13/2017	Rachel Fraser	38767-0015005
15/913,018	3/6/2018	Rachel Fraser	38767-0015006
15/912,763	3/6/2018	Rachel Fraser	38767-0015007
15/913,090	3/6/2018	Rachel Fraser	38767-0015008
13/941,211	7/12/2013	Patrick O'Reilly Brown M.D., Ph.D.	38767-0019001
15/985,697	5/21/2018	Patrick O'Reilly Brown M.D., Ph.D.	38767-0019002
15/300,339	9/29/2016	Ranjani Varadan	38767-0026US1
16/238,698	1/3/2019	Ranjani Varadan	38767-0026002

Receipt date: 03/19/2020

16/238,749	1/3/2019	Ranjani Varadan	38767-0026003

This statement is being filed before the receipt of a first action on the merits. Therefore, no fee is believed due.

Please apply any necessary charges or credits applicable under 37 C.F.R. § 1.17(p) to deposit account 06-1050, referencing the above attorney docket number.

Please contact the undersigned if there are any questions regarding this statement.

Respectfully submitted,

Date: March 19, 2020

/Kimberly M. Maize, Reg. No. 76,370/
Kimberly M. Maize
Reg. No. 76,370

Customer Number 26191
Fish & Richardson P.C.
Telephone: +1 (612) 638-5707
Facsimile: (877) 769-7945

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	22	"10327464"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/05/08 13:22
L2	34	"9826772"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/05/08 13:24
L3	26	"9808029"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/05/08 14:03
S1	1	"15913090"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/05/05 12:26
S2	9	"20120093994"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/05/06 10:51
S3	9	"20120093994"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/05/06 12:27
S4	46	A23J3/227.cpc. AND heme	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/05/06 14:40
S5	1	"15913090"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/05/07 09:34
S6	22	"10327464"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/05/08 12:04

EAST Search History (Interference)

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BIB DATA SHEET

CONFIRMATION NO. 3877

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
16/238,802	01/03/2019 RULE	426	1796	38767-0010003

APPLICANTS
Impossible Foods Inc., Redwood City, CA;

INVENTORS
Marija Vrljic, San Mateo, CA;
Sergey Solomatin, Mountain View, CA;
Rachel Fraser, San Francisco, CA;
Patrick O'Reilly Brown, Stanford, CA;
Jessica Karr, San Francisco, CA;
Celeste Holz-Schietinger, East Palo Alto, CA;
Michael Eisen, Berkeley, CA;
Ranjani Varadan, Fremont, CA;

**** CONTINUING DATA ****************************
This application is a CON of 15/786,776 10/18/2017 PAT 10172381
which is a CON of 14/796,970 07/10/2015 PAT 10039306
which is a CON of PCT/US2014/011361 01/13/2014
which is a CON of 13/941,211 07/12/2013 ABN
and claims benefit of 61/908,634 11/25/2013
and claims benefit of 61/751,816 01/11/2013

**** FOREIGN APPLICATIONS ****************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****
01/17/2019

Foreign Priority claimed	❑ Yes ☑ No		STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
35 USC 119(a-d) conditions met	❑ Yes ☑ No	❑ Met after Allowance	CA	9	24	2
Verified and Acknowledged	/ELIZABETH A GWARTNEY/ Examiner's Signature	Initials				

ADDRESS
FISH & RICHARDSON P.C. (TC)
PO BOX 1022
MINNEAPOLIS, MN 55440-1022
UNITED STATES

TITLE
METHODS AND COMPOSITIONS FOR CONSUMABLES

FILING FEE RECEIVED		
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Sheet 1 of 1

Substitute Disclosure Form	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 38767-0010003	Application No. 16/238,802
Information Disclosure Statement by Applicant (Use several sheets if necessary)		Applicant Impossible Foods Inc.	
(37 CFR §1.98(b))		Filing Date January 3, 2019	Group Art Unit

U.S. Patent Documents

Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate

Foreign Patent Documents or Published Foreign Patent Applications

Examiner Initial	Desig. ID	Document Number	Publication Date	Country or Patent Office	Class	Subclass	Translation Yes	Translation No

Other Documents (include Author, Title, Date, and Place of Publication)

Examiner Initial	Desig. ID	Document
	1.	Analysis of soy hydrolysate, Avomen Analytical Services Laboratory Test Results, July 25, 2019
	2.	Biede, et al., "Swiss cheese flavor: I. chemical analysis," Journal of Dairy Science, 1979, 62:227-237
	3.	Declaration of Dr. Jorge Ruiz-Carrascal, dated 7/29/2019, 72 pages
	4.	EP Opposition Letter from Opponent in EP Appln. No. 14737766.7 dated 8/6/2019, 55 pages
	5.	Estevez, et al., "Analysis of volatiles in meat from Iberian pigs and lean pigs after refrigeration and cooking by using SPME-GC-MS," Journal of Agricultural and Food Chemistry, 2003, 51:3429-3435
	6.	Friedman and Brandon, "Nutritional and health benefits of soy proteins," J. Agric. Food Chem., 2001, 49(3):1069-1086
	7.	Ibrahim, et al., "Mechanism of the CO-sensing heme protein CooA: new insights from the truncated heme domain and UVRR spectroscopy," Journal of Inorganic Biochemistry," 2007, 101:1776-1785
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	9.	Mahajan, et al., "Aroma compounds in sweet whey powder," Journal of Dairy Science, 2004, 87:4057-4063
	10.	Meisinger, et al., Flavor relationships among muscles from the beef chuck and round," Journal of Animal Science, 2006, 84:2826-2833
	11.	Singh, et al., "Functional and edible uses of soy protein products," Comp. Rev. Food Sci. Food Safety, 2008, 7:14-28
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	13.	Yeast Metabolom Database, "Heme (YMDB0041)," (http://www.ymdb.ca/compounds/YMDB00041)
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Examiner Signature	Date Considered
/ELIZABETH GWARTNEY/	05/08/2020

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Attorney Docket No.: 38767-0010003 / M2CON-Track 1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Marija Vrljic	Art Unit	:	Unknown
Application No.	:	16/238,802	Examiner	:	Unknown
Filed	:	January 3, 2019	Conf. No.	:	3877
Title	:	METHODS AND COMPOSITIONS FOR CONSUMABLES			

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INFORMATION DISCLOSURE STATEMENT

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Please contact the undersigned if there are any questions regarding this statement.

Respectfully submitted,

Date: September 26, 2019

/M. Angela Parsons/
M. Angela Parsons, Ph.D.
Reg. No. 44,282

Customer Number 26191
Fish & Richardson P.C.
Telephone: (612) 335-5070
Facsimile: (877) 769-7945

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/238,802	Filing Date 01/03/2019	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $460 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

AMENDMENT	11/12/2020	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 23	Minus	** 24	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0		x $480 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
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Substitute Disclosure Form	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 38767-0010003	Application No. 16/238,802
Information Disclosure Statement by Applicant (Use several sheets if necessary)		Applicant Impossible Foods Inc.	
(37 CFR §1.98(b))		Filing Date January 3, 2019	Group Art Unit 1796

U.S. Patent Documents

Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Filing Date If Appropriate	Class	Subclass
	1.	4098913	7/4/1978	Baugher			
	2.	4197324	4/8/1980	Ziminski et al.			
	3.	4324807	4/13/1982	Kim et al.			
	4.	10798958	10/13/2020	Varadan et al.			
	5.	20050112271	5/1/2005	Picarski			
	6.	20090148558	6/11/2009	Kim et al.			

Foreign Patent Documents or Published Foreign Patent Applications

Examiner Initial	Desig. ID	Document Number	Publication Date	Country or Patent Office	Translation	Class	Subclass
	7.	RU 2010137628	3/20/2012	RU	Abstract		

Other Documents (include Author, Title, Date, and Place of Publication)

Examiner Initial	Desig. ID	Document
	8.	Dinh et al., "Effects of USDA quality grade and cooking on water-soluble precursors of beef flavor," Meat Science, 2018, 146:122-130

Examiner Signature	Date Considered

EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute Disclosure Form

Attorney Docket No.: 38767-0010003 / M2CON-Track 1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Marija Vrljic	Art Unit	:	1796
Application No.	:	16/238,802	Examiner	:	Elizabeth A. Gwartney
Filed	:	January 3, 2019	Conf. No.	:	3877
Title	:	METHODS AND COMPOSITIONS FOR CONSUMABLES			

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

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Please apply any necessary charges or credits applicable under 37 C.F.R. § 1.17(p) to deposit account 06-1050, referencing the above attorney docket number.

Please contact the undersigned if there are any questions regarding this statement.

Respectfully submitted,

Date: November 12, 2020

/Kimberly M. Maize, Reg. No. 76,370/
Kimberly M. Maize
Reg. No. 76,370

Customer Number 26191
Fish & Richardson P.C.
Telephone: +1 (612) 638-5707
Facsimile: (877) 769-7945

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Patents RU 2010137628

Meat product analogue

Abstract

1. An analogue product of meat containing a combination of a dry component, a liquid, a source of a monovalent cationic carbonate or bicarbonate and an acid component of a chemical baking powder, where a dry component having a protein content contains a source of a dry protein containing sulfur; the liquid contains water; a source of monovalent cationic carbonate or bicarbonate and the acidic component of the chemical baking powder of the test are present in a ratio of about 1: 2-1: 4 by weight; and the meat analogue product contains a plurality of grooved and detachable aligned fibers in the product. ! 2. The meat analogue product of claim 1, further comprising a reducing agent. ! 3. The meat analogue product according to claim 1, where the dry component contains 0.4-4.8 wt.% A source of monovalent cationic carbonate or bicarbonate relative to the total weight of the dry component. ! 4. The meat analogue product according to claim 1, wherein the source of the dry protein containing sulfur contains gluten, soy protein, pea protein, egg white, or a mixture thereof. ! 5. The meat analogue product according to claim 1, wherein the dry component contains a source of dry meat protein containing sulfur, or a dry protein, or a source of fiber obtained from whole grains, fruits, vegetables, or mixtures thereof. ! 6. The meat analogue product according to claim 1, wherein the liquid further comprises a source of fresh or frozen meat, a source of meat processed into flour, or a mixture thereof. ! 7. The meat analogue product according to claim 1, wherein the liquid, the dry component, or both additionally contain one or more humectants, a fat source, a dye, a flavor enhancer, a flavoring substance, a vitamin, a mineral, an antioxidant, dried blood plasma, salt, dextrose, sorbitol, starch, soy protein

Classifications

» A23K50/48 Moist feed

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RU2010137628A

Russia

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Other languages: Russian

Inventor: Ральф РАЙЗЕР (US), Ральф РАЙЗЕР, Винод ГУМУДАВЕЛЛИ (US), Винод ГУМУДАВЕЛЛИ, Уильям ГЭРИБИАН (US), Уильям ГЭРИБИАН, Льюис ДЖЕЙМС (US), Льюис ДЖЕЙМС, Люсио Хироши ЙОНЕМОТО (US), Люсио Хироши ЙОНЕМОТО

Worldwide applications

2009 JP CN CA EP US AU RU WO

Application RU2010137628/13A events

2008-02-12	Priority to US27960089P
2008-02-12	Priority to US61/027,960
2009-02-12	Application filed by Марс Инкорпорейтед (US), Марс Инкорпорейтед
2012-03-20	Publication of RU2010137628A

Info: Patent citations (15), Cited by (23), Legal events, Similar documents, Priority and Related Applications

External links: Espacenet, Global Dossier, Discuss

Claims (20)

Hide Dependent

1. A meat analogue product comprising a combination of a dry component, a liquid, a source of a monovalent cationic carbonate or bicarbonate and an acid component of a chemical baking powder, where a dry component having a protein content contains a source of a dry protein containing sulfur; the liquid contains water; a source of monovalent cationic carbonate or bicarbonate and the acidic component of the chemical baking powder of the test are present in a ratio of about 1: 2-1: 4 by weight; and the meat analogue product contains a plurality of grooved and detachable aligned fibers in the product.

2. The meat analogue product according to claim 1, further comprising a reducing agent.

3. The meat analogue product according to claim 1, where the dry component contains 0.4-4.8 wt.% A source of monovalent cationic carbonate or bicarbonate relative to the total weight of the dry component.

4. The meat analogue product according to claim 1, wherein the source of the dry protein containing sulfur contains gluten, soy protein, pea protein, egg white, or a mixture thereof.

5. The meat analogue product according to claim 1, wherein the dry component comprises a source of dry meat protein containing sulfur or a dry protein or fiber source obtained from whole grains, fruits, vegetables, or mixtures thereof

6. The meat analogue product according to claim 1, wherein the liquid further comprises a source of fresh or frozen meat, a source of processed meat or a mixture thereof.

