

**IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE**

IMPOSSIBLE FOODS INC.,	)	
	)	
Plaintiff,	)	
	)	
v.	)	C.A. No. 22-311 (WCB)
	)	
MOTIF FOODWORKS, INC.,	)	
	)	
Defendant.	)	

DECLARATION OF DR. JERRAD LEGAKO

IN SUPPORT OF MOTIF'S ANSWERING CLAIM CONSTRUCTION BRIEF

I, Jerrad Legako, Ph.D., declare as follows:

1. I have been retained by Quinn Emanuel Urquhart & Sullivan LLP on behalf of Defendant Motif FoodWorks, Inc. (“Motif”) as an independent expert in the lawsuit brought by Impossible Foods Inc. (“Impossible”), captioned above. It is my understanding that this lawsuit (the “Litigation”) is currently pending before the United States District Court for the District of Delaware. I understand that the parties are presently engaging in claim construction proceedings in connection with the patents being asserted in the Litigation. I have been asked to provide this declaration containing my independent expert opinions concerning certain claim terms in some of the asserted patents, and concerning the competing positions advanced by the parties in these claim construction proceedings (“Declaration”).

2. I understand that, in this Litigation, Motif and Impossible have submitted proposed constructions of certain terms each of the asserted patents. The terms I have been asked to offer my opinions on include claim 1 of U.S. Patent No. 9,943,096 (the “’096 patent”), claims 14, 27 of U.S. Patent No. 10,039,306 (the “’306 patent”), claim 1 of U.S. Patent No. 10,863,761 (the “’761 patent”), claims 1 and 13 of U.S. Patent No. 11,013,250 (the “’250 patent”), and claims 1 and 22 of U.S. Patent No. 11,224,241 (the “’241 patent”). For purposes of this declaration, I refer to these patents as the “Foodstuff Patents,” and I refer to the claims in which these terms appear, together with the claims that depend therefrom, as the “Foodstuff Claims.”

3. I have been asked to provide my opinions regarding the meaning of select terms of the Foodstuff patents that fall within my areas of expertise, and I have been asked to provide my opinions as to how these select terms would have been understood by a person of ordinary skill in the art for the Foodstuff Patents (*i.e.*, a “POSITA,” which I define below).

4. I reserve the right to amend or supplement my opinions in this Declaration in response to any positions that Plaintiff or its experts may take in the claim construction proceedings, the Litigation, or in response to any order of the District Court.

I. QUALIFICATIONS AND EXPERTISE

5. Exhibit L1 to this Declaration is a true and correct copy of my current CV. It describes in greater detail my education, publications, employment and research history, and professional activities and awards.

6. I am presently the Interim Associate Department Chair and an Associated Professor of Meat Science in the department of Animal & Food Sciences at Texas Tech University. I received a B.S. in Biology from Texas Tech University in 2005, an M.S. in Food Science from Oklahoma State University in 2009. I received a Ph.D. in Animal Science, with an emphasis in Meat Science, from Texas Tech University in 2011. Since 2013, I have served as a full time faculty, affiliate or adjunct at numerous universities, including Utah State University, Colorado State University, Texas Tech University and the University of Arkansas.

7. I am a recognized expert and scholar in the field of animal and meat science, and have been actively involved in research in these fields for more than a decade. I have received numerous licenses and certifications related to food safety standards and practices. Among other areas, my area of expertise extends to the area of animal based food products, particularly meat related food products, as well as their flavors, aromas, structures, health benefits and health concerns related to such food products. This expertise is the result of my combined academic/food industry interactions, noted above and detailed further in my CV, as well as my research and publication activities. I have received over \$6 Million in grants and awards to fund my research. I have authored, co-authored, and/or edited 75 publications in renowned journals, including the

Journal of Food Science, the Journal of Animal Science, Food Control, Journal of Food Science and Technology, Meat and Muscle Biology Journal, Translational Animal Science Journal, and the Physiology & Behavior Journal. These publications are included in my *curriculum vitae* which is attached as Exhibit A, but a number of the titles are representative of some of the areas of my focus:

- Volatile aroma compounds from different grilled beef muscles.
- Consumer assessment of flavor of steak of varying fat levels from four beef muscles
- The effect of muscle source on ground beef flavor and texture
- Consumer sensory evaluation of six beef muscles cooked with multiple dry heat methods
- Beef quality, biochemical attributes, and descriptive sensory scores of gluteus medius, biceps femoris, and tensor fasciae latae muscles subjected to combined tumbling and postmortem aging
- Volatile flavor compounds vary by beef product type and degree of doneness
- Evaluation of the contribution of tenderness, juiciness, and flavor to the overall consumer beef eating experience

I have also served as an undergraduate research mentor to more than ten students, and have taught a several courses at the undergraduate and graduate level. These classes included the following courses at Texas Tech University: (1) FDSC 4303/5303 – Food Chemistry, 3 credits, (2) ANSC 5401 – Experimental Techniques in Meat Chemistry & Muscle Biology, 4 credits, (3) FDSC 3302/5302 – Advanced Food Analysis, 3 credits, (4) FDSC 2302 – Elementary Food Analysis, 3 credits. I also taught the following courses at Utah State University: (1) NDSF 5500/6500 – Food Analysis, 4 credits, and (2) NDSF 5020/6020 – Meat Technology & Processing, 4 credits.

8. Finally, I have offered my expertise to leading professional organizations in the field, including as an ad hoc reviewer the following journals: (1) Journal of Animal Science, (2) Meat Science Journal, (3) Journal of Agricultural & Food Chemistry, (4) Journal of Dairy Science, (5) Trends in Food Science & Technology, (6) International Journal of Food Science & Technology, (7) Journal of the Science of Food & Agriculture, (8) Food Reviews International, (9) Journal of the American Oil Chemists' Society, (10) Food Research International, (11) Meat & Muscle Biology, (12) Livestock Science, (13) Journal of Processing and Preservation, (14) Molecules. I now also serve on the editorial board of Meat and Muscle Biology Journal.

I. SCOPE OF ASSIGNMENT

9. I have been asked to provide my opinions regarding the meaning of select terms of the Foodstuff patents that fall within my areas of expertise, and I have been asked to provide my opinions as to how these select terms would have been understood by a person of ordinary skill in the art for the Foodstuff Patents. In particular, I have been asked to opine on how a POSITA would interpret certain terms and phrases recited in the Foodstuff patents.

10. The terms and phrases I have been asked to offer opinions on are shown in the table below:

Claim Term	Patents and Relevant Claims in which the term appears
"muscle replica"	'761 patent, cl. 1
"fat tissue replica"	'761 patent, cl. 1
"wherein said muscle replica and fat tissue replica are assembled in a manner that approximates the physical organization of meat"	'761 patent, cl. 1
"meat-associated aroma"	'096 patent, cl. 1; '241 patent, cl. 1, 22

“beef-like aroma”	’306 patent, cl. 14, 27; ’250 patent, cl. 1
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11. For brevity, I refer to the “muscle replica” and “fat tissue replica” phrases as the “Replica Terms,” I refer to the “wherein said muscle replica and fat tissue replica are assembled in a manner that approximates the physical organization of meat” phrase as the “Physical Organization of Meat Term,” and I refer to “meat-associated aroma” and “beef-like aroma” as the “Aroma Terms.”

12. In connection with my preparation of this Declaration, I have reviewed the materials cited in this Declaration, together with the Foodstuff Patents themselves, their respective prosecution histories, and other record materials including *inter partes* review materials for each of the Foodstuff Patents. I have also reviewed a Joint Claim Construction Statement that I understand was prepared by both Motif and Impossible, and a redacted Claim Construction Brief that I understand was prepared by Plaintiff Impossible Foods. I reproduce relevant portions of the Joint Claim Construction Statement below, which I understand represents the parties’ dispute regarding the Replica Terms, the Physical Organization of Meat Term, and the Aroma Terms.

Claim Term	Impossible’s Proposed Construction	Motif’s Proposed Construction
“muscle replica” (’761 patent, cl. 1)	Plain and ordinary meaning. If the Court decides construction is necessary, this term should be construed to exclude the actual material being replicated or approximated.	“a composition, separate from other replicas, that mimics key features of muscle before or after cooking; the composition may be partially derived from animal sources”
“fat tissue replica” (’761 patent, cl. 1)	Plain and ordinary meaning. If the Court decides construction is necessary, this term should be construed to exclude the actual	“a composition, separate from other replicas, that mimics key features of fat tissue before or after cooking; the composition may be partially derived from animal sources”

	material being replicated or approximated.	
“wherein said muscle replica and fat tissue replica are assembled in a manner that approximates the physical organization of meat” (’761 patent, cl. 1)	Plain and ordinary meaning. If the Court decides construction is necessary, this term should be construed to exclude the actual material being replicated or approximated.	Indefinite. To the extent the Court construes this term: “the muscle replica and fat tissue replica are combined to mimic the appearance of meat, and are visually distinguishable from each other after being combined”
“meat-associated aroma” (’096 patent, cl. 1; ’241 patent, cl. 1, 22)	Plain and ordinary meaning.	Indefinite.
“beef-like aroma” (’306 patent, cl. 14, 27; ’250 patent, cl. 1, 13)	Plain and ordinary meaning.	Indefinite.

13. I am informed by Motif’s counsel that Impossible contends that Motif’s food products practice each of the above noted limitations of the Foodstuff Patents.

II. SUMMARY OF OPINIONS

14. I agree with Motif’s proposed constructions for the Replica Terms, which are substantially the same except that “muscle” is used for the “muscle replica” term, and “fat tissue” is used for the “fat tissue replica” term. As I explain below, Motif’s construction is consistent with how a POSITA would have understood the term in view of the complete intrinsic record.

15. I also agree with Motif’s view that the Physical Organization of Meat Term is indefinite. The phrase “physical organization of meat” is not a term of art with any specific meaning in the field of food science, and the specification does not add any description of that

phrase such that a POSITA would understand, with reasonable certainty, the full scope and meaning of that phrase.

16. I also agree with Motif's view that the Aroma Terms are indefinite. The phrases "meat-associated aroma" and "beef-like aroma" are not terms of art with any specific meaning in the field of food science, and the specification does not add any description of those phrases such that a POSITA would understand, with reasonable certainty, their full scope and meaning.

