

Patent Owner Impossible's Oral Argument, April 3, 2024

Motif Foodworks, Inc. v. Impossible Foods, Inc.
Case No. IPR2023-00206 (U.S. Patent No. 9,943,096)

Representative Claim 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.

Grounds of Challenge

Ground	Claims	Invalidity Theory	Prior Art
I	1-5, 7-9, 23-24	Anticipation	Brown
2A-2B	1-12, 14-24	Obviousness	Giacino in view of Brown (and MacLeod)
3A-3D	1-12, 14-24	Obviousness	Giacino in view of Conrad and Crane (and Proulx, Perret, or Macleod)
4A-4C	1-12, 14-24	Obviousness	Giacino in view of Proulx and Conrad (and Perret or Macleod)

Deficiencies in Grounds

Claims	Grounds	Deficiency
1-5, 7-9, 23-24	I	Petition fails to show Brown discloses sulfur-containing compound limitation
1-5, 7-9, 23-24	I	Petition fails to show Brown discloses a food flavor additive composition
1-12, 14-24	2A-2B	Petition fails to show Giacino and Brown disclose at least two volatile compounds
1-12, 14-24	2A-2B	Hindsight fails to establish POSA would have been motivated to combine Giacino and Brown as proposed
1-12, 14-24	3A-3D	Petition fails to establish POSA would have been motivated to combine Giacino, Conrad, and Crane as proposed
1-12, 14, 24	4A-4C	Petition fails to establish POSA would have been motivated to combine Giacino, Proulx, and Conrad as proposed

Ground 1: Anticipation by Brown

Ground 1: Anticipation by Brown

Petition maps claimed sulfur compounds to pea flour proteins:

EX1116(SAC), ¶¶36, 51; EX1003(Tarte), Section X.C. Hence, based on PO's interpretation of the term, Ground 1 maps "*a compound selected from cysteine ...*" and "*a compound selected from alanine ...*" to pea flour, which contains proteins having the claimed sugar and sulfur compounds. Even if PO's interpretation is not

Pet., 12.

4. Limitation 1[c] ("[sulfur] compound selected from...")

Brown's composition includes pea flour.⁷ EX1012(Brown), [00364]. A

⁷ To the extent "a compound" is interpreted to not be limited to free compounds, Brown's muscle replica, which contains pea flour, satisfies this limitation. *See supra* Section V.C.

POR, 7-8.

Pet., 22.

Ground 1: Anticipation by Brown

District court construction excludes plant proteins (pea flour):

is not a “sulfur compound” as that term is used in the asserted claims. Accordingly, the “sulfur compound” limitation must be satisfied by a compound that is present separately from a protein.⁹

EX2016 (CC Order), 9.

Petitioner argued plant proteins are excluded from '096 claims:

Bobrick Washroom Equip., Inc., 527 F.3d 1379, 1382 (Fed. Cir. 2008). No contrary evidence exists here because, consistent with a POSITA's understanding, the patents' specifications expressly distinguish the claimed sugar and sulfur molecules from proteins. '761 patent 36:18-21

EX2019 (Motif Opening CC Brief), 9.

More specifically, where the Compound Terms recite specific compounds (ribose, glucose, cysteine, methionine, and the like), a POSITA would understand that the terms refer to those free, stand-alone molecules, rather than their inclusion as part of a larger and more complex structure such as a protein. Indeed, a POSITA would understand that the Compound Terms refer to different

POR, 9-10.

EX2020 (McGorin CC Dec.), ¶21.

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Ground 1: Anticipation by Brown

Petition maps Brown's muscle replica to a "food flavor additive composition":

1. Limitation 1[pre] ("food flavor additive composition")

Brown provides an exemplary composition for a "muscle replica" comprising "pea flour, sunflower oil, and glucose" and that is "heated for 10 minutes at 140C in the presence of ... leghemoglobin (LHb)" to provide volatile compounds that "are often associated with the aroma of cooked meat." EX1012(Brown), [00364]. This composition is added to "a meat substitute product," which also contains fat and

Pet., 20.

POR, 11, 13-18.



Ground 1: Anticipation by Brown

Petition confuses a meat replica (food product) and a muscle replica:

[00364] Evidence that the presence of leghemoglobin contributes favorably to aroma of meat replicas: A muscle replica comprising pea flour, sunflower oil, and glucose was heated for 10 minutes at 140C in the presence of either reduced leghemoglobin (LHb) or a mixture of iron (Fe³⁺), sodium and EDTA (EFS) in

EX1012 (Brown), [00364].

50. Thus, in my opinion, a POSA would have understood that the “muscle replica” described in paragraph [00364] does not include leghemoglobin, and instead, it is the “muscle replica” comprising pea flour, sunflower oil, and glucose, together with leghemoglobin that represents a meat replica—*i.e.*, an end food product.