7. The meat analogue product according to claim 1, wherein the liquid, the dry component, or both additionally contain one or more humectants, a fat source, a dye, a flavor enhancer, a flavoring substance, a vitamin, a mineral, an antioxidant, dried blood plasma, salt, dextrose, sorbitol, starch, soy proteins, gelatin, nitrates, phosphates or a fiber source.

8. The meat analogue product according to claim 1, wherein about 30-80% by weight of the protein content in the dry component is a source of dry protein containing sulfur.

9. The meat analogue product according to claim 1, wherein the dry component further comprises a dry carbohydrate source, wherein the dry carbohydrate source includes corn starch, corn flour, pea fiber, starch, or mixtures thereof.

10. The meat analogue product according to claim 1, wherein the meat analogue product contains about 25-60 wt.% Of total protein.

РОССИЙСКАЯ ФЕДЕРАЦИЯ

(19) RU (11) 2010 137 628 (13) A

(51) МПК
A23L 1/00 (2006.01)

ФЕДЕРАЛЬНАЯ СЛУЖБА
ПО ИНТЕЛЛЕКТУАЛЬНОЙ СОБСТВЕННОСТИ

(12) ЗАЯВКА НА ИЗОБРЕТЕНИЕ

(21)(22) Заявка: 2010137628/13, 12.02.2009

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Адрес для переписки:
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(71) Заявитель(и):
МАРС ИНКОРПОРЕЙТЕД (US)

(72) Автор(ы):
РАЙЗЕР Ральф (US),
ГУМУДАВЕЛЛИ Винод (US),
ГЭРИБИАН Уильям (US),
ДЖЕЙМС Льюис (US),
ЙОНЕМОТО Люсио Хироши (US)

RU 2010137628 A

(54) ПРОДУКТ-АНАЛОГ МЯСА

(57) Формула изобретения

1. Продукт-аналог мяса, содержащий сочетание сухого компонента, жидкости, источника одновалентного катионного карбоната или бикарбоната и кислого компонента химического разрыхлителя теста, где сухой компонент, имеющий содержание белка, содержит источник сухого белка, содержащего серу; жидкость содержит воду; источник одновалентного катионного карбоната или бикарбоната и кислый компонент химического разрыхлителя теста присутствуют в соотношении около 1:2-1:4 по массе; и продукт-аналог мяса содержит множество покрытых бороздками и отделяемых выровненных волокон в продукте.

2. Продукт-аналог мяса по п.1, дополнительно содержащий восстанавливающий агент.

3. Продукт-аналог мяса по п.1, где сухой компонент содержит 0,4-4,8 мас.% источника одновалентного катионного карбоната или бикарбоната по отношению к общей массе сухого компонента.

4. Продукт-аналог мяса по п.1, где источник сухого белка, содержащего серу, содержит глютен, соевый белок, гороховый белок, яичный белок или их смесь.

5. Продукт-аналог мяса по п.1, где сухой компонент содержит источник сухого мясного белка, содержащего серу, или сухой белок, или источник волокон, полученный из цельного зерна, фруктов, овощей или их смесей.

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6. Продукт-аналог мяса по п.1, где жидкость дополнительно содержит источник свежего или замороженного мяса, источник переработанного в муку мяса или их смеси.

7. Продукт-аналог мяса по п.1, где жидкость, сухой компонент или оба дополнительно содержат один или более увлажнитель, источник жира, краситель, усилитель вкуса, вкусовое вещество, витамин, минерал, антиоксидант, высушенную плазму крови, соль, декстрозу, сорбит, крахмал, соевые белки, желатин, нитраты, фосфаты или источник волокон.

8. Продукт-аналог мяса по п.1, где около 30-80 мас.% содержания белка в сухом компоненте составляет источник сухого белка, содержащего серу.

9. Продукт-аналог мяса по п.1, где сухой компонент дополнительно содержит сухой источник углеводов, где сухой источник углеводов включает кукурузный крахмал, кукурузную муку, гороховые волокна, крахмал или их смеси.

10. Продукт-аналог мяса по п.1, где продукт-аналог мяса содержит около 25-60 мас.% общего белка.

11. Продукт-аналог мяса по п.1, где продукт-аналог мяса имеет pH около 6,0-7,8.

12. Продукт-аналог мяса по п.1, где продукт-аналог мяса содержит жир в количестве 0,2-20 мас.%.

13. Продукт-аналог мяса по п.1, где продукт-аналог мяса содержит около 25-65 мас.% влаги.

14. Способ получения продукта-аналога мяса, где способ предусматривает:

a) объединение источника одновалентного катионного бикарбоната или карбоната, воды и сухого компонента, содержащего источник белка, содержащего серу, в условиях смешивания с низким сдвигом с получением тестообразной массы;

b) нагревание тестообразной массы до температуры около 100-150°C с получением нагретой тестообразной массы;

c) подача нагретой тестообразной массы на входное отверстие охлаждающего устройства;

d) перемещение нагретой тестообразной массы через охлаждающее устройство под давлением 50-900 фунтов/дюйм^2 к выходному отверстию охлаждающего устройства с получением продукта-аналога мяса, где продукт-аналог мяса имеет температуру обработки 100°C или менее на выходном отверстии.

15. Способ по п.14, где тестообразная масса дополнительно содержит восстанавливающий агент.

16. Способ по п.14, где продукт-аналог мяса содержит множество покрытых бороздками и отделяемых выровненных волокон.

17. Способ по п.14, где нагретую тестообразную массу формируют и нагревают в устройстве обработки под давлением с нагревом.

18. Способ по п.17, где устройством для обработки под давлением с нагревом является поршневый насос, двушнековый экструдер, одношнековый экструдер, экструзионный измельчитель или перемешивающий экструдер.

19. Способ по п.18, где устройством для обработки под давлением с нагревом является одношнековый экструдер; и тестообразную массу формируют в устройстве для обработки под давлением с нагревом, подавая жидкость и сухой компонент в устройство для обработки под давлением с нагревом.

20. Продукт-аналог мяса, полученный способом по п.14.

RU 2010137628 A

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Electronic Patent Application Fee Transmittal

Application Number:	16238802
Filing Date:	03-Jan-2019
Title of Invention:	METHODS AND COMPOSITIONS FOR CONSUMABLES
First Named Inventor/Applicant Name:	Marija Vrljic
Filer:	Kimberly M. Maize/Shana Knotts
Attorney Docket Number:	38767-0010003

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
SUBMISSION- INFORMATION DISCLOSURE STMT	1806	1	260	260
		Total in USD ($)		**260**

Electronic Acknowledgement Receipt

EFS ID:	41108537
Application Number:	16238802
International Application Number:	
Confirmation Number:	3877
Title of Invention:	METHODS AND COMPOSITIONS FOR CONSUMABLES
First Named Inventor/Applicant Name:	Marija Vrljic
Customer Number:	26191
Filer:	Kimberly M. Maize/Victor Ramirez-Juarez
Filer Authorized By:	Kimberly M. Maize
Attorney Docket Number:	38767-0010003
Receipt Date:	12-NOV-2020
Filing Date:	03-JAN-2019
Time Stamp:	16:30:40
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$260
RAM confirmation Number	E2020ABG31117952
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	0010003IDS1449.pdf	152907 6457081b7c55768b51cb1a6cdc4decbdc433393d	no	2
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
2	Foreign Reference	RU2010137628.pdf	3235117 7ec9515c50e55eb1519aa407b6bb6e5918db9cd7	no	3
Warnings:					
Information:					
3	Non Patent Literature	Dinh_2018.pdf	14430782 915061b3a2540a4b2d4c44eb28a529cb0b3769dd	no	38
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	30593 756ae84dc7103bae87c3e2e0cb5a48ebd71fcb58	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	17849399	

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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
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If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Attorney Docket No.: 38767-0010003 / Client Ref: M2CON-Track 1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Marija Vrljic	Art Unit	:	1796
Application No.	:	16/238,802	Examiner	:	Elizabeth A. Gwartney
Filed	:	January 3, 2019	Conf. No.	:	3877
Title	:	METHODS AND COMPOSITIONS FOR CONSUMABLES			

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REPLY TO ACTION OF MAY 13, 2020

Please consider the following reply.

Electronic Patent Application Fee Transmittal

Application Number:	16238802
Filing Date:	03-Jan-2019
Title of Invention:	METHODS AND COMPOSITIONS FOR CONSUMABLES
First Named Inventor/Applicant Name:	Marija Vrljic
Filer:	Kimberly M. Maize/Emily Palmer
Attorney Docket Number:	38767-0010003

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
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Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension - 3 months with $0 paid	1253	1	1480	1480
Miscellaneous:				
			Total in USD ($)	**1480**

Electronic Acknowledgement Receipt

EFS ID:	41110246
Application Number:	16238802
International Application Number:	
Confirmation Number:	3877
Title of Invention:	METHODS AND COMPOSITIONS FOR CONSUMABLES
First Named Inventor/Applicant Name:	Marija Vrljic
Customer Number:	26191
Filer:	Kimberly M. Maize/Emily Palmer
Filer Authorized By:	Kimberly M. Maize
Attorney Docket Number:	38767-0010003
Receipt Date:	12-NOV-2020
Filing Date:	03-JAN-2019
Time Stamp:	17:02:36
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$1480
RAM confirmation Number	E2020ABH02528678
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		Response.pdf	121314 f0f293075defd4df477812389ae555557812b65e	yes	11
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Applicant Arguments/Remarks Made in an Amendment		9	11	
	Claims		2	8	
	Amendment/Req. Reconsideration-After Non-Final Reject		1	1	
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	31224 fdfa54f3f3df6ef157c976c17c14a18382452f5a	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	152538		

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National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

REMARKS

Claims 2-25 were pending. Applicant herein canceled claim 14 without disclaimer or prejudice to further prosecution. Applicant has herein amended claim 2. Support for this amendment can be found throughout the specification as filed, including at page 9, lines 13-15 of the Specification as filed.

Upon entry of the above amendments, claims 2-13, and 15-25 will be pending. Reconsideration and allowance of the pending claims is respectfully requested.

Rejections under 35 U.S.C. § 112

Claims 2-14 are rejected under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the written description requirement. According to the Examiner, the claims contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Applicant respectfully traverses the rejection.

Without conceding to the merits of the rejection, Applicant has amended claim 2 to recite "wherein, upon cooking of the meat replica matrix, at least two volatile compounds are generated that are associated with **beef-like** aroma". Support for the amended language can be found at least at page 9, lines 13-25. As such, Applicant respectfully submits that the Applicant at the time the application was filed, had possession of the claimed invention and requests the reconsideration and withdrawal of the 35 U.S.C. § 112 rejection.

Double Patenting

Claims 2, 3, 6-9, 12-16 and 19-21 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1, 2, 4, 12-14 and 16-20 of U.S. Patent No. 10,327,464.

Without conceding to the merits of the rejection, Applicant will file a terminal disclaimer over U.S. Patent No. 10,327,464, thus rendering the rejection moot. Applicant therefore requests that the rejection be withdrawn.

Claims 2, 3, 6-8, 13-16 and 19-21 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1, 3, 10-13 and 16-19 of U.S. Patent No. 9,826,772.

Without conceding to the merits of the rejection, Applicant will file a terminal disclaimer over U.S. Patent No. 9,826,772, thus rendering the rejection moot. Applicant therefore requests that the rejection be withdrawn.

Claims 2, 3, 6-8, 13-16 and 19-21 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1, 2, 4, 11-14 and 17-20 of U.S. Patent No. 9,808,029.

Without conceding to the merits of the rejection, Applicant will file a terminal disclaimer over U.S. Patent No. 9,808,029, thus rendering the rejection moot. Applicant therefore requests that the rejection be withdrawn.

Claim 2, 3, 6-8, 13, 14-16 and 19-21 are provisionally rejected on the ground of nonstatutory double patenting as being unpatentable over claims 31-34, 43, 44 and 46-50 of copending Application No. 15/913,018.

Without conceding to the merits of the rejection, Applicant will file a terminal disclaimer over copending application number 15/913,018, thus rendering the rejection moot. Applicant therefore requests that the rejection be withdrawn.

Claims 31, 33, 34 and 46-53 are provisionally rejected on the ground of nonstatutory double patenting as being unpatentable over claims 31, 37-41 and 49-53 of copending Application No. 15/913,090.

Without conceding to the merits of the rejection, Applicant will file a terminal disclaimer over copending application number 15/913,090, thus rendering the rejection moot. Applicant therefore requests that the rejection be withdrawn.