III. **LEGAL UNDERSTANDING**

17. In this section I describe my understanding of certain legal principles that I have relied upon in forming my opinions set forth in this Declaration. I have been informed of these legal standards by counsel for Motif. I am not an attorney and I have not researched the law on patent invalidity. I am relying only on Motif's attorneys regarding these legal standards.

18. I have applied the standards below in my analysis of the Foodstuff Patents.

A. Person of Ordinary Skill in the Art (POSITA)

19. I understand that patent validity is determined from the perspective of a person of ordinary skill in the pertinent art at the time of the invention ("POSITA"). I understand that a POSITA is a hypothetical person who is presumed to be aware of all pertinent art, conventional wisdom in the art, and is a person of ordinary creativity—not an automaton.

20. In deciding the level of ordinary skill in the art, I am informed that the following factors may be considered: the levels of education and experience of persons working in the field; the types of problems encountered in the field; and the sophistication of the technology.

21. Claim Construction

22. I understand that claim construction is a matter of law for the Court to decide.

23. I understand that claim construction begins with the presumption that claim terms are given their ordinary and customary meaning, and that the ordinary and customary meaning of

a claim term is the meaning that the term would have to a person of ordinary skill in the art at the time of the invention (*i.e.*, the effective filing date), viewed in the context of the patent. I understand that to determine the ordinary and customary meaning of claim terms, courts may consult a variety of sources, including the claims themselves, the specification, and the prosecution history (collectively, referred to as “intrinsic evidence”), as well as relevant dictionaries and treatises, and expert testimony (collectively, referred to as “extrinsic evidence”). I also understand that intrinsic evidence is the most important source for determining the meaning of claim terms, but that extrinsic evidence may, in some circumstances, also be useful when considered in the context of the intrinsic record. I understand that extrinsic evidence cannot be used to contradict an unambiguous meaning provided in the intrinsic evidence.

24. I understand that, under some circumstances, an inventor may clearly define a claim term in the specification or the prosecution history to mean something other than its ordinary meaning. Similarly, I understand that under some circumstances, an inventor may clearly and intentionally disclaim certain claim scope within the specification or prosecution history.

25. I understand that the claim language must be considered in the context of the entire patent, including the specification and the prosecution history. Specifically, I understand that the usage of a claim term within the specification and prosecution history may provide guidance as to the inventor’s understanding of the meaning of the term and context which could assist a person of ordinary skill to ascertain the plain meaning of the claim language. At the same time, I understand that the specification usually cannot be used to import limitations into the claims, and that it is also generally improper to read limitations out of the claims.

26. I further understand that a patent may include two types of claims, independent claims and dependent claims. An independent claim stands alone and includes only the limitations

it recites. A dependent claim can depend from an independent claim or another dependent claim. I am informed that a dependent claim includes all the limitations that it recites, in addition to the limitations recited in the claim from which it depends.

27. I understand that claim terms should usually be read and understood in a manner that gives meaning to all of the words in the claim and, further, gives each independent claim a distinct meaning and scope from its dependent claims. Thus, other claims (and claim elements) of the patent in question, both asserted and unasserted, can inform the meaning of a claim term. For example, because claim terms are normally used consistently throughout the patent, the usage of a term in one claim can often illuminate the meaning of the same term in other claims. Differences among claims can also be a useful guide in understanding the meaning of particular claim terms.

IV. TECHNICAL BACKGROUND

28. Below I provide relevant background information concerning technology relevant to my opinions concerning the Foodstuff Patents.

A. FLAVORS AND AROMAS

29. Food flavor is commonly defined as a sensation “arising from the integration or interplay of signals produced as a consequence of sensing smell, taste, and irritating stimuli from food or beverage.” Exhibit L2, 123. With respect to food aroma, the sensation is “triggered by highly complex mixtures of volatile molecules.” *Id.* Beginning around the 1960’s, technological advances in the field of flavor chemistry began allowing scientists to identify specific flavor compounds that existed in food. Exhibit L3, 1. In particular, gas chromatography (GS) and mass spectrometry (MS), among other methods, allowed researchers to isolate volatiles in foods resulting in particular flavor profiles. Exhibit L4 at 604. By the 1970s, less than 1500 flavor

compounds had been identified in food products – but by 2008, that number had more than quadrupled to over 7000. Exhibit L2, 124.

30. Despite these vast technological improvements, detecting and identifying new flavor compounds has proven difficult for a variety of reasons. Many studies in this field have carried out isolation of volatile compounds without considering changes that may occur during the eating process, such as “temperature increase, salivation and mastication.” Exhibit L2, 124. Further, there is much variety and complexity to aroma chemicals, with many differences in volatility and instability. Exhibit L4, 601. Some compounds present in trace-level concentrations may be responsible for the overall flavor of some food matrices, while others that are present in large quantities may have little contribution to the characteristic flavor of the matrix. *Id.* Additionally, the instability of food components must be considered; food products can readily undergo reactions during the process of isolating chemical compounds, which may alter their flavor profile. *Id.*

31. Further complicating these concepts, the characterization of the flavor and aroma of food volatile compounds depends on the perception of the human olfactory system. Hundreds of volatile compounds may contribute to beef flavor and aroma, for example, and the industry does not have an established library of terms to describe the flavor components of beef. Exhibit L5, 413. Therefore, in addition to the difficulty in isolating volatile compounds that contribute to flavor and aroma, there is the difficulty of characterizing these compounds in an objective, methodical way based on a subjective sensory experience.

32. Thus, when undergoing flavor analysis research, researchers sometimes establish an objective of the investigation and a mechanism for characterizing particular aromas in the

context of their study. Exhibit L4, at 601. This could be, for example, establishing “an overall flavor profile characterization or an off-flavor analysis.” *Id.* .

B. REPLICAS

33. Scientists and engineers have engineered and attempted to design various substitute foods and ingredients (sometimes called replicas) for decades. Exhibit L6, 309. Substitute food products can achieve a number of objectives. For example, in some cases, a substitute product can provide a cheaper alternative to the product being replicated, and thereby allow for greater or more widespread enjoyment of desired textures, tastes, smells and other attributes. In another example, in some cases, a substitute product can be created in a more economically and environmentally friendly manner, creating less of an impact on resources to achieve a comparable food product at lower price point.

34. Within the category of food substitutes more generally, an area of great interest is the preparation of meat substitutes. As noted by Glesni MacLeod and M. Seyyedain-Ardebili in the article cited above, titled “Natural and Simulated Meat Flavors” in the Journal of Food Science and Nutrition, “[m]eat has constituted an important part of our diet for many years - not only as a good source of protein, but also for its sensory properties, flavor being one of the most important.” Exhibit L6, 309. Among the many meats of interest, beef is very often the focus of research and attempted replication. Indeed, MacLeod and Ardebili note that “[t]he flavor of cooked meat has been extensively studied over the last two decades. Beef flavor has received the greatest attention probably because it is the most popular meat in the Western world, and therefore the identification of desirable beef flavor has great commercial significance.” *Id.* at 309.

35. The research and findings in this area of food science is extensive, and several reviews and publications are available that discuss natural meat flavors and aromas, simulated meat flavors and aromas, and comparisons between them. Exhibit L6, at 310 (citing numerous reviews and publications). As well-recognized in the field:

“[t]wo important aspects of flavor contribute to our appreciation of any food – meat being no exception - i.e., taste and aroma. The flavor of cooked meat is due to a complex mixture of compounds many of which are produced during heating. They include

1. Volatile compounds with odor properties
2. Non-volatile, water soluble compounds with taste and tactile properties
3. Potentiators and synergists

Id. at 310.

36. Food scientists have long attempted to create replica food products attempt to mimic, via one or more of the foregoing, the tastes and aromas of the foods they aim replicate. Notably, it was well recognized in the food sciences field as of the MacLeod article, and it is still well recognized today, an often useful way replicate a food product is to use, as part of the ingredient mixture for the replica, at least “some of the natural product or an extract of it present as a foundation.” Exhibit L6, 310. That is, while some replicas in the art do not use any of the natural product being replicated, some do. Indeed, many meat replicas that have been known in the art for decades include at least a portion of the actual meat product itself.

37. For example, at least as early as 1979, scientists developed a “crab meat substitute” that included, in some recipes, a small amount of actual crab meat.

[57]

ABSTRACT

A crab meat substitute is prepared by molding mashed and seasoned meat in the presence of heat utilizing the thermally solidifying properties of the meat proteins which have a jelly strength of 300 to 1,500 g. The molded crab meat substitute is shredded into pieces ranging from 0.25 to 3.0 mm in width and up to 2.25 mm² in cross sectional area to obtain a food similar to crab meat in taste and in texture. **When suitably colored red or incorporating a small amount of crab meat or eggs, the meat substitute can be made to more closely resemble crab meat in appearance and taste.**

Exhibit L7 (U.S. Pat. No. 4,158,065), Abstract (emphasis added).

10 According to this invention, the molded mass of
 “Kamaboko” to be shredded is covered on the front and
 rear sides with a thin coating of mashed fish meat incor-
 porating a crab-like color pigment (i.e., a carotenoid
 15 pigment or artificial coloring agent) or directly coated
 on the front and rear sides with a coloring solution, and
 the colored mass is heated to fix the color and form a
 coating resembling the fascia of crag legs. The taste of
 the product of this invention can be made to closely
 20 resemble real crab meat by incorporating in the
 “Kamaboko” increased quantities of monoamino acids
 which are abundant in Crustacea. **A still closer resem-
 blance to crab meat can be achieved with addition of a
 small amount of crab meat or eggs.**

Exhibit L7, at 8:10-24 (emphasis added).

38. Similarly, today, crab meat substitutes still use at least some portion of real crab meat in their replication of crab meat. For example, a product (shown below) made and sold today under the TransOcean brand is an imitation crab food product that includes a small portion of real crab meat.



Description

Crab Classic is a blend of premium, wild caught Alaska pollock and king crab meat.

- Fully cooked. Ready-to-eat.

- A blend of Alaska pollock surimi & king crab.

- Certified sustainable seafood.

- Resealable zipper bag.

See <https://www.heb.com/product-detail/trans-ocean-lobster-classic-chunk-style-imitation-lobster/1405709> (emphasis added).