EX2030 (Qian Dec.), ¶50.

POR, 11, 13-18.

Ground 1: Anticipation by Brown

Dr. Tarté confirmed the meat replica (food product) in paragraph [0364]:

Q When you cite to Brown Paragraph 364 here at that Paragraph 109 of your declaration, what meat replica composition are you referring to?

THE WITNESS: The composition comprising pea flour, sunflower oil, glucose, and leghemoglobin.

EX2032 (Tarté Tr.), 30:22-31:3.

Petitioner's district court construction requires distinct composition:

at 17 & n.6 (citing Dkt. No. 120-1, Exh. 18, at 1-17) (emphases omitted). Motif disagrees, and argues that a "food flavor additive composition" must be distinct from the food product itself.

EX2020 (CC Order), 17.

POR, 11, 13-18.



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DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Ground 1: Anticipation by Brown

Petitioner does not dispute POR arguments:

Petitioner responds to PO's arguments concerning Grounds 2A-2B and 4A-4C, and relies on the arguments made in the Petition for Grounds 1 and 3A-3D.

Pet. Reply, I.

PO Sur-reply, I.



II

Patent Owner Impossible's Oral Argument

Grounds 2A-2B: Obviousness over Giacino and Brown

Grounds 2A-2B: Obviousness over Giacino and Brown

“[A] patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. ... [I]t can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does.”

KSR Int’l Co. v. Teleflex Inc., 550 U.S. 398, 418 (2006).

“A factfinder should be aware, of course, of the distortion caused by hindsight bias and must be cautious of arguments reliant upon ex post reasoning.”

Id. at 421.

Grounds 2A-2B: Obviousness over Giacino and Brown

Petition proposes adding leghemoglobin to Giacino's composition:

XII.A. Accordingly, adding heme-containing protein (as taught by Brown) to Giacino's composition results in a modified composition that satisfies all limitations of the independent claims. EX1003(Tarte), ¶¶166-280.

Pet., 27.

Based on Brown's teachings, a POSITA would have been motivated to add leghemoglobin to a flavoring composition, such as Giacino's, that already includes flavor precursors (*e.g.*, sulfur compounds and reducing sugars) to provide a cooked meat aroma and flavor. A POSITA would have been motivated to make such a

Pet., 30.

POR, 23, 25-26, 30-31.



Grounds 2A-2B: Obviousness over Giacino and Brown

Petition's uncorroborated rationale: a “true[r] flavor of meat”

modulate their flavor. This modification would further Giacino's goal of providing a “true[r] flavor” of meat. EX1003(Tarte), ¶¶175, 195.¹⁰

Pet., 30.

A POSITA would understand that adding Brown's leghemoglobin would only further contribute to the meaty aroma volatiles because Brown's process reacts leghemoglobin with amino acids and sugars to achieve a “cooked meat” aroma. EX1003(Tarte), ¶212.

Pet., 34.

POR, 30-31.



Grounds 2A-2B: Obviousness over Giacino and Brown

Dr. Tarté lacked basis for his testimony:

212. A POSITA would understand that adding leghemoglobin to Giacino's flavoring compositions would only further contribute to the meaty aroma and volatiles produced since Brown teaches that reacting leghemoglobin in the presence

EX1003 (Tarté Dec.), ¶212.

Q And is that the only possible outcome of positive contribution to the meaty aroma?

A I don't know. I would defer to Dr. McGorrin on that. I would not have a good answer to that.

Q Okay. So you would defer to Dr. McGorrin as to whether it's possible that adding leghemoglobin would negatively impact the meaty aroma?

THE WITNESS: Either negatively or in any other way. It's outside my area of expertise.

POR, 31-32.

EX2032 (Tarté Tr.), 78:14-25.



Grounds 2A-2B: Obviousness over Giacino and Brown

Dr. Tarté lacked basis for his testimony:

3:43-45, 3:68-73, 4:21-24, 5:75-6:7. Hence, a POSITA would reasonably expect the same catalyzation to take place when adding leghemoglobin to Giacino's compositions to produce volatiles associated with cooked meat. Moreover, nothing

EX1003 (Tarté Dec.), ¶184.

Q Okay. So you don't know what reaction occurs?

A I would defer to Dr. McGorrin on the specific reaction that takes place.

EX2032 (Tarté Tr.), 76:14-17.

Grounds 2A-2B: Obviousness over Giacino and Brown

Dr. Tarté did not identify a Giacino composition:

Q I would agree with that. Which is why I'm asking what composition is it that you envision being compared to the '096 claims here?