CONCLUSION

It is believed that all of the pending claims have been addressed and the claims are in condition for allowance.

The undersigned welcomes the opportunity to further discuss by telephone any position or issue not fully addressed by the above remarks and amendments.

The fees for extension of time are being paid with this reply on the Electronic Filing System. Apply those fees and any other necessary charges or credits to Deposit Account 06-1050, referencing the above attorney docket number.

Respectfully submitted,

Date: November 12, 2020

/Kimberly M. Maize, Reg. No. 76,370/
Kimberly M. Maize
Reg. No. 76,370

Customer Number 26191
Fish & Richardson P.C.
Telephone: +1 (612) 638-5707
Facsimile: (877) 769-7945

62332901.doc

Amendments to Claims:
Listing of Claims.

1. (Canceled).

2. (Currently Amended) A meat replica matrix comprising:

one or more plant proteins;

a sugar selected from glucose, ribose, sucrose, fructose, xylose, maltodextrin, and combinations thereof;

at least one sulfur compound selected from methionine, cysteine, and thiamine; and

0.01%-5% (by weight of the meat replica matrix) of a non-animal heme-containing protein,

wherein, upon cooking of the meat replica matrix, at least two volatile compounds are generated that are associated with a ~~meat-like~~beef-like aroma.

3. (Previously Presented) The meat replica matrix of claim 2, wherein the non-animal heme-containing protein has an amino acid sequence with at least 70% homology to the amino acid sequence set forth in SEQ ID NO: 1.

4. (Previously Presented) The meat replica matrix of claim 2, wherein the non-animal heme-containing protein has a UV-VIS spectrum that is substantially similar to that of myoglobin from an animal.

5. (Previously Presented) The meat replica matrix of claim 2, wherein the heme-containing protein is selected from the group consisting of a leghemoglobin, a flavohemoglobin, Hell's gate globin I, an erythrocruorin, a protoglobin, a cyanoglobin, a chlorocruorin, a truncated hemoglobin, a truncated 2/2 globin, and a hemoglobin 3.

6. (Previously Presented) The meat replica matrix of claim 2, wherein the

meat replica matrix comprises 0.4%-1% (by weight of the meat replica matrix) of the non-animal heme-containing protein.

7. (Previously Presented) The meat replica matrix of claim 2, wherein the meat replica matrix comprises about 0.3% (by weight of the meat replica matrix) of the non-animal heme-containing protein.

8. (Previously Presented) The meat replica matrix of claim 2, wherein the meat replica matrix comprises about 0.2% (by weight of the meat replica matrix) of the non-animal heme-containing protein.

9. (Previously Presented) The meat replica matrix of claim 2, wherein the one or more plant proteins are selected from the group consisting of rubisco, pea proteins, lentil proteins, and other legume proteins.

10. (Previously Presented) The meat replica matrix of claim 9, wherein the pea proteins comprise pea albumin proteins.

11. (Previously Presented) The meat replica matrix of claim 2, wherein the one or more plant proteins are present in the meat replica matrix in an amount of between 1% and 30% (by weight of the meat replica matrix).

12. (Previously Presented) The meat replica matrix of claim 2, wherein the meat replica matrix is comprised within a consumable product, wherein the consumable product is selected from taco filling, a casserole, a sauce, a topping, soup, stew, and a loaf, wherein, upon cooking of the consumable product, the at least two volatile compounds are produced in higher amounts compared to the amounts of the at least two volatile compounds produced upon cooking of the meat replica matrix lacking the non-animal heme-containing protein.

13. (Previously Presented) The meat replica matrix of claim 2, wherein the at least two volatile compounds are selected from the group consisting of(E)-2-decenal; (E)-2-heptenal; (E)-2-hexenal; (E)-2-nonenal; (E)-2-octenal; (E)-4-octene; (E,E)-2,4-decadienal; (E,E)-2,4-

heptadienal; (E,E)-2,4-nonadienal; (E,E)-3,5-octadien-2-one; (E,Z)-2,6-nonadienal; (Z)-2-decenal; (Z)-2-heptenal; (Z)-2-nonenal; (Z)-2-octen-1-ol; (Z)-4-heptenal; 1-(1H-pyrrol-2-yl)-ethanone; 1-(2-furanyl)-ethanone; 1-(6-methyl-2-pyrazinyl)-1-ethanone; 1-(acetyloxy)-2-propanone; 1,3-dimethyl-benzene; 1,3-hexadiene; 1-butanol; 1-ethyl-5-methylcyclopentene; 1-heptanol; 1-heptene; 1-hexanol; 1H-pyrrole-2-carboxaldehyde; 1-hydroxy-2-propanone; 1-methyl-1(H)-pyrrole-2-2carboxaldehyde; 1-octanal; 1-octanol; 1-octen-3-ol; 1-octen-3-one; 1-octene; 1-pentanol; 1-penten-3-ol; 1-penten-3-one; 1-propanol; 2(5H)-furanone; 2,2,4,6,6-pentamethyl-heptane; 2,2-dimethyl-undecane; 2,3-butanedione; 2,3-dihydro-3,5-dihydroxy-6-methyl-4(H)-pyran-4-one; 2,3-dimethyl-5-ethylpyrazine; 2,3-dimethyl-pyrazine; 2,4-dodecadienal; 2,5-dimethyl-3-(3-methyl butyl) pyrazine; 2,5-dimethyl-pyrazine; 2,6-dimethylnonane; 2,6-dimethylpyrazine; 2-acetylthiazole; 2-butanone; 2-butenal; 2-decanone; 2-ethenyl-6-methyl-pyrazine; 2-ethyl furan; 2-ethyl-1-hexanol; 2-ethyl-5-methyl-pyrazine; 2-ethyl-furan; 2-furanmethanol; 2-heptanone; 2-heptenal; 2-hexyl-furan; 2-hexyl-thiophene; 2-hydroxy-3-methyl-2-cyclopentene-1-one; 2-methyl thiazole; 2-methyl-1H-pyrrole; 2-methyl-2-heptene; 2-methyl-butanal; 2-methyl-furan; 2-methyl-heptane; 2-methyl-propanal; 2-n-butylacrolein; 2-n-heptylfuran; 2-nonanone; 2-octanone; 2-pentanone; 2-pentyl-furan; 2-pentyl-thiophene; 2-propenal; 2-propyl-furan; 2-pyridinecarboxaldehyde; 2-pyrrolidinone; 2-thiophenecarboxaldehyde; 2-tridecen-1-ol; 2-undecenal; 3,5-octadien-2-one; 3,6,6-trimethyl-bicyclo[3.1.1]hept-2-ene; 3-acetyl-1h-pyrolline; 3-ethyl-2,2-dimethyl-pentane; 3-ethyl-2,5-dimethyl-pyrazine; 3-ethyl-2-1,4-dioxin; 3-ethyl-2-methyl-1,3-hexadiene; 3-ethylcyclopentanone; 3-methyl-2-butenal; 3-methyl-2-thiophenecarboxaldehyde; 3-methyl-3-hexene; 3-methyl-butanal; 3-methyl-furan; 3-octen-2-one; 3-pentyl-furan; 3-thiophenecarboxaldehyde; 3-thiophenmethanol; 4,7-dimethyl-undecane; 4-cyanocyclohexene; 4-cyclopentene-1,3-dione; 4-decyne; 4-methyl-5-thiazoleethanol; 4-methylthiazole; 4-octene; 4-penten-2-one; 5-acetyldihydro-2(3H)-furanone; 5-ethyldihydro-2(3H)-furanone; 5-methyl-2-furancarboxaldehyde; 5-methyl-2-thiophenecarboxaldehyde; 6-methyl-2-heptanone; 6-methyl-5-hepten-2-one; 8-methyl-1-undecene; acetaldehyde; acetamide; acetic acid; acetic acid ethenyl ester; acetoin; acetone; acetonitrile; acetophenone; benzaldehyde; benzene; benzyl alcohol; butanal; butanoic acid; butyrolactone; caprolactam; carbon disulfide; decanal; decanol; dihydro-2-methyl-3(2H)-furanone; dihydro-5-pentyl-2(3H)-furanone; dihydro-5-propyl-2(3H)-

furanone; dimethyl sulfide; dimethyl trisulfide; d-limonene; ethenyl pyrazine; ethyl acetate; ethyl pyrazine; formamide; formic acid heptyl ester; furan; furaneol; furfural; heptanal; heptane; heptanoic acid; heptyl ester; hexanoic acid; isopropyl alcohol; isovaleric acid; methacrolein; methional; methyl ethanoate; methyl-pyrazine; methyl-thiirane; n-caproic acid vinyl ester; nonanal; octanal; octane; octanoic acid; oxalic acid, butyl propyl ester; pantolactone; p-cresol; pentanal; pentanoic acid; phenol; phenylacetaldehyde; propanal; pyrazine; pyridine; pyrrole; styrene; tetramethyl-pyrazine; thiazole; thiophene; toluene; trans-2-(2-pentenyl)furan; trans-3-nonen-2-one; trichloromethane; trimethyl-ethanethiol; and trimethyl-pyrazine.

14. (Canceled).

15. (Previously Presented) A meat replica matrix comprising:

one or more plant proteins;

a sugar selected from glucose, ribose, sucrose, fructose, xylose, maltodextrin, and combinations thereof;

at least one sulfur compound selected from methionine, cysteine, and thiamine; and

0.01%-5% (by weight of the meat replica matrix) of a non-animal heme-containing protein,

wherein, upon cooking of the meat replica matrix, at least two volatile compounds are generated, and

wherein the at least two volatiles are selected from the group consisting of.(E)-2-decenal; (E)-2-heptenal; (E)-2-hexenal; (E)-2-nonenal; (E)-2-octenal; (E)-4-octene; (E,E)-2,4-decadienal; (E,E)-2,4-heptadienal; (E,E)-2,4-nonadienal; (E,E)-3,5-octadien-2-one; (E,Z)-2,6-nonadienal; (Z)-2-decenal; (Z)-2-heptenal; (Z)-2-nonenal; (Z)-2-octen-1-ol; (Z)-4-heptenal; 1-(1H-pyrrol-2-yl)-ethanone; 1-(2-furanyl)-ethanone; 1-(6-methyl-2-pyrazinyl)-1-ethanone; 1-(acetyloxy)-2-propanone; 1,3-dimethyl-benzene; 1,3-hexadiene; 1-butanol; 1-ethyl-5-methylcyclopentene; 1-heptanol; 1-heptene; 1-hexanol; 1H-pyrrole-2-carboxaldehyde; 1-hydroxy-2-propanone; 1-methyl-1(H)-pyrrole-2-2carboxaldehyde; 1-