Nutrition Facts	
Per serving	
About 2.5 servings per container	
Serving Size	0.50 cup
Amount Per Serving	
Calories	80
	% Daily Value*
Total Fat 0g	0%
Saturated Fat 0g	0%
Trans Fat 0g	
Cholesterol 5mg	2%
Sodium 390mg	17%
Total Carbohydrate 14g	5%
Dietary Fiber 0g	0%
Total Sugars 4g	
Includes Added Sugars 4g	9%
Protein 6g	
Vitamin D 0.4mcg	2%
Calcium 0mg	0%
Iron 0mg	0%
Potassium 260mg	6%
* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.	

Ingredients

Alaska Pollock (MSC Certified), Water, Egg Whites, Corn Starch, Sugar, Sorbitol, **Contains 2% or Less of: King Crab Meat,** Natural and Artificial Flavor Extracts of Blue Crab, Snow Crab, Lobster, and Alaska Pollock), Refined Fish Oil (Adds a Trivial Amount of Fat) (Alaska Pollock), Rice Wine (Water, Rice, Koji), Modified Tapioca Starch, Sea Salt, Carrageenan, Yam Flour, Potassium Chloride, Disodium Inosinate, Sodium Pyrophosphate, Carmine, Paprika, Color Added.

See <https://www.heb.com/product-detail/trans-ocean-lobster-classic-chunk-style-imitation-lobster/1405709> (emphasis added).

C. MEAT ULTRASTRUCTURE

39. In addition to aroma and flavor, another feature important in food replicas, especially in meat replicas, is the structure and related texture of the substitute food product. Consumers have become used to the structure of natural meat cuts, ranging from the natural meat ultrastructure from a very freshly cut piece of meat that is still intact, to the natural meat structure achieved as the ultrastructure breaks down over time (e.g., aged meats, which reflect a

breakdown of cytoskeletal proteins in the meat ultrastructure). *See, e.g.*, Exhibit L8, 11:24-28.

And like aroma and flavor, a great deal of research and development has been dedicated to mimicking the structure of intact cuts of beef such as a steak, for example, to achieve an eating experience corresponding to that of eating an actual steak of the same cut.

40. Mimicking the structure of intact meat cuts has been attempted, but only with moderate success. In many cases, instead of attempting to mimic the structure of the actual meat, scientists and engineers have found it easier to create substitute meat products that do not resemble the structure of intact natural meat, but instead attempt to mimic a pre-formed food product that is the result of a man-made manipulation of the original meat into a new assembly. An example of this is imitation ground beef. Ground beef is normally made by grinding up animal parts, including meat and fat, and destroying the meat's natural structure to create something unnatural but still appealing. Another example is imitation sausage. Thus, scientists have found it more achievable to make a substitute product that resembles a man-made food item, rather than the natural structure of meat itself.

V. FOODSTUFF PATENTS

A. LEVEL OF ORDINARY SKILL IN THE ART

41. The Foodstuff Patents are directed to the art of food science. In my opinion, a POSITA for the Foodstuff Patents would have a Master's degree or Ph.D. in food science or at least three years of experience working as a food scientist. A POSITA could also be part of a team of food scientists, including flavor chemists. As explained above, I exceed all of these requirements. In this Declaration, I provide my opinions based on the knowledge and understanding of a POSITA for the Foodstuff Patents.

42. Below I provide a recitation of the claims that contain the terms and phrases for which I have been asked to offer my expertise and opinions from the perspective of a POSITA, as well as a brief overview of the corresponding patent specifications and certain prosecution history events for each of the respective Foodstuff Patents.

B. THE 761 PATENT

1. CLAIMS

43. Claim 1 of the '761 patent is provided below, with the claim terms and phrases I've been asked to offer my expertise and opinions on in bold-underlined font.

1. A beef replica product, comprising:
 - a) **a muscle replica** comprising 0.1%-5% of a heme-containing protein, at least one sugar compound and at least one sulfur compound; and
 - b) **a fat tissue replica** comprising at least one plant oil and a denatured plant protein,
wherein said muscle replica and fat tissue replica are assembled in a manner that approximates the physical organization of meat.

Exhibit L9 ('761 patent), 49:13-21 (emphasis added).

44. Claims 2-17 of the '761 patent depend from claim 1, either directly or through one or more intervening claims, and therefore inherit the claim language recited in claim 1 on account of their dependency. See '761 patent, 49:21-50:48.

2. SPECIFICATION

45. The '761 patent is entitled "Methods and compositions for consumables," and is generally related to the art of food science and recombinant protein expression. '761 patent, Title, Abstract, Summary. The '761 patent is directed to beef replicas with components that are assembled to, in the language of the patent, approximate the physical organization of meat. The specification proposes meat replicas intended address purported negative impacts of meat

consumption, including “greenhouse gas emissions” and pollution from animal farming, human health problems, and inability to adequately address hunger worldwide. ’761 patent, 1:18-40. It proposes that a shift to a vegetarian diet would address these problems, but that “[p]lant-based meat substitutes have largely failed to cause a shift to a vegetarian diet.” ’761 patent, 1:41-42. The ’761 patent explains that common limitations of these products are a texture and mouth-feel that is different than meat products. ’761 patent, 1:45-48.

46. The ’761 patent purports to provide an improvement in replicating the characteristics of meat in meat substitutes, including by combining a muscle replica and a fat tissue replica in a manner that purports to “approximate[] the physical organization of meat.” ’761 patent, Claim 1. According to the Abstract, for example, the patent discloses “improved methods and compositions which more accurately replicate the characteristics that consumers value in the preparation and consumption of meat and which overcome the shortcomings and drawbacks of current meat substitutes.” ’761 patent, Abstract, 1:56-60.

47. The ’761 patent explains that “[i]n some aspects,” its meat substitute products “accurately mimic[] the taste, texture, or color of a meat product derived from animal sources,” ’761 patent, 2:1-2, and that, “[f]or instance[,], the consumables can be meat replicas made entirely from plant sources.” ’761 patent, 18:26-28. Notably, the patent expressly provides that “[i]n some embodiments, the . . . meat substitute product . . . [is] partially derived from animal sources.” ’761 patent, 30:60-63. These animal-based embodiments are the embodiments corresponding to one or more of claims 1-11 and 13-17, but not dependent claim 12 because dependent claim 12 is the only claim that expressly precludes “no animal products.” ’761 patent, 50:26-28.

48. The '761 patent also discusses “fat tissue replicas.” '761 patent, 29:38-40. In one form, the patent’s fat tissue replica “is an emulsion comprising a solution of one or more proteins and one or more fats suspended therein as droplets.” '761 patent, 29:38-40.

3. PROSECUTION HISTORY

49. The '761 patent issued from U.S. Application No. 15/985,697 (“’697 application”). During examination, the '697 application appears to have received a single substantive office action (the “Office Action”). Notably, the '697 application is a continuation of abandoned U.S. Application No. 13/941,211 (“’211 application”). *See* Exhibit L10, . 2-6. The prosecution of the '211 application was unsuccessful, unable to overcome prior art rejections after more than four years of prosecution. The Applicant ultimately abandoned the '211 application and filed the '697 application. *Id.*

50. On January 2, 2022, the Examiner rejected the '697 application claims as obvious over the same art raised against its parent '211 application, including prior art references referred to as “Van den Briel,” “Proulx,” “Brewer,” and “Asgar.” The Examiner asserted that Van den Briel disclosed muscle replica, fat replica, connective tissue replica, and several other claim limitations, and asserted that the remaining limitations were disclosed by one or more of “Proulx,” “Brewer,” and “Asgar.” *See* Exhibit L10, . 7-17. As such, the Examiner rejected each of the then-pending claims as obvious. *See id.*

51. The Applicant responsively amended the claims to overcome the rejections. Among other things, Applicant added a limitation that the claimed “fat tissue replica” includes “a denatured plant protein.” *See* Exhibit L10, 18-29. The Applicant argued, among other things, that Van den Briel does not “disclose or even suggest a fat tissue replica including a denatured plant protein,” and that none of Proulx, Brewer, or Asgar “cure the deficiencies of Van den

Briel” as to that added limitation. *See* Exhibit L10, 23-28. Thereafter, the Examiner issued a notice of allowance.

52. In the Notice of Allowance, the Examiner allowed the amended claims, noting specifically, as the sole reason for allowance, that the prior art did not “disclose a fat replica comprising at least one plant oil and denatured plant protein.” *See* Exhibit L10, 30-38.

C. **PRIORITY DATE**

53. I have not conducted an independent assessment of the priority date of the ’761 patent. I have been asked, for purposes of this declaration only, to assume a priority date for the ’761 patent of July 12, 2011.

D. **THE 096 PATENT**

54. **CLAIMS**

55. Claim 1 of the ’096 patent is provided below, with the claim terms and phrases I’ve been asked to offer my expertise and opinions on in bold-underlined font.

1. A food flavor additive composition comprising:
 - a) an isolated heme-containing protein;
 - b) a compound selected from glucose, ribose, fructose, lactose, xylose, arabinose, glucose-6-phosphate, maltose, maltodextrin, and galactose, and mixtures of two or more thereof; and
 - c) a compound selected from cysteine, cystine, thiamine, methionine, and mixtures of two or more thereof;wherein the flavor additive composition contains no animal products; and
wherein cooking the food flavor additive composition results in the production of at least two volatile compounds which have **a meat-associated aroma**.

Exhibit L11 (’096 patent), 73:45-51 (emphasis added).

56. Claims 2-9 of the '096 patent depend directly from claim 1, and therefore inherit the claim language recited in claim 1 on account of their dependency. See '096 patent, 73:59-75:7.

1. SPECIFICATION

57. The '096 patent is entitled “Methods and compositions for affecting the flavor and aroma profile of consumables,” and is generally related to the art of food science and recombinant protein expression. '096 patent, Title, Abstract, Summary. The '096 patent describes its “invention” as being “relate[d] to food products and more particularly, to food products that include a highly conjugated heterocyclic ring complexed to iron such as a heme-cofactor and one or more flavor precursor molecules.” '096 patent, 1:22-25.