A Well --

THE WITNESS: I hadn't really thought of what I envisioned. I'm just trying to stick to the verbiage of Giacino.

BY MR. ROSATO:

Q What do you mean by that, "trying to stick to the verbiage of Giacino"?

A Well, I -- I'm commenting on -- on Giacino only. I, you know, and not being a flavor chemistry expert myself, I have not thought about what I envisioned. But what I read in Giacino and what -- and what it teaches.

EX2032 (Tarté Tr.), 48:14-49:4.

Q Your statement was: "As long as you have a sugar and source of amino acids, that tells you that you're able to achieve meaty flavors."

MR. ROSATO: My question is: Do -- is it your opinion that other ingredients don't matter to that outcome?

THE WITNESS: On that, I would -- I would actually defer to Dr. McGorrin. That's getting a little bit outside of my -- of my basic knowledge of -- of meat flavor.

EX2032 (Tarté Tr.), 57:24-58:9.

Grounds 2A-2B: Obviousness over Giacino and Brown

Yet, Dr. McGorrin did not address the combination of Giacino and Brown, nor did he opine on a POSA's expectations regarding whether Brown's leghemoglobin "would only further contribute" to the meaty aroma of Giacino's compositions. *See* EX1003, ¶¶175, 195, 212 (Dr. Tarté addressing motivation);

POR, 32.

But Dr. McGorrin's first declaration, on which Dr. Tarté relied, failed to provide an assessment of any particular composition disclosed in Giacino, or how a POSA would have viewed the impact of Brown's leghemoglobin in combination with Giacino's compositions. *See* Pet., 30, 34 (citing EX1003, ¶¶175, 195, 210-

PO Sur-reply, 5.

Grounds 2A-2B: Obviousness over Giacino and Brown

Dr. McGorin testified composition critical:

67. The selection of particular sugars and sulfur compounds is significant because—as with any chemical reaction—the end products of the Maillard reaction in a food product depend on the identity of precursor molecules that are reacted.

EX1005 (McGorin Dec.), ¶67.

experimentation. In fact, producing particular aromas involves various factors such as identity of the precursor(s), reaction temperature, time, and pH, as well as the presence of other components in the chemical reaction. I reserve all rights to offer opinions on this subject at a later date if called to do so.

EX2020 (McGorin CC Dec.), ¶64 n.2.

Q. Can you have a Maillard reaction occur and produce an aroma that is not meaty in nature?

A. In some cases that's possible.

Q. What's an example of a case where that would occur?

A. Well, for example, if you have the concentrations and combinations out of whack, so it's not balanced.

PO Sur-reply, 17-19.

EX2033 (McGorin Tr.), 10:14-21.



Grounds 2A-2B: Obviousness over Giacino and Brown

Petition's evidence explains the particular ingredients impact aroma profile:

application to a food flavor additive or meat-like-food product. A POSITA would understand that the milieu of the foodstuff could affect the Maillard reaction chemistry and resulting aroma of the product—e.g., depending on the foodstuff's pH and moisture content. Depending on the presence of other components, the Maillard reaction may favor the generation of compounds and development of flavors that are not meaty. This is exemplified in the '816 Provisional itself ([00255]), in which the

EX1005 (McGorin Dec.), ¶106.

164. In fact, the combination of Maillard reactants and heme-containing protein with plant proteins and other components of a meat replica (e.g., lipids) could potentially lead to a non-“beef-like” volatile profile. As the '306 patent recognizes:

EX1005 (McGorin Dec.), ¶164.

POR, 3, 26-27.



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Patent Owner Impossible's Oral Argument

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Grounds 2A-2B: Obviousness over Giacino and Brown

Petition's evidence explains the particular ingredients impact volatile production:

37. The presence or absence of lipids and water in a matrix can influence the formation of volatile compounds via the Maillard reaction. See

EX2030 (Qian Dec.), ¶¶37.

Table 1. Volatile Compounds Obtained from Reactions between Cysteine and Ribose in the Presence and Absence of Phospholipid and Water ^a

compound	LRI ^b	relative concentration ^c				
		water absent		water present		
		C + R	C + R + L	C + R	C + R + L	C alone
5-methylthiazole ^f	846	tr	—	tr	—	+
2,4-dimethylthiazole ^f	892	tr	—	tr	—	—
4,5-dimethylthiazole	933	tr	—	tr	—	tr
5-ethylthiazole ^f	940	+	tr	—	—	tr
2-propylthiazole ^f	981	tr	—	—	—	tr
trimethylthiazole	1000	+	+	+	+	+
5-ethyl-2-methylthiazole	1015	+++	++	+	++	+
5-ethyl-4-methylthiazole	1039	tr	—	tr	tr	tr
2,5-dimethyl-4-ethylthiazole ^f	1066	+	tr	+	+	—
4-ethyl-5-methylthiazole	1068	tr	—	tr	—	—
2,4-dimethyl-5-ethylthiazole	1078	+	+	+	+	—
4,5-dimethyl-2-ethylthiazole ^f	1105	tr	tr	—	tr	—
4,5-dimethyl-2-propylthiazole ^f	1180	tr	+	tr	tr	tr
4(or 5)-ethyl-2-propylthiazole ^f	1190	+	+	tr	+	+

EX1129 (Mottram), 986 (Table I).