octanal; 1-octanol; 1-octen-3-ol; 1-octen-3-one; 1-octene; 1-pentanol; 1-penten-3-ol; 1-penten-3-one; 1-propanol; 2(5H)-furanone; 2,2,4,6,6-pentamethyl-heptane; 2,2-dimethyl-undecane; 2,3-butanedione; 2,3-dihydro-3,5-dihydroxy-6-methyl-4(H)-pyran-4-one; 2,3-dimethyl-5-ethylpyrazine; 2,3-dimethyl-pyrazine; 2,4-dodecadienal; 2,5-dimethyl-3-(3-methyl butyl) pyrazine; 2,5-dimethyl-pyrazine; 2,6-dimethylnonane; 2,6-dimethylpyrazine; 2-acetylthiazole; 2-butanone; 2-butenal; 2-decanone; 2-ethenyl-6-methyl-pyrazine; 2-ethyl furan; 2-ethyl-1-hexanol; 2-ethyl-5-methyl-pyrazine; 2-ethyl-furan; 2-furanmethanol; 2-heptanone; 2-heptenal; 2-hexyl-furan; 2-hexyl-thiophene; 2-hydroxy-3-methyl-2-cyclopentene-1-one; 2-methyl thiazole; 2-methyl-1H-pyrrole; 2-methyl-2-heptene; 2-methyl-butanal; 2-methyl-furan; 2-methyl-heptane; 2-methyl-propanal; 2-n-butylacrolein; 2-n-heptylfuran; 2-nonanone; 2-octanone; 2-pentanone; 2-pentyl-furan; 2-pentyl-thiophene; 2-propenal; 2-propyl-furan; 2-pyridinecarboxaldehyde; 2-pyrrolidinone; 2-thiophenecarboxaldehyde; 2-tridecen-1-ol; 2-undecenal; 3,5-octadien-2-one; 3,6,6-trimethyl-bicyclo[3.1.1]hept-2-ene; 3-acetyl-1h-pyrolline; 3-ethyl-2,2-dimethyl-pentane; 3-ethyl-2,5-dimethyl-pyrazine; 3-ethyl-2-1,4-dioxin; 3-ethyl-2-methyl-1,3-hexadiene; 3-ethylcyclopentanone; 3-methyl-2-butenal; 3-methyl-2-thiophenecarboxaldehyde; 3-methyl-3-hexene; 3-methyl-butanal; 3-methyl-furan; 3-octen-2-one; 3-pentyl-furan; 3-thiophenecarboxaldehyde; 3-thiophenmethanol; 4,7-dimethyl-undecane; 4-cyanocyclohexene; 4-cyclopentene-1,3-dione; 4-decyne; 4-methyl-5-thiazoleethanol; 4-methylthiazole; 4-octene; 4-penten-2-one; 5-acetyldihydro-2(3H)-furanone; 5-ethyldihydro-2(3H)-furanone; 5-methyl-2-furancarboxaldehyde; 5-methyl-2-thiophenecarboxaldehyde; 6-methyl-2-heptanone; 6-methyl-5-hepten-2-one; 8-methyl-1-undecene; acetaldehyde; acetamide; acetic acid; acetic acid ethenyl ester; acetoin; acetone; acetonitrile; acetophenone; benzaldehyde; benzene; benzyl alcohol; butanal; butanoic acid; butyrolactone; caprolactam; carbon disulfide; decanal; decanol; dihydro-2-methyl-3(2H)-furanone; dihydro-5-pentyl-2(3H)-furanone; dihydro-5-propyl-2(3H)-furanone; dimethyl sulfide; dimethyl trisulfide; d-limonene; ethenyl pyrazine; ethyl acetate; ethyl pyrazine; formamide; formic acid heptyl ester; furan; furaneol; furfural; heptanal; heptane; heptanoic acid; heptyl ester; hexanoic acid; isopropyl alcohol; isovaleric acid; methacrolein; methional; methyl ethanoate; methyl-pyrazine; methyl-thiirane; n-caproic acid vinyl ester; nonanal; octanal; octane; octanoic acid; oxalic acid, butyl propyl ester;

pantolactone; p-cresol; pentanal; pentanoic acid; phenol; phenylacetaldehyde; propanal; pyrazine; pyridine; pyrrole; styrene; tetramethyl-pyrazine; thiazole; thiophene; toluene; trans-2-(2-pentenyl)furan; trans-3-nonen-2-one; trichloromethane; trimethyl-ethanethiol; and trimethyl-pyrazine

16. (Previously Presented) The meat replica matrix of claim 15, wherein the non-animal heme-containing protein has an amino acid sequence with at least 70% homology to the amino acid sequence set forth in SEQ ID NO: 1.

17. (Previously Presented) The meat replica matrix of claim 15, wherein the non-animal heme-containing protein has a UV-VIS spectrum that is substantially similar to that of myoglobin from an animal.

18. (Previously Presented) The meat replica matrix of claim 15, wherein the heme-containing protein is selected from the group consisting of a leghemoglobin, a flavohemoglobin, Hell's gate globin I, an erythrocruorin, a protoglobin, a cyanoglobin, a chlorocruorin, a truncated hemoglobin, a truncated 2/2 globin, and a hemoglobin 3.

19. (Previously Presented) The meat replica matrix of claim 15, wherein the meat replica matrix comprises 0.4%-1% (by weight of the meat replica matrix) of the non-animal heme-containing protein.

20. (Previously Presented) The meat replica matrix of claim 15, wherein the meat replica matrix comprises about 0.3% (by weight of the meat replica matrix) of the non-animal heme-containing protein.

21. (Previously Presented) The meat replica matrix of claim 15, wherein the meat replica matrix comprises about 0.2% (by weight of the meat replica matrix) of the non-animal heme-containing protein.

22. (Previously Presented) The meat replica matrix of claim 15, wherein the one or more plant proteins are selected from the group consisting of rubisco, pea proteins, lentil

proteins, and other legume proteins.

23. (Previously Presented) The meat replica matrix of claim 22, wherein the pea proteins comprise pea albumin proteins.

24. (Previously Presented) The meat replica matrix of claim 15, wherein the one or more plant proteins are present in the meat replica matrix in an amount of between 1% and 30% (by weight of the meat replica matrix).

25. (Previously Presented) The meat replica matrix of claim 15, wherein the meat replica matrix is comprised within a consumable product, wherein the consumable product is selected from taco filling, a casserole, a sauce, a topping, soup, stew, and a loaf, wherein, upon cooking of the consumable product, the at least two volatile compounds are produced in higher amounts compared to the amounts of the at least two volatile compounds produced upon cooking of the meat replica matrix lacking the non-animal heme-containing protein.

Doc Code: DIST.E.FILE **Document Description: Electronic Terminal Disclaimer - Filed**	PTO/SB/25 PTO/SB/26 U.S. Patent and Trademark Office Department of Commerce

Electronic Petition Request	**TERMINAL DISCLAIMER TO OBVIATE A PROVISIONAL DOUBLE PATENTING REJECTION OVER A PENDING "REFERENCE" APPLICATION AND TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT**
Application Number	16238802
Filing Date	03-Jan-2019
First Named Inventor	Marija Vrljic
Attorney Docket Number	38767-0010003
Title of Invention	METHODS AND COMPOSITIONS FOR CONSUMABLES

☒ Filing of terminal disclaimer does not obviate requirement for response under 37 CFR 1.111 to outstanding Office Action

☒ This electronic Terminal Disclaimer is not being used for a Joint Research Agreement.

Owner	Percent Interest
Impossible Foods Inc.	100 %

The owner(s) of percent interest listed above in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of any patent granted on pending reference Application Number(s)

15913090 filed on 03/06/2018

15913018 filed on 03/06/2018

as the term of any patent granted on said reference application may be shortened by any terminal disclaimer filed prior to the grant of any patent on the pending reference application. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and any patent granted on the reference application are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full statutory term of any patent granted on said reference application, "as the term of any patent granted on said reference application may be shortened by any terminal disclaimer filed prior to the grant of any patent on the pending reference application," in the event that any such patent granted on the pending reference application: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term as shortened by any terminal disclaimer filed prior to its grant.

The owner(s) with percent interest listed above in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of prior patent number(s)

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as the term of said prior patent is presently shortened by any terminal disclaimer. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the prior patent are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the owner does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the prior patent, "as the term of said prior patent is presently shortened by any terminal disclaimer," in the event that said prior patent later:
- expires for failure to pay a maintenance fee;
- is held unenforceable;
- is found invalid by a court of competent jurisdiction;
- is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;
- has all claims canceled by a reexamination certificate;
- is reissued; or
- is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

(●) Terminal disclaimer fee under 37 CFR 1.20(d) is included with Electronic Terminal Disclaimer request.

( ) I certify, in accordance with 37 CFR 1.4(d)(4), that the terminal disclaimer fee under 37 CFR 1.20(d) required for this terminal disclaimer has already been paid in the above-identified application.

Applicants claims the following fee status:

( ) Small Entity

( ) Micro Entity

(●) Regular Undiscounted

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

THIS PORTION MUST BE COMPLETED BY THE SIGNATORY OR SIGNATORIES

I certify, in accordance with 37 CFR 1.4(d)(4) that I am:

(●) An attorney or agent registered to practice before the Patent and Trademark Office who is of record in this application

Registration Number 76370

( ) A sole inventor

( ) A joint inventor; I certify that I am authorized to sign this submission on behalf of all of the inventors as evidenced by the power of attorney in the application

( ) A joint inventor; all of whom are signing this request

Signature	/Kimberly M. Maize, Reg. No. 76,370/
Name	Kimberly M. Maize

*Statement under 37 CFR 3.73(b) is required if terminal disclaimer is signed by the assignee (owner).
Form PTO/SB/96 may be used for making this certification. See MPEP § 324.

Electronic Patent Application Fee Transmittal

Application Number:	16238802
Filing Date:	03-Jan-2019
Title of Invention:	METHODS AND COMPOSITIONS FOR CONSUMABLES
First Named Inventor/Applicant Name:	Marija Vrljic
Filer:	Kimberly M. Maize/Emily Palmer
Attorney Docket Number:	38767-0010003

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
STATUTORY OR TERMINAL DISCLAIMER	1814	1	170	170
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**170**

Doc Code: DISQ.E.FILE
Document Description: Electronic Terminal Disclaimer – Approved

Application No.: 16238802

Filing Date: 03-Jan-2019

Applicant/Patent under Reexamination: Vrljic

Electronic Terminal Disclaimer filed on November 12, 2020

☒ APPROVED

This patent is subject to a terminal disclaimer

☐ DISAPPROVED

Approved/Disapproved by: Electronic Terminal Disclaimer automatically approved by EFS-Web

U.S. Patent and Trademark Office

Electronic Acknowledgement Receipt

EFS ID:	41110394
Application Number:	16238802
International Application Number:	
Confirmation Number:	3877
Title of Invention:	METHODS AND COMPOSITIONS FOR CONSUMABLES
First Named Inventor/Applicant Name:	Marija Vrljic
Customer Number:	26191
Filer:	Kimberly M. Maize/Emily Palmer
Filer Authorized By:	Kimberly M. Maize
Attorney Docket Number:	38767-0010003
Receipt Date:	12-NOV-2020
Filing Date:	03-JAN-2019
Time Stamp:	17:45:13
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$170
RAM confirmation Number	E2020ABH45119465
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Terminal Disclaimer-Filed (Electronic)	eTerminal-Disclaimer.pdf	37590 8a273e9ab73d6fd7ba8588ab95670105da810165	no	3
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30447 499bc019329fa96e8ec7c47245de99f1035a2be0	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	68037		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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NOTICE OF ALLOWANCE AND FEE(S) DUE

26191 7590 01/27/2021
FISH & RICHARDSON P.C. (TC)
PO BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER
GWARTNEY, ELIZABETH A

ART UNIT	PAPER NUMBER
1796	

DATE MAILED: 01/27/2021

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/238,802	01/03/2019	Marija Vrljic	38767-0010003	3877

TITLE OF INVENTION: METHODS AND COMPOSITIONS FOR CONSUMABLES

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	04/27/2021

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

26191 7590 01/27/2021
FISH & RICHARDSON P.C. (TC)
PO BOX 1022
MINNEAPOLIS, MN 55440-1022

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/238,802	01/03/2019	Marija Vrljic	38767-0010003	3877

TITLE OF INVENTION: METHODS AND COMPOSITIONS FOR CONSUMABLES

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	04/27/2021

EXAMINER	ART UNIT	CLASS-SUBCLASS
GWARTNEY, ELIZABETH A	1796	426-574000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1_____
2_____
3_____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. Fees submitted: ❑Issue Fee ❑Publication Fee (if required) ❑Advance Order - # of Copies _____

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

❑ Electronic Payment via EFS-Web ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/238,802	01/03/2019	Marija Vrljic	38767-0010003	3877

26191 7590 01/27/2021
FISH & RICHARDSON P.C. (TC)
PO BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER
GWARTNEY, ELIZABETH A

ART UNIT	PAPER NUMBER
1796	

DATE MAILED: 01/27/2021

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 16/238,802	Applicant(s) Vrljic et al.	
	Examiner ELIZABETH A GWARTNEY	Art Unit 1796	AIA (FITF) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to Amendment filed 12 November 2020..
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 2-13 and 15-25 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information , please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐All b) ☐ Some *c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☑ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☑ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/ELIZABETH GWARTNEY/
Primary Examiner, Art Unit 1796

Notice of Allowability

1. The present application is being examined under the pre-AIA first to invent provisions.

2. The previous rejection under 35 U.S.C. 112, first paragraph is withdrawn in light of Applicants' amendment filed 12 November 2020.

3. **Claims 2-13 and 15-25 are allowed**

Terminal Disclaimer

4. The terminal disclaimer filed on 12 November 2020 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of **U.S. Patent No. 10,327,464; 9,826,772; and 9,808,029;** and any patent granted on **U.S. Application No. 15/913,090 and 15/913,018** has been reviewed and is accepted. The terminal disclaimer has been recorded.

Reasons for Allowance

5. The following is an examiner's statement of reasons for allowance:

The prior art of record does not disclose a meat replica comprising non-animal sources of heme-containing protein, a sugar, a sulfur compound and one or more plant proteins wherein upon cooking the meat replica results in the production and increase amount of at least two volatile compounds that have a beef-like aroma.