58. The '096 patent explains that “[c]urrent plant-based meat substitutes have largely failed to cause a shift to a vegetarian diet,” and that “[m]eat substitute compositions are typically extruded soy/grain mixtures which largely fail to replicate the experience of cooking and eating meat.” '096 patent, 1:46-48. In particular, the '096 patent teaches that these substitutes “fail to replicate the aromas, flavors, and other key features, such as texture and mouth-feel, associated with cooking or cooked meat.” '096 patent, 1:53-55. With respect to aromas, the '096 patent describes that combining “one or more iron complexes such as a heme-cofactor (e.g., a heme-containing protein” with “one or more flavor precursor molecules or compositions (see, e.g., Table 1 or Table 13)” that purportedly “can generate or provide a range of savory and meaty aromas and tastes (see, e.g., Tables 2, 7, and/or 11) in a cooked consumable food product.” '096 patent, 2:43-65.

59. The '096 patent specification does not use the term “meat-associated aroma” outside of claim 1, and instead references a range of other aroma related concepts under different

labels, such as the “meaty aroma[s]” recited in claim 10 (*see, e.g.*, ’096 patent, 2:48-49.), and other “aroma profiles” that it characterizes as “more meat like” such as: “beef-like,” “lamb-like,” “pork-like,” “turkey-like,” “duck-like,” “deer-like,” “yak-like,” “bison-like,” etc. (*see, e.g.*, ’096 patent, 3:8-14). The ’096 patent does not define these terms.

2. PROSECUTION HISTORY

60. The ’096 patent issued from U.S. Application No. 15/398,479 (“’479 application”). During examination, the ’479 application appears to have received a single substantive office action (the “Office Action”). The Office Action rejected original “composition” claim 31 (corresponding to issued claim 1 ’096 patent) as being invalid over a number of prior art references, including references referred to in the file history as “Tong,” “Shimbayashi,” “Koutsidis,” and “Field.” Exhibit L12, 22-35. The Office Action also rejected original claim 42 (corresponding to issued claim 10) as being invalid over a number of prior art references, including references referred to in the file history as “Jamieson,” “Koutsidis,” and “Griffiths.” *Id.*

61. The Examiner asserted that Tong and Koutsidis disclosed that beef blood and beef muscle tissue, respectively, included the claimed “isolated heme-containing protein” (e.g., hemoglobin), “a sugar ... selected from glucose, ribose” (e.g., glucose), and “a compound selected from cysteine, ... thiamine, [or] methionine.” Exhibit L12, 22-35.

62. Applicant amended the claims to recite “wherein the flavor additive composition contains no animal products,” and argued that the prior art references asserted in the Office Action, which included real beef and/or real beef blood, failed to satisfy this amended limitation. Exhibit L12, 19-21.

63. Following this amendment, the Examiner allowed the claims. Exhibit L12, 2-7, 8-18. The Examiner stated that “[w]hile the various pieces of applied prior art disclose compositions comprising animal derived heme-containing protein, sugars and amino acids, the references do not disclose food flavor additive compositions that contain no animal products as presently claimed.” Exhibit L12, 16.

E. **PRIORITY DATE**

64. I have not conducted an independent assessment of the priority date of the ’096 patent. I have been asked, for purposes of this declaration only, to assume a priority date for the ’096 patent of January 11, 2013.

F. **THE 241 PATENT**

1. **CLAIMS**

65. Claims 1 and 22 of the ’241 patent are provided below, with the claim terms and phrases I’ve been asked to offer my expertise and opinions on in bold-underlined font.

1. A meat-like-food product produced by a method comprising:
 providing one or more plant proteins; and
 combining, with the one or more plant proteins:
 a composition comprising a heme-containing protein, wherein the composition comprises at least 60% of the heme-containing protein on a dry weight basis;
 a compound selected from glucose, ribose, fructose, lactose, xylose, arabinose, glucose-6-phosphate, maltose, and galactose, and mixtures of two or more thereof; and
 a compound selected from cysteine, cystine, thiamine, methionine, and mixtures of two or more thereof in a concentration of at least 1.5 mM;
 wherein the meat-like food product is free of animal heme-containing protein;
 wherein cooking the meat-like-food-product results in the production of at least two volatile compounds which have **a meat-associated aroma**; and
 wherein the meat-like food product is in a form selected from the group consisting of a hotdog, a burger,

ground meat, a sausage, a steak, a filet, a roast, a meatball, a meatloaf, or bacon.

Exhibit L13 ('241 patent), 77:53-78:58 (emphasis added).

22. A meat-like-food product produced by a method comprising:
 providing one or more plant proteins; and
 combining, with the one or more plant proteins:
 a heme-containing protein;
 one or more of glucose, ribose, fructose, lactose, xylose, arabinose, glucose-6-phosphate, maltose, and galactose; and
 one or more of cysteine, cystine, thiamine, and methionine;
 wherein the meat-like food product is free of animal heme-containing protein;
 wherein cooking the meat-like-food-product results in the production of at least two volatile compounds which have a meat-associated aroma; and
 wherein the meat-like food product is in a form selected from the group consisting of a hotdog, a burger, ground meat, a sausage, a steak, a filet, a roast, a meatball, a meatloaf, or bacon.

'241 patent, 83:9-27 (emphasis added).

66. Claims 2-21 of the '241 patent depend from claim 1, either directly or through one or more intervening claims, and therefore inherit the claim language recited in claim 1 on account of their dependency. *See* '241 patent, 78:58-83:8. Claim 23 of the '241 patent depends directly from claim 22, and therefore inherits the claim language recited in claim 22 on account of its dependency. *See* '241 patent, 83:28-30.

2. SPECIFICATION

67. The '241 patent issued from a continuation filing from the same application that resulted in the '096 patent, and is similarly titled "Methods and compositions for affecting the flavor and aroma profile of consumables." As a continuation, the '241 patent shares the same specification as the '096 patent, and thus relates to similar subject matter. For brevity, I do not

repeat the discussion, but instead note that my discussion above with respect to the '096 patent specification is equally applicable to the '241 patent.

3. PROSECUTION HISTORY

68. The '241 patent issued from U.S. Application No. 15/913,090 ("090 application"). During examination, the '090 application appears to have received two rejections before issuance. *See* Exhibit L14, (May 12, 2020, Non-Final Rejection); 14-24 (Feb. 08, 2021, Final Rejection).

69. In the Non-Final Rejection dated May 12, 2020, the Examiner rejected pending claims, then numbered 31-53, for failing to comply with the written description requirement. *See* Exhibit L14, 44-47. The Examiner explained that the "present specification uses the term 'meat-like' to describe the flavors produced upon cooking" without providing a "description of a 'meat-like' food product. *Id.* Claims 31-50 were also were rejected for indefiniteness. *Id.* at 4. The examiner concluded that "the term 'meat-like food product' renders the claim indefinite." *Id.* The Examiner explained that "it is not clear what properties define a 'meat-like food product.'" *Id.* The Examiner also rejected claims 31-53 as being invalid over a number of references, including references referred to as "Hseih" and "Proulx." *Id.*, 420.

70. In response to the Non-Final Office Action, the Applicant amended claim 31 to include the limitation "wherein the heme-containing protein is free of animal heme-containing proteins." *See* Exhibit L14, 25-43 (Nov. 12, 2020, Final Rejection) at 6.

71. In the Final Office Action dated February 08, 2021, the Examiner maintained rejections set out in the Non-Final Rejection. *See* Exhibit L14, 14-24 (Feb. 08, 2021, Final Rejection).

72. On April 8, 2021, the applicant amended the claims, and to some degree modified the way the terms were organized within the claims. Notably, the applicant amended the “free of animal heme-containing protein” limitation, and argued that its amendment would traverse the examiner’s rejection based on the use of Hsieh’s plant protein product comprising animal meat combined with Proulx’s non-animal heme-containing protein, since animal meat contains animal heme-containing proteins.

73. After amendment, the Examiner issued a Notice of Allowance on April, 27, 2021. See Ex. See Exhibit L14, 2-13 (Apr. 27, 2021, Notice of Allowance).

4. **PRIORITY DATE**

74. I have not conducted an independent assessment of the priority date of the ’241 patent. I have been asked, for purposes of this declaration only, to assume a priority date for the ’241 patent of January 11, 2013.

G. **THE 306 PATENT**

1. **CLAIMS**

75. Claims 14 and 27 of the ’306 patent are provided below, with the claim terms and phrases I’ve been asked to offer my expertise and opinions on in bold-underlined font.

14. A method for making a meat replica matrix having a beef-like aroma, wherein the meat replica matrix comprises one or more plant proteins, a sugar selected from glucose, ribose, sucrose, fructose, xylose, maltodextrin, and combinations thereof, and at least one sulfur compound selected from methionine, cysteine and thiamine, the method comprising obtaining a non-animal heme-containing protein; and incorporating 0.01%-5% (by weight of the meat replica matrix) of the non-animal heme-containing protein into the meat replica matrix, wherein, upon cooking of the meat replica matrix, at least two volatile compounds are generated that are associated with **a beef-like aroma**.

Exhibit L15 ('306 patent), 124:12-24 (emphasis added).

27. A method for making a meat replica matrix having a beef-like aroma, wherein the meat replica matrix comprises one or more plant proteins, a sugar selected from glucose, ribose, sucrose, fructose, xylose, maltodextrin, and combinations thereof, and at least one sulfur compound selected from methionine, cysteine and thiamine, the method comprising incorporating 0.01%-5% (by weight of the meat replica matrix) of a non-animal heme-containing protein into the meat replica matrix, wherein, upon cooking of the meat replica matrix, at least two volatile compounds are generated that are associated with **a beef-like aroma**.

'306 patent, 125:4-18 (emphasis added).

76. Claims 15-26 of the '306 patent depend from claim 14, either directly or through one or more intervening claims, and therefore inherit the claim language recited in claim 14 on account of their dependency. *See* '306 patent, 124:25-125:3. Claims 28-33 of the '306 patent depend directly from claim 27, and therefore inherit the claim language recited in claim 27 on account of their dependency. *See* '306 patent, 125:14-126:21.

2. SPECIFICATION

77. The '306 patent is entitled "Methods and compositions for consumables," and is generally related to "the production of non-meat consumable products." '306 patent, Title, Abstract, Summary. The '306 patent describes its "invention" as being "relate[d] to consumable products and more particularly, to non-animal based replicas of animal-based food products, that can be produced, in some embodiments, by breaking down non-animal materials into their constituent parts and reassembling those parts into the consumables." '306 patent, 1:25-30.

78. The '306 patent recognized that "[i]n recent years, attempts have been made to bring scientific rigor to the process of food preparation, under the fields of food science and molecular gastronomy." '306 patent, 2:35-37. In connection with the claimed embodiments, the

“[p]rovided herein is a method for imparting a beef like flavor to a consumable product, comprising adding to the consumable composition a heme-containing protein, wherein after cooking, a beef-like flavor is imparted to the consumable composition.” ’306 patent, 6:19-23.

79. The ’306 patent explains that “[p]lant based meat substitutes have largely failed to cause a shift to a vegetarian diet,” and that “[m]eat substitute compositions involves the extrusion of soy/grain mixture, resulting in products which largely fail to replicate the experience of cooking and eating meat.” ’306 patent, 1:56-60. The ’306 patent teaches that “[c]ommon limitations of these products are a texture and mouthfeel that are more homogenous than that of equivalent meat products.” ’306 patent, 1:60-63. With respect to aromas, the ’306 patent describes that “[b]eef flavors and aromas can be created in non beef consumables by addition of heme proteins.” ’306 patent, 73:62-63.

80. Except for the single reference noted above, the ’306 patent specification does not use the term “beef-like” outside of the claims. ’306 patent, 6:19-23. The ’306 patent does not define “beef-like.”

3. PROSECUTION HISTORY

81. The ’306 patent issued from U.S. Application No. 14/796,970 (“’970 application”). During examination, the ’970 application appears to have received several substantive office actions. *See* Exhibit L16.

82. Among the various rejections, the claims containing the term “meat replica” were rejected over a prior art reference referred to as “Vega” (Exhibit L17) because, as the Examiner observed, the meat substitute disclosed in Vega partially included real meat from an animal. *See* Exhibit L16. The Applicant did not dispute the examiner’s interpretation of the term “meat

replica” as including at least some actual meat. Instead, the Applicant amended the claims to recite “contains no animal products” (a phrase used in other Foodstuff Claims) as shown below:

1. (Currently Amended) A method for imparting a beef-like flavor to a consumable product, wherein the consumable product is a meat replica that contains no animal products and comprises one or more plant proteins, comprising obtaining an isolated heme-containing protein; and adding, to the consumable, 0.01%-5% (by weight of the consumable) of the isolated ~~heme-containing protein from a non-animal source~~ [[a]], wherein, after cooking, a beef-like flavor is imparted to the consumable.

See Exhibit L16, 218.

7. (Currently Amended) A method for making a meat replica composition having a beef flavor and aroma, wherein the meat replica composition contains no animal products and comprises one or more plant proteins, the method comprising obtaining an isolated heme-containing protein; and adding 0.01%-5% (by weight of the consumable) of the isolated ~~heme-containing protein from a non-animal source~~ [[a]] to the meat replica composition.

See Exhibit L16, 218-219.

83. With that amendment, the Applicant argued that Vega’s disclosure of a meat-containing meat substitute failed to satisfy the as-amended claims, as well as a new claim the Applicant added that included the same “contains no animal products” language. See, e.g., Exhibit L16, 222-232. Later the Examiner suggested claim amendments involving adjustments to this language, including the addition of a step reciting a “non-animal” qualifier to the “heme-containing protein to the meat replica matrix” phrase. See Exhibit L16, 32.

Ultimately, the USPTO issued a notice of allowance on April 4, 2018. See Exhibit L16.

4. **PRIORITY DATE**

84. I have not conducted an independent assessment of the priority date of the ’306 patent. I have been asked, for purposes of this declaration only, to assume a priority date for the ’306 patent of January 11, 2013.

H. THE 250 PATENT

1. CLAIMS

85. Claim 1 of the '250 patent is provided below, with the claim terms and phrases I've been asked to offer my expertise and opinions on in bold-underlined font.

1. 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**.

'250 patent, 121:61-122:65 (emphasis added).

86. Claims 2-12 of the '250 patent depend from claim 1, either directly or through one or more intervening claims, and therefore inherit the claim language recited in claim 1 on account of their dependency. See '250 patent, 122:65 -124:39.

2. SPECIFICATION

87. The '250 patent issued from a continuation filing from the same application that resulted in the '306 patent, and is similarly titled "Methods and compositions for consumables." As a continuation, the '250 patent shares the same specification as the '306 patent, and thus relates to similar subject matter. For brevity, I do not repeat the discussion, but instead note that my discussion above with respect to the '306 patent specification is equally applicable to the '250 patent.

3. PROSECUTION HISTORY

88. The '250 patent issued from U.S. Application No. 16/238,802 (“’802 application”). During examination, the ’802 application appears to have received a single, limited rejection before issuance. *See* Exhibit L18, 71-79 (May 13, 2020, Non-Final Rejection).

89. On May 13, 2020, the Examiner issued a non-final rejection that rejected the claims on the ground of non-statutory double patenting over claims of U.S. 10,327,464, claims of U.S. 9,826,772, claims of U.S. 9,808,029, and certain co-pending claims of U.S. Application Nos. 15/913,018 and 15,913,090. *See* Exhibit L18, 71-79 (May 13, 2020, Non-Final Rejection).

90. The Applicant traversed this limitation by simply filing a terminal disclaimer on November 12, 2020, which was granted. *See* Exhibit L18, 61-63 (November 12, 2020 Response).

91. Thereafter, the Examiner issues a Notice of Allowance. *See* Exhibit L18, 45-53 (Notice of Allowance). In the Notice of Allowance the Examiner referenced the prosecution of an earlier-filed application in this family, namely, the ’970 application, which I referenced above and which was later issued as the ’306 patent. *Id.*

4. PRIORITY DATE

92. I have not conducted an independent assessment of the priority date of the ’250 patent. I have been asked, for purposes of this declaration only, to assume a priority date for the ’250 patent of January 11, 2013.

VI. ANALYSIS OF DISPUTED CLAIM TERMS

93. In the sections below, I detail my opinions as to the Replica Terms, the Physical Organization of Meat Term, and the Aroma Terms.

A. “Replica Terms”

94. I understand the parties’ respective positions on the Replica Terms is as follows:

“muscle replica”	
Motif’s Construction	Impossible’s Construction
“a composition, separate from other replicas, that mimics key features of muscle tissue before or after cooking; the composition may be partially derived from animal sources”	Plain and Ordinary meaning If the Court decides construction is necessary, this term should be construed to exclude the actual material being replicated or approximated.
“fat tissue replica”	
Motif’s Construction	Impossible’s Construction
“a composition, separate from other replicas, that mimics key features of fat tissue before or after cooking; the composition may be partially derived from animal sources”	Plain and Ordinary meaning If the Court decides construction is necessary, this term should be construed to exclude the actual material being replicated or approximated.

95. I agree with Motif’s proposed constructions for the Replica Terms, which are substantially the same except that “muscle” is used in the construction for the “muscle replica” term, and “fat tissue” is used in the construction for the “fat tissue replica” term. In my opinion, Motif’s construction is consistent with how a POSITA would have understood the term in view of the specification, file history, and complete intrinsic record.

96. Motif’s proposed construction differs from Impossible’s in at least two significant ways. First, Motif’s construction clarifies that each replica is “separate from other replicas.” Impossible’s proposed construction is silent on this point. Second, Motif’s proposed construction does not include the restrictive limitation found in Impossible’s alternative construction specifying that the respective replica compositions should “exclude the actual material being replicated or approximated.” Instead of including that restrictive limitation, Motif’s proposed construction uses the verbatim-identical language from the ’761 patent specification to capture the precise scope on this point: “the composition may be partially derived from animal sources.”

97. As to the first point of distinction, I agree with Motif that the construction should include the phrase “separate from other replicas.” In my opinion, this concept would not be captured by the “Plain and Ordinary Meaning” proposed by Impossible, yet it must be understood when applying the claims because of Impossible’s own statements about these very claim terms during an IPR proceeding concerning the ’761 patent (Case No. IPR2022-00887). Upon my review of papers from IPR2022-00887, I observed that in Impossible’s Patent Owner Preliminary Response, it distinguished the ’761 patent claims from a prior art reference named McMindes, and did so, in part, by arguing that the McMindes failed to teach that the replicas were “two separate components.” *See generally* Exhibit L20. I’ve provided snips of the sections where I found these statements below:

C. Petitioner Fails to Show McMindes Discloses the “Muscle Replica and Fat Tissue Replica Are Assembled In a Manner that Approximates the Physical Organization of Meat”

Claim 1 also requires fitting together two separate components, a “muscle replica” and a “fat tissue replica,” to approximate the physical organization of meat. As discussed above, Petitioner fails to establish that McMindes discloses the claimed “muscle replica” and “fat tissue replica” (§ IV.A-B, *supra*), and as such, Petitioner fails to show that McMindes discloses fitting together such separate components to approximate the physical organization of meat.

Petitioner also fails to show that there are two separate components in any McMindes product. Petitioner provides numerous possible “muscle replicas” and “fat tissue replicas” throughout the petition, *both of which* include components from the soy protein material (A) and the humectant (B) of McMindes. § IV.A-B, *supra* (e.g., a muscle replica may contain soy protein from (A) and colorant from (B), a fat tissue replica contains gluten from (A) and emulsion from (B)). There is

Exhibit L20, 32 (emphasis added).

no disclosure or suggestion anywhere in McMIndes that certain components from (A) and (B) could be combined into a “muscle replica,” and certain components from (A) and (B) could be combined into a “fat tissue replica,” and then these combinations can be fitted together “to approximate the physical organization of meat.”

Petitioner further fails to show McMIndes discloses any two components fitted in a manner that would approximate the physical organization of meat. Petitioner asserts a POSITA would “know how to adjust the extent of mixing McMIndes’s muscle and fat replicas to achieve a desired organization.” Pet., 37, n.4. This mischaracterizes McMIndes, which provides no teaching or suggestion of a muscle replica or a fat tissue replica, or assembling these two components “in a manner that approximates the *physical organization* of meat” as claimed. McMIndes instead teaches mixing all ingredients into a homogeneous soy protein-containing food product, and then cutting or shaping the product into a meat-like shape. EX1003, [000111] (“The soy protein containing food product is prepared by a process comprising...mixing the hydrated soy protein material and the humectant to produce a homogenous fibrous and texturized soy protein containing food product”), [000107], [000112] (“[T]he contents are mixed until a homogeneous mass of a soy protein containing food product is obtained. At this point, the soy protein containing food product may be formed into strips, steaks

Exhibit L20, 33 (emphasis added).

cutlets, or patties, either by hand or by machine.”). There is thus no disclosure of combining two components to approximate the *physical organization* of meat, much less two “replicas.”