In addition, for the reasons set forth below and related to the prior art reported in U.S. Application No. 14/796,970, now U.S. Patent No. 10,039,306:

Proulx et al. teach that the bioavailability hemoglobin from soy root nodules is similar to that of heme iron from animal sources (p. 1521/Results and Discussion). Proulx et al. teach using plant hemoglobin, i.e. leghemoglobin, as a heme iron source in diets that are consumed by humans (p. 1518/Introduction). While Proulx et al. provides motivation to

include leghemoglobin, a non-animal heme-containing protein, in a foodstuff, the reference is silent with respect to the influence of heme-containing protein on beef associated flavor.

Cerny et al. ("Formation of Aroma Compounds from Ribose and Cysteine during the Maillard Reaction" -./. Agric. Food Chem., 2003, 51, pp. 2714-2721) teach that the Maillard reaction plays a substantial role in flavor generation during the cooking of meat (p. 2714/Introduction). Cerny et al. teach that besides, thiamine, the precursors ribose and cysteine are important for meat aroma and are consequently employed in the product of meat flavors (Abstract, p. 2714/Introduction).

While Cerny et al. disclose that mixtures of ribose and cysteine, when heated, are known to produce flavors associated with meat, Applicants have demonstrated that the combination of: (a) a heme-containing protein b) compound selected from glucose, ribose, fructose, sucrose, xylose, maltodextrin and combinations thereof; and (c) at least one sulfur compound selected from methionine, cysteine and thiamine produces novel (i.e., not produced in the absence of heme-containing protein) volatile compounds associated with a meaty aroma upon heating.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ELIZABETH A GWARTNEY whose telephone number is (571)270-3874. The examiner can normally be reached on M-F: 8 a.m. - 4 p.m..

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald (Larry) Tarazano can be reached on 571-272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see https://ppair-my.uspto.gov/pair/PrivatePair. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ELIZABETH A. GWARTNEY
Primary Examiner
Art Unit 1796

/ELIZABETH GWARTNEY/
Primary Examiner, Art Unit 1796

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/238,802	Vrljic et al.
	Examiner	**Art Unit**
	ELIZABETH A GWARTNEY	1796

CPC - Searched*		
Symbol	**Date**	**Examiner**
A23J3/227	05/06/2020	EG

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	**Date**	**Examiner**
Inventor search completed	05/07/2020	EG
A23J3/227 (text limted by heme)	05/06/2020	EG
Review of 15/786,776 and 14/796,970 - parent application prosecution history	05/07/2020	EG

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**
A23J	3/227	01/16/2021	EG
A23L	13/426	01/16/2021	EG

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/238,802	Vrljic et al.
	Examiner	**Art Unit**
	ELIZABETH A GWARTNEY	1796

CPC

Symbol					Type	Version
A23L	/	13	/	426	F	2016-08-01
A23D	/	7	/	0053	I	2013-01-01
A23D	/	7	/	0056	I	2013-01-01
A23L	/	2	/	66	I	2013-01-01
A23J	/	3	/	227	I	2013-01-01
A23L	/	29	/	238	I	2016-08-01
A23L	/	7	/	109	I	2016-08-01
A23L	/	27	/	10	I	2016-08-01
A23L	/	5	/	41	I	2016-08-01
A23L	/	33	/	185	I	2016-08-01
A23J	/	3	/	14	I	2013-01-01
A23L	/	27	/	26	I	2016-08-01
A23L	/	27	/	00	I	2016-08-01
A23L	/	13	/	424	I	2016-08-01
A23L	/	27	/	20	I	2016-08-01
A23L	/	13	/	42	I	2016-08-01

CPC Combination Sets

Symbol					Type	Set	Ranking	Version
A23V	/	2002	/	00	A	1	1	2013-01-01
A23V	/	2200	/	15	A	1	2	2013-01-01

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 23	
/ELIZABETH GWARTNEY/ Primary Examiner, Art Unit 1796 (Primary Examiner)	16 January 2021 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 1

U.S. Patent and Trademark Office

Part of Paper No.: 20210116

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/238,802	Vrljic et al.
	Examiner	**Art Unit**
	ELIZABETH A GWARTNEY	1796

INTERNATIONAL CLASSIFICATION				
CLAIMED				
A23L	/	13	/	00
	/		/	
	/		/	

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 23	
/ELIZABETH GWARTNEY/ Primary Examiner, Art Unit 1796 (Primary Examiner)	16 January 2021 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 1

U.S. Patent and Trademark Office

Part of Paper No.: 20210116

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/238,802	Vrljic et al.
	Examiner	**Art Unit**
	ELIZABETH A GWARTNEY	1796

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
-	1	9	10	17	19										
1	2	10	11	18	20										
2	3	11	12	19	21										
3	4	12	13	20	22										
4	5	-	14	21	23										
5	6	13	15	22	24										
6	7	14	16	23	25										
7	8	15	17												
8	9	16	18												

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 23	
/ELIZABETH GWARTNEY/ Primary Examiner, Art Unit 1796 (Primary Examiner)	16 January 2021 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 1

U.S. Patent and Trademark Office Part of Paper No.: 20210116

Receipt date: 11/12/2020

Sheet _1_ of _1_

Substitute Disclosure Form	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 38767-0010003	Application No. 16/238,802
Information Disclosure Statement by Applicant (Use several sheets if necessary)		Applicant Impossible Foods Inc.	
(37 CFR §1.98(b))		Filing Date January 3, 2019	Group Art Unit 1796

U.S. Patent Documents

Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Filing Date If Appropriate	Class	Subclass
/E.G./	1.	4098913	7/4/1978	Baugher			
/E.G./	2.	4197324	4/8/1980	Ziminski et al.			
/E.G./	3.	4324807	4/13/1982	Kim et al.			
/E.G./	4.	10798958	10/13/2020	Varadan et al.			
/E.G./	5.	20050112271	5/1/2005	Picarski			
/E.G./	6.	20090148558	6/11/2009	Kim et al.			

Foreign Patent Documents or Published Foreign Patent Applications

Examiner Initial	Desig. ID	Document Number	Publication Date	Country or Patent Office	Translation	Class	Subclass
/E.G./	7.	RU 2010137628	3/20/2012	RU	Abstract		

Other Documents (include Author, Title, Date, and Place of Publication)

Examiner Initial	Desig. ID	Document
/E.G./	8.	Dinh et al., "Effects of USDA quality grade and cooking on water-soluble precursors of beef flavor," Meat Science, 2018, 146:122-130

Examiner Signature	Date Considered
/ELIZABETH GWARTNEY/	01/16/2021

EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute Disclosure Form

Receipt date: 11/12/2020

Attorney Docket No.: 38767-0010003 / M2CON-Track 1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Marija Vrljic	Art Unit	:	1796
Application No.	:	16/238,802	Examiner	:	Elizabeth A. Gwartney
Filed	:	January 3, 2019	Conf. No.	:	3877
Title	:	METHODS AND COMPOSITIONS FOR CONSUMABLES			

MAIL STOP AMENDMENT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT

Please consider the documents listed on the disclosure form submitted with this statement. Copies of the documents are being submitted with this statement to the extent required under 37 C.F.R. § 1.98(a)(2).

This statement is being filed after a first action on the merits, but before receipt of a final action or a notice of allowance.

Please apply any necessary charges or credits applicable under 37 C.F.R. § 1.17(p) to deposit account 06-1050, referencing the above attorney docket number.

Please contact the undersigned if there are any questions regarding this statement.

Respectfully submitted,

Date: November 12, 2020

/Kimberly M. Maize, Reg. No. 76,370/
Kimberly M. Maize
Reg. No. 76,370

Customer Number 26191
Fish & Richardson P.C.
Telephone: +1 (612) 638-5707
Facsimile: (877) 769-7945

62464154.doc

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	1	"15913090"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/05/05 12:26
S2	9	"20120093994"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/05/06 10:51
S3	9	"20120093994"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/05/06 12:27
S4	46	A23J3/227.cpc. AND heme	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/05/06 14:40
S5	1	"15913090"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/05/07 09:34
S6	22	"10327464"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/05/08 12:04
S7	22	"10327464"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/05/08 13:22
S8	34	"9826772"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/05/08 13:24
S9	26	"9808029"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/05/08 14:03
S10	1	"16238769"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/05/11 09:17

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	35	A23J3/227.cpc. AND heme	US-PGPUB; USPAT	OR	OFF	2021/01/16 20:32
L2	468	A23J3/227.cpc.	US-PGPUB; USPAT	OR	OFF	2021/01/16 21:06

L3	569	A23L13/426.cpc.	US-PGPUB; USPAT	OR	OFF	2021/01/16 21:19
L4	36	A23L13/426.cpc. AND heme	US-PGPUB; USPAT	OR	OFF	2021/01/16 21:19

1/16/2021 9:22:50 PM
C:\Users\egwartney\Documents\EAST\Workspaces\16238802.wsp

Bibliographic Data

Application No: 16/238,802

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☑ No | ☐ Met After Allowance

Verified and Acknowledged: Examiner's Signature | Initials

Title: METHODS AND COMPOSITIONS FOR CONSUMABLES

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
01/03/2019 RULE	426	1796	38767-0010003

APPLICANTS

Impossible Foods Inc., Redwood City, CA, UNITED STATES

INVENTORS

Marija Vrljic, San Mateo, CA, UNITED STATES

Sergey Solomatin, Mountain View, CA, UNITED STATES

Rachel Fraser, San Francisco, CA, UNITED STATES

Patrick O'Reilly Brown, Stanford, CA, UNITED STATES

Jessica Karr, San Francisco, CA, UNITED STATES

Celeste Holz-Schietinger, East Palo Alto, CA, UNITED STATES

Michael Eisen, Berkeley, CA, UNITED STATES

Ranjani Varadan, Fremont, CA, UNITED STATES

CONTINUING DATA

This application is a CON of 15786776 10/18/2017 PAT 10172381

15786776 is a CON of 14796970 07/10/2015 PAT 10039306

14796970 is a CON of PCT/US2014/011361 01/13/2014

PCT/US2014/011361 has PRO of 61908634 11/25/2013

PCT/US2014/011361 is a CON of 13941211 07/12/2013ABN

PCT/US2014/011361 has PRO of 61751816 01/11/2013

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

01/17/2019

STATE OR COUNTRY

UNITED STATES

ADDRESS

FISH & RICHARDSON P.C. (TC)
PO BOX 1022
MINNEAPOLIS, MN 55440-1022
UNITED STATES

FILING FEE RECEIVED

$2,120

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/238,802	01/03/2019	Marija Vrljic	38767-0010003	3877

26191 7590 02/17/2021
FISH & RICHARDSON P.C. (TC)
PO BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER
GWARTNEY, ELIZABETH A

ART UNIT	PAPER NUMBER
1796	

NOTIFICATION DATE	DELIVERY MODE
02/17/2021	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATDOCTC@fr.com

PTOL-90A (Rev. 04/07)

Supplemental *Notice of Allowability*	**Application No.** 16/238,802	**Applicant(s)** Vrljic et al.	
	Examiner ELIZABETH A GWARTNEY	**Art Unit** 1796	**AIA (FITF) Status** No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to Amendment filed 12 November 2020.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 2-13 and 15-25 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information , please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐All b) ☐ Some *c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☑ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/ELIZABETH GWARTNEY/
Primary Examiner, Art Unit 1796

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/238,802	Vrljic et al.
	Examiner	**Art Unit**
	ELIZABETH A GWARTNEY	1796

CPC

Symbol					Type	Version
A23L	/	13	/	426	F	2016-08-01
A23D	/	7	/	0053	I	2013-01-01
A23D	/	7	/	0056	I	2013-01-01
A23L	/	2	/	66	I	2013-01-01
A23J	/	3	/	227	I	2013-01-01
A23L	/	29	/	238	I	2016-08-01
A23L	/	7	/	109	I	2016-08-01
A23L	/	27	/	10	I	2016-08-01
A23L	/	5	/	41	I	2016-08-01
A23L	/	33	/	185	I	2016-08-01
A23J	/	3	/	14	I	2013-01-01
A23L	/	27	/	26	I	2016-08-01
A23L	/	27	/	00	I	2016-08-01
A23L	/	13	/	424	I	2016-08-01
A23L	/	27	/	20	I	2016-08-01
A23L	/	13	/	42	I	2016-08-01

CPC Combination Sets

Symbol					Type	Set	Ranking	Version
A23V	/	2002	/	00	A	1	1	2013-01-01
A23V	/	2200	/	15	A	1	2	2013-01-01

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 23	
/ELIZABETH GWARTNEY/ Primary Examiner, Art Unit 1796 (Primary Examiner)	11 February 2021 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 1