Exhibit L20, 34 (emphasis added).

98. I understand that the Patent Owner’s statements made during an IPR are treated as statements made during prosecution, particularly where the patent owner expressly, clearly and unmistakably states that the claims do not cover (or are not satisfied by) a particular feature. Here, in my opinion, Impossible’s IPR statements make it unmistakably clear that “Claim 1 [(from which all of the 761 patent claims depend] ... requires fitting together **two separate components**, a ‘muscle replica’ and a ‘fat tissue replica.’” Exhibit L20, 32 (emphasis added).

99. Thus, in my opinion, highlighting the “separate” nature of the two replica components directly within the construction, as Motif proposes, merely reflects the very statements that Impossible made about its own claims during the IPR proceeding (to distinguish them over the prior art). And in my opinion, it would be helpful to a jury or other factfinder to have this phrase before them, directly within the construction, as it would allow the jury or other factfinder to more easily and precisely understand what is and what is not covered by a patent claim as understood by a POSITA in view of the complete intrinsic record.

100. Accordingly, I agree with Motif’s proposal to include the “separate from other replicas” phrase in the construction of each of the Replica Terms; and I disagree with Impossible’s proposal that the Plain and Ordinary Meaning of the term “muscle replica” and “fat tissue replica” would suffice.

101. As to the second point of distinction, I agree with Motif that the construction should include the phrase “partially derived from animal sources.” In my opinion, this articulation is

supported by the intrinsic record; indeed, it is verbatim-identical to the language used in the '761 patent's description, and is consistent with how a POSITA would understand the "replica" terms in claim 1 in view of the intrinsic record.

102. This is consistent with the specification description corresponding to embodiments that can include animal products (covered by claim 1), as is provided in the section copied below:

In other aspects, the present invention provides compositions for a muscle tissue replica (herein referred to as "muscle replica"), an adipose tissue replica (herein referred to as "fat replica"), and a connective tissue replica (herein referred to as "connective tissue replica"). In some embodiments, the compositions and meat substitute products are principally or entirely composed of ingredients derived from non-animal sources. In alternative embodiments, **the muscle, fat, and/or connective tissue replica, or the meat substitute products comprising one or more of said replicas, are partially derived from animal sources but supplemented with ingredients derived from non-animal sources.** In yet other alternative embodiments, the invention provides meat products substantially derived from animal sources but which are supplemented with one or more of a muscle tissue replica, a fat replica, and/or a connective tissue replica, wherein said replicas are derived substantially or entirely from non-animal sources.

Exhibit L9, 22:63-23:8 (emphasis added).

103. Notably, this description in the '761 patent does not put any limits on what the "animal source" may include, and from which the replica ingredients may be derived. For example, if a whole steer, heifer, or cow presented for slaughter is considered the "animal source," then any part that is isolated or separated from the slaughtered animal – including whole muscle, whole bone, whole fat tissue, or any part thereof – may be considered to be "derived" from the animal source. Alternatively, if a hind quarter from a beef carcass is the "animal source," then any portion that is isolated or separated from the hind quarter (necessarily less than the entire hind quarter itself) may be considered to be "derived" from the animal source. By contrast, a portion of

the beef carcass that is not part of the hind quarter could not be said to be “derived” from the hind quarter, if the hind quarter was what was deemed to be the “animal source.” However, it could still be said to be derived from the beef carcass of a whole slaughtered animal, if the whole animal were deemed to be the “animal source.” In my opinion, the ’761 patent specification does not limit what may or may not be considered the “animal source” or what can be considered a derivation therefrom. Instead, the 761 patent specification confirms that anything from an animal source – e.g., a whole cut of meat itself, an individual protein, etc. – can be understood to be “derived from animal sources.” The ’761 patent specification confirms this:

In some aspects, the invention provides a meat substitute composition comprising a protein content, wherein one or more isolated and purified proteins accounts for 10% or more of said protein content by weight, wherein said meat substitute composition accurately mimics the taste, texture, or color ***of a meat product derived from animal sources.***

’761 patent at 1:64-2:2 (identifying that a meat product itself can be considered to be “derived” from an animal source).

In another aspect, the invention provides a muscle tissue replica comprising a protein content, wherein said protein content comprises ***one or more isolated and purified proteins***, wherein said muscle tissue replica approximates the taste, texture, or color of an equivalent muscle tissue derived from an animal source.

’761 patent at 5:31-36 (identifying that an isolated protein can be considered to be “derived from an animal source”).

104. Thus, in my opinion, a POSITA would understand from the ’761 patent specification that anything isolated or separated from any “animal source” may be included as an ingredient in the claimed “muscle replica” and “fat tissue replica” composition. Of course, the recited replicas cannot be *entirely* made up of the material they are replicating, but that point is

clear enough in the specification's instruction that the replicas can only be "partially derived from animal sources," and that they must be "supplemented with ingredients derived from non-animal sources." See Exhibit L9, 23:4-8. Accordingly, I agree with Motif's construction of these terms.

105. Based on my review of a redacted version of Impossible's opening claim construction brief, I understand that Impossible submits that these Replica Terms should be construed to "exclude[] the actual material being replicated or approximated." Exhibit L23, 7-8. I also understand that Impossible submitted a paper to the USPTO during the IPR proceeding, its Patent Owner Preliminary Response, advocating this same position. See, e.g., Exhibit L20, 7-8. In my view, Impossible emphasized the 761's disclosure that an "isolated and purified protein" such as "myoglobin" was an ingredient "derived from an animal source," but appears to have ignored or at least de-emphasized the 761's disclosure that a "meat product" itself is also considered to be "derived from an animal source," which runs contrary to Impossible's argument surrounding derivation. Although I disagree, I understand that the PTAB sided with Impossible on these terms, and concluded that a "muscle replica may include components derived from an animal source, but does not include muscle tissue itself," and that a "replica" should be understood to "exclude the actual material being replicated or approximated":

Accordingly, we construe "muscle replica" to mean "a composition approximating the taste, texture or color of an equivalent muscle tissue derived from an animal source; the muscle replica may include components derived from an animal source, but does not include muscle tissue itself" and "replica" such that it "excludes the actual material being replicated or approximated" for purposes of the present decision.

Exhibit L21, 9.

106. I will note that, to the extent Impossible's position and the PTAB's construction is that the claimed replicas cannot be *entirely* made up of the material being replicated – e.g., the

“muscle replica” cannot be entirely made up of actual animal muscle tissue – I do not disagree. However, if Impossible’s position and the PTAB’s construction is that the “muscle replica” cannot include any amount at all of animal muscle tissue (and to the extent that is what the PTAB’s construction implies), I must disagree. As I noted above, the ’761 patent specification includes no such limits in connection with the “muscle replica” and “fat tissue replica” components recited in claim 1. In my opinion, the ’761 patent is clear that so long as it is “supplemented with ingredients derived from non-animal sources,” the recited “replica[s]” may be partially made up of elements from animal source, including the material that is being replicated or approximated. Specifically, in my opinion the recited “muscle replica” can include at least some actual muscle tissue so long as that actual muscle tissue is “supplemented with ingredients derived from non-animal sources” such that it does not make up the entirety of the identified “muscle replica.” Similarly, the recited “fat tissue replica” can include at least some actual fat tissue so long as that actual fat tissue is “supplemented with ingredients derived from non-animal sources” such that it does not make up the entirety of the identified “fat tissue replica.”

107. Impossible’s proposed construction, in my opinion, adds an exclusion into the claims that is found nowhere in the specification, and that would be contrary to how a POSITA would have understood the Replica Terms in view of the specification and file history.

108. Moreover, I note that a POSITA would have understood the term “replica”—in the context of food products such as those in the ’761 Patent—to encompass a range of substitute compositions that mimicked or otherwise imitated a genuine form of a food product, including compositions that included at least a portion of the actual product they were meant to imitate. The food science arts have recognized for decades that replicas of muscle, fat, and other mammalian

tissues may or may not include—depending on the given substitute food product— a small amount of the actual muscle, fat or other mammalian tissue being replicated.

109. By way of a nonlimiting example, as of the date of the alleged invention of the ‘761 patent, July 12, 2011, and long before, a POSITA would have been well aware of a food product commonly referred to as “imitation crab.” There are a number of early patents covering varieties of imitation/replica crab meat, many of which use and contemplate the use of someamount of crab meat in forming the replica.

110. For example, United States Patent Number 4,158,065, issued in 1979 and entitled “crab meat substitute and method of preparing same,” discloses that its crab meat replica can include actual crab meat:

[57]

ABSTRACT

A crab meat substitute is prepared by molding mashed and seasoned meat in the presence of heat utilizing the thermally solidifying properties of the meat proteins which have a jelly strength of 300 to 1,500 g. The molded crab meat substitute is shredded into pieces ranging from 0.25 to 3.0 mm in width and up to 2.25 mm² in cross sectional area to obtain a food similar to crab meat in taste and in texture. **When suitably colored red or incorporating a small amount of crab meat or eggs, the meat substitute can be made to more closely resemble crab meat in appearance and taste.**

Exhibit L7 at Abstract.

10 According to this invention, the molded mass of
 “Kamaboko” to be shredded is covered on the front and
 rear sides with a thin coating of mashed fish meat incor-
 porating a crab-like color pigment (i.e., a carotenoid
 15 pigment or artificial coloring agent) or directly coated
 on the front and rear sides with a coloring solution, and
 the colored mass is heated to fix the color and form a
 coating resembling the fascia of crag legs. The taste of
 the product of this invention can be made to closely
 20 resemble real crab meat by incorporating in the
 “Kamaboko” increased quantities of monoamino acids
 which are abundant in Crustacea. **A still closer resem-
 blance to crab meat can be achieved with addition of a
 small amount of crab meat or eggs.**

Exhibit L7 at 8:10-24; *see also* Exhibit L17 (Vega), [0037]-[0038] (describing “meat substitutes” that partially include meat).

111. This understanding in the field has not changed since 1979. That is, from at least 1979 until now, POSITAs have understood and been well aware that that meat replica products can include some real meat. Confirming this, and borrowing from the same example of imitation crab meat, a product made today by TransOcean (shown below) is an imitation crab food product that a POSITA would understand to be replica of real crab. Just as described in United States Patent Number 4,158,065, it is still well understood that such replica meat products can and do include some real meat.