U.S. Patent and Trademark Office

Part of Paper No.: 20210211

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/238,802	Vrljic et al.
	Examiner	**Art Unit**
	ELIZABETH A GWARTNEY	1796

INTERNATIONAL CLASSIFICATION				
CLAIMED				
A23L	/	13	/	00
	/		/	
	/		/	

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE (Assistant Examiner) (Date)		**Total Claims Allowed:** 23	
/ELIZABETH GWARTNEY/ Primary Examiner, Art Unit 1796 (Primary Examiner)	11 February 2021 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 1

U.S. Patent and Trademark Office Part of Paper No.: 20210211

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/238,802	Vrljic et al.
	Examiner	**Art Unit**
	ELIZABETH A GWARTNEY	1796

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
-	1	9	10	17	19										
1	2	10	11	18	20										
2	3	11	12	19	21										
3	4	12	13	20	22										
4	5	-	14	21	23										
5	6	13	15	22	24										
6	7	14	16	23	25										
7	8	15	17												
8	9	16	18												

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 23	
/ELIZABETH GWARTNEY/ Primary Examiner, Art Unit 1796 (Primary Examiner)	11 February 2021 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 1

U.S. Patent and Trademark Office Part of Paper No.: 20210211

Receipt date: 03/19/2020

Sheet 1 of 1

Substitute Disclosure Form	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 38767-0010003	Application No. 16/238,802
Information Disclosure Statement by Applicant (Use several sheets if necessary)		Applicant Impossible Foods Inc.	
(37 CFR §1.98(b))		Filing Date January 3, 2019	Group Art Unit

U.S. Patent Documents

Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Filing Date If Appropriate	Class	Subclass

Foreign Patent Documents or Published Foreign Patent Applications

Examiner Initial	Desig. ID	Document Number	Publication Date	Country or Patent Office	Translation	Class	Subclass
	1.	JP H08-289761	11/5/1996	JP	Abstract		

Other Documents (include Author, Title, Date, and Place of Publication)

Examiner Initial	Desig. ID	Document
	2.	"Peas, green raw," FoodData Central, US Department of Agriculture, retrieved from URL <https:/fdc.nal.usda.gov/fdc-app.html#/food-details/170419/nutrients>, April 1, 2019, 8 pages
	3.	Berrios, et al., "Carbohydrate composition of raw and extruded pulse flours," Food Research International, 2010, 43:531-536
	4.	EP Opposition, in Application No. 14737766.7, dated July 4, 2019, 8 pages
	5.	Jahreis, et al., "Legume flours: nutritionally important sources of protein and dietary fiber," Ernahrungs Umschau, 2016, 63(2):36-42
	6.	Liu, "Comparison of lipid content and fatty acid composition and their distribution within seeds of 5 small grain species," J. Food Sco., 2011, 76(2):C334-C342
	7.	Macnicol, "Developmental changes in the free amino acid pool and total protein amino acids of pea cotyledons (Pisum sativum L.)," Plant Physiol., 1983, 72:492-497
	8.	Oldach, "Biochemistry of a Burger: Impossible Foods does science, makes food and tries to change the world," ASBMB Today, retrieved from URL <https://www.asbmb.org/asbmb-today/industry/100119/biochemistry-of-a-burger>, October 1, 2019, 12 pages
	9.	Opponent's Reply Letter in opposition to EP Patent. No. 2943072, dated 1/20/2020, 18 pages
	10.	Rebuttal Declaration of Dr. Jorge Ruiz-Carrascal and Supporting Exhibits, dated January 20, 2020, 12 pages
	11.	Warendorf, et al., "The flavour of bouillon: 2. Sensory analysis of non-volatiles and imitation of a bouillon," Z. Lebensm. Unters. Forsch., 1992, 195(3):215-223, English Abstract
	12.	Wood, et al., "Fatty deposition, fatty acid composition and meat quality: a review," Meat Science, 2008, 78:343-358

Examiner Signature	Date Considered
/ELIZABETH GWARTNEY/	05/08/2020

EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute Disclosure Form

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /E.G./

Receipt date: 03/19/2020

Attorney Docket No.: 38767-0010003 / M2CON-Track 1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Marija Vrljic	Art Unit	:	Unknown
Application No.	:	16/238,802	Examiner	:	Unknown
Filed	:	January 3, 2019	Conf. No.	:	3877
Title	:	METHODS AND COMPOSITIONS FOR CONSUMABLES			

MAIL STOP AMENDMENT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT

Please consider the documents listed on the disclosure form submitted with this statement. Copies of the documents are being submitted with this statement to the extent required under 37 C.F.R. § 1.98(a)(2).

The applicant wishes to make the Examiner aware of the following related applications. The prosecution histories for these applications and patents are available on PAIR, and are not provided with this statement.

Application No.	Filing Date	First Named Inventor	Attorney Docket No.
14/796,970	7/10/2015	Marija Vrljic	38767-0010001
15/786,776	10/18/2017	Marija Vrljic	38767-0010002
16/238,769	1/3/2019	Marija Vrljic	38767-0010004
14/152,499	1/10/2014	Patrick O'Reilly Brown M.D., Ph.D.	38767-0012001
14/752,540	6/26/2015	Patrick O'Reilly Brown M.D., Ph.D.	38767-0012002
15/985,694	5/21/2018	Patrick O'Reilly Brown M.D., Ph.D.	38767-0012003
14/797,006	7/10/2015	Rachel Fraser	38767-0015001
15/398,479	1/4/2017	Rachel Fraser	38767-0015002
15/624,505	6/15/2017	Rachel Fraser	38767-0015003
15/624,513	6/15/2017	Rachel Fraser	38767-0015004
15/839,994	12/13/2017	Rachel Fraser	38767-0015005
15/913,018	3/6/2018	Rachel Fraser	38767-0015006
15/912,763	3/6/2018	Rachel Fraser	38767-0015007
15/913,090	3/6/2018	Rachel Fraser	38767-0015008
13/941,211	7/12/2013	Patrick O'Reilly Brown M.D., Ph.D.	38767-0019001
15/985,697	5/21/2018	Patrick O'Reilly Brown M.D., Ph.D.	38767-0019002
15/300,339	9/29/2016	Ranjani Varadan	38767-0026US1
16/238,698	1/3/2019	Ranjani Varadan	38767-0026002

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /E.G./

Receipt date: 03/19/2020

16/238,749	1/3/2019	Ranjani Varadan	38767-0026003

This statement is being filed before the receipt of a first action on the merits. Therefore, no fee is believed due.

Please apply any necessary charges or credits applicable under 37 C.F.R. § 1.17(p) to deposit account 06-1050, referencing the above attorney docket number.

Please contact the undersigned if there are any questions regarding this statement.

Respectfully submitted,

Date: March 19, 2020

/Kimberly M. Maize, Reg. No. 76,370/
Kimberly M. Maize
Reg. No. 76,370

Customer Number 26191
Fish & Richardson P.C.
Telephone: +1 (612) 638-5707
Facsimile: (877) 769-7945

62274489.doc

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /E.G./

Attorney's Docket No.: 38767-0010003 / M2CON-Track 1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Marija Vrljic	Art Unit	:	1796
Application No.	:	16/238,802	Examiner	:	Elizabeth A. Gwartney
Filed	:	January 3, 2019	Confirmation No.	:	3877
			Notice of Allowance Date: 1/27/2021		
Title	:	METHODS AND COMPOSITIONS FOR CONSUMABLES			

MAIL STOP ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT AFTER ALLOWANCE
PURSUANT TO 37 C.F.R. §1.312

Please amend the application as indicated on the following pages. This amendment is being filed concurrently with the payment of the issue fee.

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Canceled).

2. (Previously Presented) A meat replica matrix comprising:

one or more plant proteins;

a sugar selected from glucose, ribose, sucrose, fructose, xylose, maltodextrin, and combinations thereof;

at least one sulfur compound selected from methionine, cysteine, and thiamine; and

0.01%-5% (by weight of the meat replica matrix) of a non-animal heme-containing protein,

wherein, upon cooking of the meat replica matrix, at least two volatile compounds are generated that are associated with a beef-like aroma.

3. (Previously Presented) The meat replica matrix of claim 2, wherein the non-animal heme-containing protein has an amino acid sequence with at least 70% homology to the amino acid sequence set forth in SEQ ID NO: 1.

4. (Previously Presented) The meat replica matrix of claim 2, wherein the non-animal heme-containing protein has a UV-VIS spectrum that is substantially similar to that of myoglobin from an animal.

5. (Currently Amended) The meat replica matrix of claim 2, wherein non-animal the heme-containing protein is selected from the group consisting of a leghemoglobin, a flavohemoglobin, Hell's gate globin I, an erythrocruorin, a protoglobin, a cyanoglobin, a chlorocruorin, a truncated hemoglobin, a truncated 2/2 globin, and a hemoglobin 3.

6. (Previously Presented) The meat replica matrix of claim 2, wherein the

meat replica matrix comprises 0.4%-1% (by weight of the meat replica matrix) of the non-animal heme-containing protein.

7. (Previously Presented) The meat replica matrix of claim 2, wherein the meat replica matrix comprises about 0.3% (by weight of the meat replica matrix) of the non-animal heme-containing protein.

8. (Previously Presented) The meat replica matrix of claim 2, wherein the meat replica matrix comprises about 0.2% (by weight of the meat replica matrix) of the non-animal heme-containing protein.

9. (Previously Presented) The meat replica matrix of claim 2, wherein the one or more plant proteins are selected from the group consisting of rubisco, pea proteins, lentil proteins, and other legume proteins.

10. (Previously Presented) The meat replica matrix of claim 9, wherein the pea proteins comprise pea albumin proteins.

11. (Previously Presented) The meat replica matrix of claim 2, wherein the one or more plant proteins are present in the meat replica matrix in an amount of between 1% and 30% (by weight of the meat replica matrix).

12. (Previously Presented) The meat replica matrix of claim 2, wherein the meat replica matrix is comprised within a consumable product, wherein the consumable product is selected from taco filling, a casserole, a sauce, a topping, soup, stew, and a loaf, wherein, upon cooking of the consumable product, the at least two volatile compounds are produced in higher amounts compared to the amounts of the at least two volatile compounds produced upon cooking of the meat replica matrix lacking the non-animal heme-containing protein.

13. (Previously Presented) The meat replica matrix of claim 2, wherein the at least two volatile compounds are selected from the group consisting of(E)-2-decenal; (E)-2-heptenal; (E)-2-hexenal; (E)-2-nonenal; (E)-2-octenal; (E)-4-octene; (E,E)-2,4-decadienal; (E,E)-2,4-heptadienal; (E,E)-2,4-nonadienal; (E,E)-3,5-octadien-2-one; (E,Z)-2,6-nonadienal; (Z)-2-

decenal; (Z)-2-heptenal; (Z)-2-nonenal; (Z)-2-octen-1-ol; (Z)-4-heptenal; 1-(1H-pyrrol-2-yl)-ethanone; 1-(2-furanyl)-ethanone; 1-(6-methyl-2-pyrazinyl)-1-ethanone; 1-(acetyloxy)-2-propanone; 1,3-dimethyl-benzene; 1,3-hexadiene; 1-butanol; 1-ethyl-5-methylcyclopentene; 1-heptanol; 1-heptene; 1-hexanol; 1H-pyrrole-2-carboxaldehyde; 1-hydroxy-2-propanone; 1-methyl-1(H)-pyrrole-2-2carboxaldehyde; 1-octanal; 1-octanol; 1-octen-3-ol; 1-octen-3-one; 1-octene; 1-pentanol; 1-penten-3-ol; 1-penten-3-one; 1-propanol; 2(5H)-furanone; 2,2,4,6,6-pentamethyl-heptane; 2,2-dimethyl-undecane; 2,3-butanedione; 2,3-dihydro-3,5-dihydroxy-6-methyl-4(H)-pyran-4-one; 2,3-dimethyl-5-ethylpyrazine; 2,3-dimethyl-pyrazine; 2,4-dodecadienal; 2,5-dimethyl-3-(3-methyl butyl) pyrazine; 2,5-dimethyl-pyrazine; 2,6-dimethylnonane; 2,6-dimethylpyrazine; 2-acetylthiazole; 2-butanone; 2-butenal; 2-decanone; 2-ethenyl-6-methyl-pyrazine; 2-ethyl furan; 2-ethyl-1-hexanol; 2-ethyl-5-methyl-pyrazine; 2-ethyl-furan; 2-furanmethanol; 2-heptanone; 2-heptenal; 2-hexyl-furan; 2-hexyl-thiophene; 2-hydroxy-3-methyl-2-cyclopentene-1-one; 2-methyl thiazole; 2-methyl-1H-pyrrole; 2-methyl-2-heptene; 2-methyl-butanal; 2-methyl-furan; 2-methyl-heptane; 2-methyl-propanal; 2-n-butylacrolein; 2-n-heptylfuran; 2-nonanone; 2-octanone; 2-pentanone; 2-pentyl-furan; 2-pentyl-thiophene; 2-propenal; 2-propyl-furan; 2-pyridinecarboxaldehyde; 2-pyrrolidinone; 2-thiophenecarboxaldehyde; 2-tridecen-1-ol; 2-undecenal; 3,5-octadien-2-one; 3,6,6-trimethyl-bicyclo[3.1.1]hept-2-ene; 3-acetyl-1h-pyrolline; 3-ethyl-2,2-dimethyl-pentane; 3-ethyl-2,5-dimethyl-pyrazine; 3-ethyl-2-1,4-dioxin; 3-ethyl-2-methyl-1,3-hexadiene; 3-ethylcyclopentanone; 3-methyl-2-butenal; 3-methyl-2-thiophenecarboxaldehyde; 3-methyl-3-hexene; 3-methyl-butanal; 3-methyl-furan; 3-octen-2-one; 3-pentyl-furan; 3-thiophenecarboxaldehyde; 3-thiophenmethanol; 4,7-dimethyl-undecane; 4-cyanocyclohexene; 4-cyclopentene-1,3-dione; 4-decyne; 4-methyl-5-thiazoleethanol; 4-methylthiazole; 4-octene; 4-penten-2-one; 5-acetyldihydro-2(3H)-furanone; 5-ethyldihydro-2(3H)-furanone; 5-methyl-2-furancarboxaldehyde; 5-methyl-2-thiophenecarboxaldehyde; 6-methyl-2-heptanone; 6-methyl-5-hepten-2-one; 8-methyl-1-undecene; acetaldehyde; acetamide; acetic acid; acetic acid ethenyl ester; acetoin; acetone; acetonitrile; acetophenone; benzaldehyde; benzene; benzyl alcohol; butanal; butanoic acid; butyrolactone; caprolactam; carbon disulfide; decanal; decanol; dihydro-2-methyl-3(2H)-furanone; dihydro-5-pentyl-2(3H)-furanone; dihydro-5-propyl-2(3H)-furanone; dimethyl sulfide; dimethyl trisulfide; d-limonene; ethenyl pyrazine; ethyl acetate;

ethyl pyrazine; formamide; formic acid heptyl ester; furan; furaneol; furfural; heptanal; heptane; heptanoic acid; heptyl ester; hexanoic acid; isopropyl alcohol; isovaleric acid; methacrolein; methional; methyl ethanoate; methyl-pyrazine; methyl-thiirane; n-caproic acid vinyl ester; nonanal; octanal; octane; octanoic acid; oxalic acid, butyl propyl ester; pantolactone; p-cresol; pentanal; pentanoic acid; phenol; phenylacetaldehyde; propanal; pyrazine; pyridine; pyrrole; styrene; tetramethyl-pyrazine; thiazole; thiophene; toluene; trans-2-(2-pentenyl)furan; trans-3-nonen-2-one; trichloromethane; trimethyl-ethanethiol; and trimethyl-pyrazine.

14. (Canceled).

15. (Currently Amended) A meat replica matrix comprising:

one or more plant proteins;

a sugar selected from glucose, ribose, sucrose, fructose, xylose, maltodextrin, and combinations thereof;

at least one sulfur compound selected from methionine, cysteine, and thiamine; and

0.01%-5% (by weight of the meat replica matrix) of a non-animal heme-containing protein,

wherein, upon cooking of the meat replica matrix, at least two volatile compounds are generated, and

wherein the at least two ~~volatiles~~ <u>volatile compounds</u> are selected from the group consisting of.(E)-2-decenal; (E)-2-heptenal; (E)-2-hexenal; (E)-2-nonenal; (E)-2-octenal; (E)-4-octene; (E,E)-2,4-decadienal; (E,E)-2,4-heptadienal; (E,E)-2,4-nonadienal; (E,E)-3,5-octadien-2-one; (E,Z)-2,6-nonadienal; (Z)-2-decenal; (Z)-2-heptenal; (Z)-2-nonenal; (Z)-2-octen-1-ol; (Z)-4-heptenal; 1-(1H-pyrrol-2-yl)-ethanone; 1-(2-furanyl)-ethanone; 1-(6-methyl-2-pyrazinyl)-1-ethanone; 1-(acetyloxy)-2-propanone; 1,3-dimethyl-benzene; 1,3-hexadiene; 1-butanol; 1-ethyl-5-methylcyclopentene; 1-heptanol; 1-heptene; 1-hexanol; 1H-pyrrole-2-carboxaldehyde; 1-hydroxy-2-propanone; 1-methyl-1(H)-pyrrole-2-2carboxaldehyde; 1-octanal; 1-octanol; 1-octen-3-ol; 1-octen-3-one; 1-octene; 1-pentanol; 1-penten-3-ol; 1-penten-3-one; 1-propanol; 2(5H)-furanone; 2,2,4,6,6-pentamethyl-heptane;

2,2-dimethyl-undecane; 2,3-butanedione; 2,3-dihydro-3,5-dihydroxy-6-methyl-4(H)-pyran-4-one; 2,3-dimethyl-5-ethylpyrazine; 2,3-dimethyl-pyrazine; 2,4-dodecadienal; 2,5-dimethyl-3-(3-methyl butyl) pyrazine; 2,5-dimethyl-pyrazine; 2,6-dimethylnonane; 2,6-dimethylpyrazine; 2-acetylthiazole; 2-butanone; 2-butenal; 2-decanone; 2-ethenyl-6-methyl-pyrazine; 2-ethyl furan; 2-ethyl-1-hexanol; 2-ethyl-5-methyl-pyrazine; 2-ethyl-furan; 2-furanmethanol; 2-heptanone; 2-heptenal; 2-hexyl-furan; 2-hexyl-thiophene; 2-hydroxy-3-methyl-2-cyclopentene-1-one; 2-methyl thiazole; 2-methyl-1H-pyrrole; 2-methyl-2-heptene; 2-methyl-butanal; 2-methyl-furan; 2-methyl-heptane; 2-methyl-propanal; 2-n-butylacrolein; 2-n-heptylfuran; 2-nonanone; 2-octanone; 2-pentanone; 2-pentyl-furan; 2-pentyl-thiophene; 2-propenal; 2-propyl-furan; 2-pyridinecarboxaldehyde; 2-pyrrolidinone; 2-thiophenecarboxaldehyde; 2-tridecen-1-ol; 2-undecenal; 3,5-octadien-2-one; 3,6,6-trimethyl-bicyclo[3.1.1]hept-2-ene; 3-acetyl-1h-pyrolline; 3-ethyl-2,2-dimethyl-pentane; 3-ethyl-2,5-dimethyl-pyrazine; 3-ethyl-2-1,4-dioxin; 3-ethyl-2-methyl-1,3-hexadiene; 3-ethylcyclopentanone; 3-methyl-2-butenal; 3-methyl-2-thiophenecarboxaldehyde; 3-methyl-3-hexene; 3-methyl-butanal; 3-methyl-furan; 3-octen-2-one; 3-pentyl-furan; 3-thiophenecarboxaldehyde; 3-thiophenmethanol; 4,7-dimethyl-undecane; 4-cyanocyclohexene; 4-cyclopentene-1,3-dione; 4-decyne; 4-methyl-5-thiazoleethanol; 4-methylthiazole; 4-octene; 4-penten-2-one; 5-acetyldihydro-2(3H)-furanone; 5-ethyldihydro-2(3H)-furanone; 5-methyl-2-furancarboxaldehyde; 5-methyl-2-thiophenecarboxaldehyde; 6-methyl-2-heptanone; 6-methyl-5-hepten-2-one; 8-methyl-1-undecene; acetaldehyde; acetamide; acetic acid; acetic acid ethenyl ester; acetoin; acetone; acetonitrile; acetophenone; benzaldehyde; benzene; benzyl alcohol; butanal; butanoic acid; butyrolactone; caprolactam; carbon disulfide; decanal; decanol; dihydro-2-methyl-3(2H)-furanone; dihydro-5-pentyl-2(3H)-furanone; dihydro-5-propyl-2(3H)-furanone; dimethyl sulfide; dimethyl trisulfide; d-limonene; ethenyl pyrazine; ethyl acetate; ethyl pyrazine; formamide; formic acid heptyl ester; furan; furaneol; furfural; heptanal; heptane; heptanoic acid; heptyl ester; hexanoic acid; isopropyl alcohol; isovaleric acid; methacrolein; methional; methyl ethanoate; methyl-pyrazine; methyl-thiirane; n-caproic acid vinyl ester; nonanal; octanal; octane; octanoic acid; oxalic acid, butyl propyl ester; pantolactone; p-cresol; pentanal; pentanoic acid; phenol; phenylacetaldehyde; propanal; pyrazine; pyridine; pyrrole; styrene; tetramethyl-pyrazine; thiazole; thiophene; toluene; trans-

2-(2-pentenyl)furan; trans-3-nonen-2-one; trichloromethane; trimethyl-ethanethiol; and trimethyl-pyrazine.

16. (Previously Presented) The meat replica matrix of claim 15, wherein the non-animal heme-containing protein has an amino acid sequence with at least 70% homology to the amino acid sequence set forth in SEQ ID NO: 1.

17. (Previously Presented) The meat replica matrix of claim 15, wherein the non-animal heme-containing protein has a UV-VIS spectrum that is substantially similar to that of myoglobin from an animal.

18. (Currently Amended) The meat replica matrix of claim 15, wherein the non-animal heme-containing protein is selected from the group consisting of a leghemoglobin, a flavohemoglobin, Hell's gate globin I, an erythrocruorin, a protoglobin, a cyanoglobin, a chlorocruorin, a truncated hemoglobin, a truncated 2/2 globin, and a hemoglobin 3.

19. (Previously Presented) The meat replica matrix of claim 15, wherein the meat replica matrix comprises 0.4%-1% (by weight of the meat replica matrix) of the non-animal heme-containing protein.

20. (Previously Presented) The meat replica matrix of claim 15, wherein the meat replica matrix comprises about 0.3% (by weight of the meat replica matrix) of the non-animal heme-containing protein.

21. (Previously Presented) The meat replica matrix of claim 15, wherein the meat replica matrix comprises about 0.2% (by weight of the meat replica matrix) of the non-animal heme-containing protein.

22. (Previously Presented) The meat replica matrix of claim 15, wherein the one or more plant proteins are selected from the group consisting of rubisco, pea proteins, lentil proteins, and other legume proteins.

23. (Previously Presented) The meat replica matrix of claim 22, wherein the pea

proteins comprise pea albumin proteins.

24. (Previously Presented) The meat replica matrix of claim 15, wherein the one or more plant proteins are present in the meat replica matrix in an amount of between 1% and 30% (by weight of the meat replica matrix).

25. (Previously Presented) The meat replica matrix of claim 15, wherein the meat replica matrix is comprised within a consumable product, wherein the consumable product is selected from taco filling, a casserole, a sauce, a topping, soup, stew, and a loaf, wherein, upon cooking of the consumable product, the at least two volatile compounds are produced in higher amounts compared to the amounts of the at least two volatile compounds produced upon cooking of the meat replica matrix lacking the non-animal heme-containing protein.

REMARKS

Claims 2-13 and 15-25 are pending with claims 2 and 15 being independent. Claims 5, 15, and 18 have been amended to correct minor errors. No new matter has been introduced. Applicant asks that all claims be allowed in view of the amendment to the claims.

Please apply any necessary charges or credits to Deposit Account 06-1050, referencing the above attorney docket number.