Description

Crab Classic is a blend of premium, wild caught Alaska pollock and king crab meat.

- Fully cooked. Ready-to-eat.
- A blend of Alaska pollock surimi & king crab.
- Certified sustainable seafood.
- Resealable zipper bag.

See <https://www.heb.com/product-detail/trans-ocean-lobster-classic-chunk-style-imitation-lobster/1405709> (emphasis added).

Nutrition Facts	
Per serving	
About 2.5 servings per container	
Serving Size	0.50 cup
Amount Per Serving	
Calories	80
% Daily Value*	
Total Fat 0g	0%
Saturated Fat 0g	0%
Trans Fat 0g	
Cholesterol 5mg	2%
Sodium 390mg	17%
Total Carbohydrate 14g	5%
Dietary Fiber 0g	0%
Total Sugars 4g	
Includes Added Sugars 4g	9%
Protein 6g	
Vitamin D 0.4mcg	2%
Calcium 0mg	0%
Iron 0mg	0%
Potassium 260mg	6%
* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.	

Ingredients

Alaska Pollock (MSC Certified), Water, Egg Whites, Corn Starch, Sugar, Sorbitol, **Contains 2% or Less of: King Crab Meat**, Natural and Artificial Flavor Extracts of Blue Crab, Snow Crab, Lobster, and Alaska Pollock), Refined Fish Oil (Adds a Trivial Amount of Fat) (Alaska Pollock), Rice Wine (Water, Rice, Koji), Modified Tapioca Starch, Sea Salt, Carrageenan, Yam Flour, Potassium Chloride, Disodium Inosinate, Sodium Pyrophosphate, Carmine, Paprika, Color Added.

See <https://www.heb.com/product-detail/trans-ocean-lobster-classic-chunk-style-imitation-lobster/1405709> (emphasis added).

112. As I have demonstrated above, a POSITA would have understood the term “replica,” in the context of substitute food products and ingredients, to include compositions that included at least some amount of the real product and still be considered a “replica.” The ’761 patent is no different, and very clearly explains that the muscle replica can include some ingredients derived directly from the animal source – which a POSITA would understand to

include some actual muscle in the case of “muscle replicas” and some actual fat tissue in the case of “fat tissue replicas” – so long as it is “supplemented with ingredients derived from non-animal sources” such that it does not make up the entirety of the given “replica.” See Exhibit L9, 23:4-8.

113. Thus, in my opinion the “muscle replica” and “fat tissue replica” terms should be construed to ensure that Impossible’s own statements about the scope of its claims are clearly reflected, and also to clarify what a POSITA would understand the ’761 patent to be disclosing and claiming insofar as it relates to the composition of the “muscle replica” and “fat tissue replica” recited. In my opinion, Motif’s construction is correct because it does both.

B. “Physical Organization of Meat”

114. I understand the parties’ respective positions on the Physical Organization of Meat Term is as follows:

“wherein said muscle replica and fat tissue replica are assembled in a manner that approximates the physical organization of meat”	
Motif’s Construction	Impossible’s Construction
Indefinite. To the extent the Court construes this term: “the muscle replica and fat tissue replica are combined to mimic the appearance of meat, and are visually distinguishable from each other after being combined”	Plain and ordinary meaning. If the Court decides construction is necessary, this term should be construed to exclude the actual material being replicated or approximated.

115. I agree with Motif’s view that the Physical Organization of Meat Term is indefinite. A POSITA would not understand with reasonable certainty the meaning and scope of the limitation: “wherein said muscle replica and fat tissue replica are assembled in a manner that approximates the physical organization of meat,” particularly in view of the inconsistencies arising out of the specification itself, the file history, and claim language of the ’761 patent.

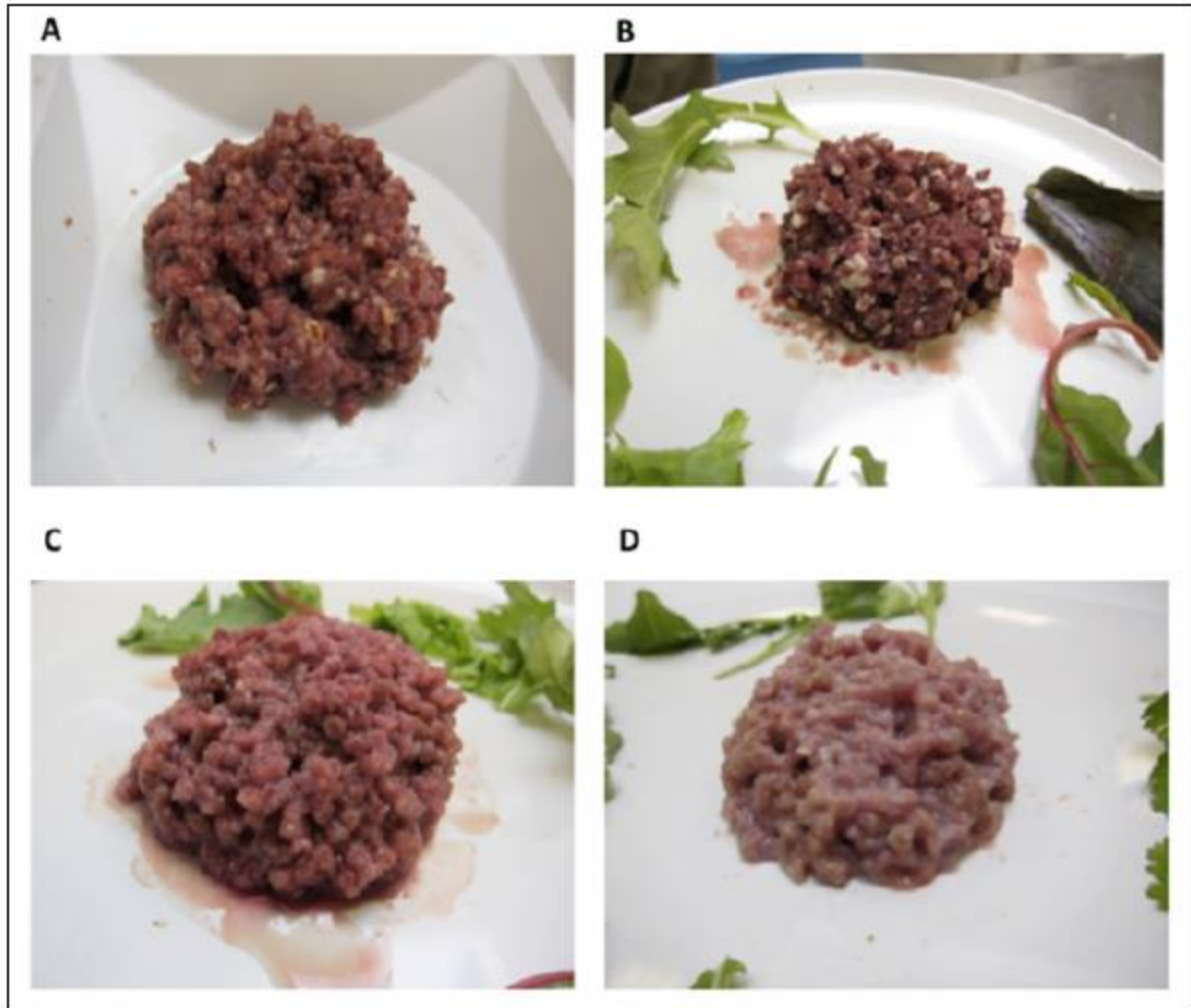
116. As a preliminary matter, the phrase “physical organization of meat” is not a term of art with any specific or recognized meaning in the field of food science. Nor does the ’761 patent specification add any description of that phrase such that a POSITA would understand, with reasonable certainty, the full scope and meaning of the phrase as recited in the claims of the ’761 patent. In my opinion, the ’761 patent specification is virtually silent about the boundaries of this phrase. A related phrase more commonly understood in the art is “muscle ultrastructure.” Muscle ultrastructure refers to the striated nature of skeletal muscle fibers, surrounding connective tissues, and lipid depots in meat. However, upon reviewing the ’761 patent specification and intrinsic record, a POSITA would understand that the ’761 patent specification could not be referring to “muscle ultrastructure” because it gives examples where the muscle ultrastructure has been intentionally destroyed, and yet apparently still qualifies, from the inventors perspective, as an approximation of the “physical organization of meat.” Accordingly, a POSITA would be left with uncertainty as to scope and meaning of this terminology.

117. For example, ’761 patent specification appears to contemplate that food products that look like “natural ground meat” will fall within the scope of a product that “approximates the physical organization of meat.” *See, e.g.*, ’761 Patent, Fig. 15. However, this disclosure only confirms that “physical organization of meat” is not the same concept as “muscle ultrastructure” noted above, and must be something else. Indeed, ground products constitute an intentional disruption of muscle ultrastructure, and intentionally destroy the muscle ultrastructure in order to improve tenderness and provide a greater retention of blended fat or other ingredients among various products. That is, an essential part of ground products is to destroy the muscle ultrastructure in order to facilitate development of ground products. Because of that, a POSITA would understand only that “physical organization of meat” could not be considered the same as

the muscle ultrastructure found in whole muscle cuts (e.g., cuts of meat displaying intact muscle, connective tissue, and lipid structures) because somehow it could capture ground products.

118. Furthermore, because “ground beef” is itself a manipulation of muscle and fat tissue that does not even approximate the physical organization of natural meat, the boundaries of this claim phrase is entirely unclear. Indeed, if “approximat[ing] the physical organization of meat” can be satisfied by a product that looks like another product made with meat through other manipulations (including those manipulations that bear no resemblance to the physical organization of natural meat), then the boundaries of this claim limitation are completely subjective and become entirely uncertain.

119. The boundaries become even less clear when observing Figures 15-16 of the 761 Patent, together with Impossible’s statements in the IPR relating to the 761 Patent. In particular, as shown below, Figures 15A-B depict two imitation ground meat compositions where the “muscle replica” and “fat tissue replica” are assembled to form a **non-homogenous** composition (the replicas remain visually distinguishable), and Figures 15C-D depict two imitation ground beef compositions where the replicas are mixed into a more **homogenous** composition (i.e., the replicas are not visually distinguishable).



See '761 patent, Figs. 15A-D.