Respectfully submitted,

Date: April 15, 2021

/Molly R. Kelley, Reg. No. 76,691/

Molly R. Kelley
Reg. No. 76,691

Customer Number 26191
Fish & Richardson P.C.
Telephone: +1 (612) 337-2519
Facsimile: (877) 769-7945

100399930.doc

Electronic Patent Application Fee Transmittal

Application Number:	16238802
Filing Date:	03-Jan-2019
Title of Invention:	METHODS AND COMPOSITIONS FOR CONSUMABLES
First Named Inventor/Applicant Name:	Marija Vrljic
Filer:	Molly Ruth Kelley/Jill Wright
Attorney Docket Number:	38767-0010003

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
UTILITY APPL ISSUE FEE	1501	1	1200	1200

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**1200**

Electronic Acknowledgement Receipt

EFS ID:	42467184
Application Number:	16238802
International Application Number:	
Confirmation Number:	3877
Title of Invention:	METHODS AND COMPOSITIONS FOR CONSUMABLES
First Named Inventor/Applicant Name:	Marija Vrljic
Customer Number:	26191
Filer:	Molly Ruth Kelley/Jill Wright
Filer Authorized By:	Molly Ruth Kelley
Attorney Docket Number:	38767-0010003
Receipt Date:	15-APR-2021
Filing Date:	03-JAN-2019
Time Stamp:	17:12:06
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$1200
RAM confirmation Number	E20214EH12183021
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	RESP.pdf	76795 4f709b83dc6a8577a7a226cf2174fffb1e1f7f114	no	2
Warnings:					
Information:					
2	Issue Fee Payment (PTO-85B)	PARTB.pdf	160921 e74677fc6973eea828f9dd70cd1aab3773ec3bc0	no	1
Warnings:					
Information:					
3		AMEND.pdf	107995 4336ca05a08e2b26ba9bb7e13ec88c131dff10e7	yes	9

Multipart Description/PDF files in .zip description

Document Description	Start	End
Amendment after Notice of Allowance (Rule 312)	1	1
Claims	2	8
Applicant Arguments/Remarks Made in an Amendment	9	9

Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	30489 6cc871c3108b38657a31c8a2e5109a55508b6063	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	376200	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Attorney's Docket No.: 38767-0010003 / M2CON-Track 1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Marija Vrljic	Art Unit	:	1796
Application No.	:	16/238,802	Examiner	:	Elizabeth A. Gwartney
Filed	:	January 3, 2019	Confirmation No.	:	3877
			Notice of Allowance Date: January 27, 2021		
Title	:	METHODS AND COMPOSITIONS FOR CONSUMABLES			

MAIL STOP ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REPLY TO NOTICE OF ALLOWANCE

In response to the Notice of Allowance dated January 27, 2021, enclosed are a completed Part B - Fee(s) Transmittal and Amendment After Allowance.

The issue fee is being paid with this reply on the Electronic Filing System. Apply those fees and any other necessary charges or credits to Deposit Account 06-1050, referencing the above attorney docket number.

COMMENTS ON EXAMINER'S REASONS FOR ALLOWANCE

It is recognized that in accordance with M.P.E.P. § 1302.14, the Examiner's reasons for allowance need not set forth all of the details as to why the claims are allowed. In the above-referenced application, it is not conceded that the Examiner's stated reasons for allowance are the only reasons for which the claims are allowable. The Examiner's reasons for allowance indicate that particular claim elements are not disclosed or suggested by the prior art of record, yet the claims may be patentable for other reasons as well, including the inventive combination of all of the recited claim elements. It is not conceded that the specific limitations identified by the Examiner are necessary to distinguish the art of record or to satisfy the requirements of 35 U.S.C. § 112. Moreover, the Examiner does not assert, and it would not be conceded, that the Examiner's reasons have any bearing on the patentability of claims in any other applications directed to the disclosed subject matter.

In addition, each dependent claim stands on its own and may be allowable on its own merits. In particular, each dependent claim may be allowable on the basis of a combination of some of the features recited in the dependent claim and its base claim(s), which combination of features may not include all of the limitations identified in the Examiner's reasons for allowance.

Respectfully submitted,

Date: April 15, 2021

/Molly R. Kelley, Reg. No. 76,691/
Molly R. Kelley
Reg. No. 76,691

Customer Number 26191
Fish & Richardson P.C.
Telephone: +1 (612) 638-5707
Facsimile: (877) 769-7945

100342800.doc

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22314-1450

By fax, send to: (571) 273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)
26191 7590 1/27/2021

FISH & RICHARDSON P.C.
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/238,802	01/03/2019	Marija Vrljic	38767-0010003	3877

TITLE OF INVENTION: METHODS AND COMPOSITIONS FOR CONSUMABLES

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	LARGE	$1200	$0	$0	$1200	04/27/2021

EXAMINER	ART UNIT	CLASS-SUBCLASS
GWARTNEY, ELIZABETH A.	1796	426-574000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

[ ] Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

[ ] "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Fish & Richardson P.C.
2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE
Impossible Foods Inc.

(B) RESIDENCE: (CITY and STATE OR COUNTRY)
Redwood City, CA

Please check the appropriate assignee category or categories (will not be printed on the patent): [ ] Individual [X] Corporation or other private group entity [ ] Government

4a. Fees Submitted: [X] Issue Fee [ ] Publication Fee (if required) [ ] Advance Order - # of Copies

4b. Method of Payment (*Please first reapply any previously paid fee shown above*):

[X] Electronic Payment via EFS-Web [ ] Enclosed check [ ] Non-electronic payment by credit card (Attach form PTO-2038)

[X] The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account No. 06-1050

5. **Change of Entity Status** (from status indicated above)

[ ] Applicant certifying micro entity status. See 37 CFR 1.29 — **NOTE**: Absent a valid Certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

[ ] Applicant asserting small entity status. See 37 CFR 1.27. — **NOTE**: If the application was previously under micro entity status, checking this box will be taken as a notification of loss of entitlement to micro entity status.

[ ] Applicant changing to regular undiscounted fee status. — **NOTE**: Checking this box will be taken as a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Molly R. Kelley, Reg. No. 76,691/ Date April 15, 2021

Typed or printed name Molly R. Kelley Registration No. 76,691

PTOL-85 Part B (08-18). Approved for use through 1/31/2020 OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

100399394.doc

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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P.O. Box 1450
Alexandria, Virginia 22313-1450
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/238,802	01/03/2019	Marija Vrljic	38767-0010003	3877

26191 7590 04/26/2021
FISH & RICHARDSON P.C. (TC)
PO BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER
GWARTNEY, ELIZABETH A

ART UNIT	PAPER NUMBER
1796	

NOTIFICATION DATE	DELIVERY MODE
04/26/2021	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATDOCTC@fr.com

PTOL-90A (Rev. 04/07)

Response to Rule 312 Communication	Application No.	Applicant(s)	
	16/238,802	Vrljic et al.	
	Examiner	Art Unit	AIA (FITF) Status
	ELIZABETH A GWARTNEY	1796	No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

1. ☑ The amendment filed on 15 April 2021 under 37 CFR 1.312 has been considered, and has been:
   - a) ☐ entered.
   - b) ☑ entered as directed to matters of form not affecting the scope of the invention.
   - c) ☐ disapproved because the amendment was filed after the payment of the issue fee.
     Any amendment filed after the date the issue fee is paid must be accompanied by a petition under 37 CFR 1.313(c)(1) and the required fee to withdraw the application from issue.
   - d) ☐ disapproved. See explanation below.
   - e) ☐ entered in part. See explanation below.

/ELIZABETH GWARTNEY/
Primary Examiner, Art Unit 1796

Attorney's Docket No.: 38767-0010003 / M2CON-Track 1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Marija Vrljic	Art Unit	:	1796
Application No.	:	16/238,802	Examiner	:	Elizabeth A. Gwartney
Filed	:	January 3, 2019	Confirmation No.	:	3877
			Notice of Allowance Date: 1/27/2021		
Title	:	METHODS AND COMPOSITIONS FOR CONSUMABLES			

MAIL STOP ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT AFTER ALLOWANCE
PURSUANT TO 37 C.F.R. §1.312

Please amend the application as indicated on the following pages. This amendment is being filed concurrently with the payment of the issue fee.

OK TO ENTER: /E.G./

04/19/2021

Receipt date: 05/07/2019

Substitute Disclosure Form	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 38767-0010003	Application No. 16/238,802
Information Disclosure Statement by Applicant (Use several sheets if necessary)		Applicant Impossible Foods Inc.	
(37 CFR §1.98(b))		Filing Date January 3, 2019	Group Art Unit

U.S. Patent Documents

Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	157.	20110287467	11/24/2011	Crane et al.			
	158.	20110288389	11/24/2011	Levinson et al.			
	159.	20120059150	3/8/2012	Moloney et al.			
	160.	20120093994	4/19/2012	Hsieh et al.			
	161.	20130004617	1/3/2013	Zhang et al.			
	162.	20140011347	1/9/2014	Yerushalmi et al.			
	163.	20140220217	8/7/2014	Brown et al.			
	164.	20150289541	10/15/2015	Brown et al.			
	165.	20150296834	10/22/2015	Geistlinger et al.			
	166.	20150296835	10/22/2015	Anderson et al.			
	167.	20150366233	12/24/2015	Brown et al.			
Change(s) applied to document, /M.H.E./ 2/24/2021	168.	20160305361	~~10/29/2015~~	~~Holz-Schietinger et al.~~		10/2016	Akita
	169.	20170105438	4/20/2017	Ajami et al.			
	170.	20170172169	6/22/2017	Grzanich			
	171.	20170188612	~~9/29/2016~~	Varadan et al.		07/2017	
	172.	20170321204	11/9/2017	Kale et al.			
	173.	20180027851	2/1/2018	Vrlijic et al.			
	174.	20180168209	6/21/2018	Fraser et al.			
	175.	20180192680	7/12/2018	Fraser et al.			
	176.	20180199605	7/19/2018	Fraser et al.			
	177.	20180199606	7/19/2018	Fraser et al.			
	178.	20180368453	12/27/2018	Brown et al.			
	179.	20190008192	1/10/2019	Brown et al.			
	180.	20190116855	4/25/2019	Vrljic et al.			

Foreign Patent Documents or Published Foreign Patent Applications

Examiner Initial	Desig. ID	Document Number	Publication Date	Country or Patent Office	Class	Subclass	Translation Yes	Translation No

Examiner Signature	Date Considered
/ELIZABETH GWARTNEY/	05/08/2020

EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /E.G./

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/238,802	05/25/2021	11013250	38767-0010003	3877

26191 7590 05/05/2021
FISH & RICHARDSON P.C. (TC)
PO BOX 1022
MINNEAPOLIS, MN 55440-1022

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

Marija Vrljic, San Mateo, CA;
Impossible Foods Inc., Redwood City, CA;
Sergey Solomatin, Mountain View, CA;
Rachel Fraser, San Francisco, CA;
Patrick O'Reilly Brown, Stanford, CA;
Jessica Karr, San Francisco, CA;
Celeste Holz-Schietinger, East Palo Alto, CA;
Michael Eisen, Berkeley, CA;
Ranjani Varadan, Fremont, CA;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

IR103 (Rev. 10/09)

AO 120 (Rev. 08/10)

TO:	Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court for the District of Delaware on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
22-cv-00311-CFC	3/9/2022	for the District of Delaware

PLAINTIFF	DEFENDANT
IMPOSSIBLE FOODS INC.	MOTIF FOODWORKS, INC.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	10,863,761	12/15/2020	IMPOSSIBLE FOODS INC.
2			
3			
4			
5			

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY
7/25/2022	☑ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	9,943,096	4/17/2018	IMPOSSIBLE FOODS INC.
2	10,039,306	8/7/2018	IMPOSSIBLE FOODS INC.
3	11,013,250	5/25/2021	IMPOSSIBLE FOODS INC.
4	11,224,241	1/18/2022	IMPOSSIBLE FOODS INC.
5			

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director **Copy 3—Upon termination of action, mail this copy to Director**
Copy 2—Upon filing document adding patent(s), mail this copy to Director **Copy 4—Case file copy**

AO 120 (Rev. 08/10)

TO:	**Mail Stop 8** **Director of the U.S. Patent and Trademark Office** **P.O. Box 1450** **Alexandria, VA 22313-1450**	**REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK**

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court for the District of Delaware on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

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22-cv-00311-CFC	3/9/2022	for the District of Delaware

PLAINTIFF	DEFENDANT
IMPOSSIBLE FOODS INC.	MOTIF FOODWORKS, INC.

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1 10,863,761	12/15/2020	IMPOSSIBLE FOODS INC.
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In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☑ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 9,943,096	4/17/2018	IMPOSSIBLE FOODS INC. (included by amendment on 7/25/22)
2 10,039,306	8/7/2018	IMPOSSIBLE FOODS INC. (included by amendment on 7/25/22)
3 11,013,250	5/25/2021	IMPOSSIBLE FOODS INC. (included by amendment on 7/25/22)
4 11,224,241	1/18/2022	IMPOSSIBLE FOODS INC. (included by amendment on 7/25/22)
5 See Exhibit A		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director **Copy 3—Upon termination of action, mail this copy to Director**
Copy 2—Upon filing document adding patent(s), mail this copy to Director **Copy 4—Case file copy**