120. Though the 761 patent specification appears to capture both non-homogenous and homogenous mixtures within the concept of “physical organization of meat,” during IPR Impossible has carved out certain homogenous mixtures in order to distinguish the claims over the McMindes prior art reference. In particular, Impossible argued that “mixing all ingredients into a **homogenous** ... food product, and then cutting or shaping the product into a meat-like shape” did not satisfy “assembl[y] in a manner that approximates the physical organization of meat.” See Exhibit L20, 33. Instead, it appears that Impossible insisted that the “homogenous”

nature of the “mixture” in McMindes did not “approximate the ***physical organization*** of meat.” *Id.* at 34 (emphasis original).

121. Thus, on the one hand, the specification teaches that the invention includes homogeneous mixtures and can include ground meats that do not themselves approximate natural meat, yet on the other hand Impossible expressly stated that the claims somehow do not cover homogeneous mixtures like the ones in McMindes. Unfortunately, this blurs the line between what degree of homogeneity, if any, is captured by the claim. Consequently, a POSITA would be unable to resolve the inconsistencies in the specification and the intrinsic record, and would not be able to understand the boundaries of the Physical Organization of Meat Term with any degree of certainty.

122. I understand that Impossible cites to language from the following '761 patent disclosure as providing clarity for this claim phrase: “[t]he physical organization of the meat substitute product can be manipulated by controlling the localization, organization, assembly, or orientation of the muscle, fat, and/or connective tissue replicas described herein.” Exhibit L23, 9 (citing '761 patent, 23:24-27). In my opinion, this disclosure does nothing to provide the needed clarity. It fails to describe which or what degree of such “manipulat[ions]” might result in a product that has the “approximates the physical organization of meat” as contemplated by the claims. In my opinion, a disclosure of how to manipulate physical organization says nothing about whether or not such manipulations result in a product that does in fact “approximate[] the physical organization of meat” by any objective criteria. Nor does it provide any direction about what the full scope of the term “meat” is in the context of the claim. Nor is this disclosure tied to any particular type of “meat,” further contributing to the lack of clarity about what “approximates the physical organization of meat.” For example, “meat” could refer to various

cuts from a diverse array of animals, or mixtures of different kinds of meats manipulated into man-made products, each of which has a different structure. But there is no clarity from the specification to enable a POSITA to draw the line between what does and does not “approximate the physical organization of meat” with any degree of certainty.

123. Thus, I agree with Motif that the Physical Organization of Meat Term is indefinite. To the extent this term gets construed despite my opinions above, at the very least it should be understood to exclude “homogeneous” mixtures that Impossible said were not covered during the IPR, a concept which, in my opinion, is captured by Motif’s alternative construction requiring that the replicas remain “visually distinguishable from each other after being combined.”

A. “Aroma Terms”

124. I understand the parties’ respective positions on the Aroma Terms is as follows:

“meat-associated aroma” (’096 patent, cl. 1; ’241 patent, cl. 1, 22)	
Motif’s Construction	Impossible’s Construction
Indefinite.	Plain and ordinary meaning.
“beef-like aroma” (’306 patent, cl. 14, 27; ’250 patent, cl. 1, 13)	
Motif’s Construction	Impossible’s Construction
Indefinite.	Plain and ordinary meaning.

125. I agree with Motif’s proposed construction of indefiniteness for the Aroma Terms.

126. As a preliminary matter, I note that the specific phrases “meat-associated aroma” and “beef-like aroma” do not have a singular ordinary meaning in the field of food and meat science. The more common terms – “meat aroma” and “beef aroma” – generally refer to aroma profiles that are generated from actual “meat” or “beef,” respectively. However, the degree to

which an aroma is deemed to be “associated” with meat or “like” beef is highly contextual, and the degree to which those terms depart from the more common “meat aroma” and “beef aroma” terms, and can only be determined, if at all, within the context of the particular study or paper that may use those terms.

127. Moreover, and notably, although meat and beef flavors and aromas have been discussed for decades in food science and meat science literature, there is no set definition delineating a consensus as to what these terms encompass, e.g., whether a volatile or aroma that does or does not comprises meat and/or beef flavors or aromas. Rather, these terms are used in a highly contextual manner. This is particularly true where “meat” is discussed generally, instead of in connection with a particular kind of meat: fish, lamb, beef, pork, etc. And as noted above, the scope of what is or is not considered a “meat” or “beef” flavor or aroma becomes less clear when qualifiers such as “like” or “associated” are introduced as they are in the claims of the 761 patent. As noted, these phrases can only be understood, if at all, through definitional language or other context from the papers or studies that delineate the scope of these terms for purposes of the paper or study. In some cases, the studies or papers never do provide a specific boundary (leaving it relatively subjective), and in some cases they do (providing an objective delineation).

128. For example, the MacLeod reference discusses meat flavorings in detail, and specifically explores “the unique, characteristic flavor of meat, e.g., beef.” Exhibit L6, 309. MacLeod notes a range of compounds present in boiled beef that, when isolated, fall along a “spectrum of more desirable odor qualities associated with the roasted aromas of heated beef.” Exhibit L6, 356-357. MacLeod acknowledges that there is a “spectrum” of odors ranging from most characteristic to least characteristic of heated beef, some of which are not sufficiently beef-like or “meaty” for purposes of his own specific study. *Id.* Further, MacLeod lists dozens of

patents issued in the food flavor industry, which are directed to flavors which range from “meat,” “beef,” and “chicken” to “meat-like,” “meat extract-like,” or “beef-like,” not all of which reflect a singular view. Exhibit L6, at Table 17. For purposes of his own paper, MacLeod contemplated that “meat” flavor could be considered to be essentially synonymous with “beef” flavor, in each of the patents discussed, the scope of what constituted a “meat” flavor or aroma varied and was specific to the context being explored.

129. In another example, the Song reference appears to define “beeflike process flavor” as the “characteristic beef flavour” of “cooked beef meat.” Exhibit L22, at 2. Here the delineation is more specific. Song analyzes what volatile compounds are sufficiently “beeflike,” in the context of the paper, through controlled sensory analysis. *Id.*

130. Thus, what qualifies as sufficiently “beef-like” or “meat-associated” may differ from one paper to the next. In some cases these papers and studies merely provide examples of what flavors and aromas the authors believe are “beef-like” or “meat-associated” (or other descriptor), but do not provide an objective definition whereby a POSITA could determine whether a particular volatile not identified by the authors qualifies or not. This is similar to the Foodstuff patents.

131. Based on my review of the Foodstuff patents and complete intrinsic record, it appears that the Foodstuff patents do not provide the requisite context or delineations to understand what the full scope of “meat-associated” or “beef-like” is as it pertains to the recited “aromas.” In my opinion, Foodstuff patents create uncertainty around these terms, such that a POSITA would not be certain about the scope of the invention being claimed. For instance, in discussing aromas, the Foodstuff patents include adjectives describing not only different types of meat, such as “beefy” or “bacony,” but also adjectives describing ostensibly non-meat

substances, such as “plastic,” “bloody,” “metallic,” “potato,” “bread,” and ’096 Patent at 2:12-14, Tables 2, 7, 11; ’241 Patent at 2:17-19, Tables 2, 7, 11. A POSITA would not recognize “plastic” aromas as being either a “meat aroma” or a “beef aroma.” Thus, the Foodstuff Patents would leave a POSITA wondering what the meaning of “meat-associated” and “beef-like” truly is in the scope of the patent, particularly if “plastic” or “bread” or “potato” aromas are intended to qualify under unspecified circumstances.

132. Indeed, it would be unclear to a POSITA whether, how, or why a food product that, when cooked, generates a bouquet of volatiles that smells like “plastic” (an example from the Foodstuff Patents) could be considered to have produced a “meat-associated aroma.” *See, e.g.*, Exhibit L13, Table 11. Plastic smells like plastic, not like meat or beef. Similarly, it would be unclear to a POSITA whether a food product that, when cooked, generates a bouquet of volatiles that smells like a “potato” (another example from the Foodstuff Patents) can be considered to have produced a “meat-associated aroma.” *See, e.g.*, Exhibit L13, Table 2. Outside the context of the Foodstuff patents, potatoes smell like potatoes, not like meat or beef. The same is true of food products that smell “bread” (another example from the Foodstuff Patents), for example. *Id.* The Foodstuff patents never tell. Because of this, these terms are unclear.

133. At best, a POSITA could only surmise that the “like” and “associated” qualifiers in the claim phrases open the terms up to capture a different set of aromas depending on what may or may not be subjectively understood to be “associated” with meat or “like” beef to either the reader or the inventors. In short, these terms, viewed in the context of the specification, are only delineated by an entirely subjective boundary.

134. Accordingly, the '096 and '241 Patents fail to provide objective boundaries on what is considered “meat-associated,” and a POSITA would be left to guess as to what was or was not captured by those terms.

135. Similarly, and for at least the same reasons noted above, the '306 and '251 Patents fail to provide clarity for what is a “beef-like aroma” in the context of the claims. Although the term “beef-like” does appear once in the specification of both patents, it is never used in conjunction with “aroma,” and there is no definition of how or at what point something is considered “like” “beef.” And while “beef-like” may be used in some contexts in the food sciences field, like “meat-associated” it does not have a singular established meaning in the field, nor is there any consensus in the field on the full scope of what is or is not to be considered “beef-like.”

136. As recently as 2011, a full beef flavor lexicon was still being researched and developed, with studies uncovering various “rare” flavor terms used by taste testers to describe beef. Exhibit L5, 416. Further, these studies revealed a wide variety of descriptive terms for beef, with some terms being used to describe 99% of samples and others being used to describe <5%. *Id.* Thus, there is no definitive industry standard for flavors or aromas considered to be “beef-like,” and there is a high degree of variance based on subjective experience and context of discussion. Like the '096 and '241 patents, the '306 and '251 patents' use of qualifying adjectives further confuse the meaning of these terms.

137. In my opinion, “meat-associated aroma” and “beef-like aroma” are indefinite in the context of the Foodstuff Patents; when read in light of the specification, the Foodstuff Patents, and the prosecution history, they fail to inform a POSITA about the scope of the invention with reasonable certainty.

VII. CONCLUSION

138. I hereby declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Dated: June 28, 2023

A handwritten signature in black ink, reading "Jerrad Legako", is positioned above a horizontal line.

/s/ Dr. Jerrad Legako, Ph.D.