POR, 3, 26.



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Grounds 2A-2B: Obviousness over Giacino and Brown

Leghemoglobin believed to adversely affect aroma and flavor:

Although heme-proteins can promote lipid oxidation and undesirable flavors in meat and other products *over time*, lipid oxidation contributes to a desirable meaty aroma upon initial cooking.

EX1005 (McGorrin Dec.), ¶16.

The term [WOF] was coined ... to describe the rapid development of oxidized flavor in cooked meat *upon subsequent holding*. The rancid or stale flavor becomes readily apparent *within 48 h*.

EX1048(Pearson), 287.

precursors. In fact, the patents teach that plant proteins can contribute to undesirable flavors and aromas. Specifically, the patents teach that plant proteins are associated with “planty” aromas and “off-flavors.” Ex. M9, ’306 patent 13:52-56; 87:19-46; 87:63-88:9, Examples 16, 34. The patents

EX1005 (McGorrin Dec.), ¶71.

EX2020 (McGorrin CC Dec.), ¶69.

79. Petitioner’s arguments also ignore that autoxidation can occur in food products without heat during storage, and such autoxidation can form undesirable aromas and flavors before consumption. *See*, ¶¶38-39 above.

POR, 32-33; PO Sur-reply, 8, 11, 18.

EX2030 (Qian Dec.), ¶79.

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Grounds 2A-2B: Obviousness over Giacino and Brown

Dr. McGorrin: “undesirable aroma” and unpredictability

167. Patent Owner argued that increasing the levels of certain volatile compounds—purportedly achieved by only leghemoglobin—would translate into an improved beef-like aroma. I disagree. As noted above (Section V.A.1), increasing the levels of aroma-associated volatiles—particularly character-impact compounds with low odor thresholds—can lead to an undesirable aroma.

EXI005 (McGorrin Dec.), ¶167.

replica or the latter’s volatile profile. A POSITA would not be able to reasonably predict aroma compound formation, and its sensory impact, merely from reacting isolated components together.

EXI005 (McGorrin Dec.), ¶199.

Grounds 2A-2B: Obviousness over Giacino and Brown

Reply responds by excluding lipids:

Even if considered, PO's contentions fail. First, lipid oxidation is a non-issue for claims 1-7, 9-12, 14-16, 18-20, and 22-24 because Giacino's compositions do not require lipids.⁴ Ex. 1181, ¶¶60-68; Ex. 1182 (Quan Tr.), 87:19-92:5 (PO's expert

Pet. Reply, 17.

Petition not premised on exclusion of lipids in Giacino:

Giacino's compositions include "edible oils" as a medium. EX1015(Giacino), 2:23-26, 5:22-25. However, Giacino does not expressly disclose the type of edible

Pet., 36.

PO Sur-reply, 8-13.



Grounds 2A-2B: Obviousness over Giacino and Brown

Reply responds by forgoing heating step:

PO's assertions concerning "shelf life" are also incorrect because Giacino teaches that its compositions can be added to foods *first* and then cooked. Giacino,

Pet. Reply, 17.

Petition relied on heating Giacino's pre-mix:

Giacino discloses that "[t]he meat flavor of the compositions of the present invention is developed by heating the pre-mix compositions at an elevated temperature for a period of time." EX1015(Giacino), 6:15-17. The heating step

Pet., 33.

Grounds 2A-2B: Obviousness over Giacino and Brown

Reply relies on alleged similarities between Brown and Giacino:

Giacino's composition prior to heating. Pet., 31; Ex. 1003, ¶¶184, 196. Moreover, Brown's and Giacino's compositions are both consumable products and have similar ingredients including reducing sugars and plant proteins/amino acids. Pet., 28-34; Ex. 1003, ¶¶196, 201-202, 210 (Giacino includes thiamine, taurine, vegetable protein hydrolysate, cysteine, ribose), 174, 193 (Brown includes plant protein (pea flour), glucose, oil). The Petition argued that these similarities support a reasonable expectation of success. Pet., 30-31; Ex. 1003, ¶¶184, 196.

Pet. Reply, 20-21.

Grounds 2A-2B: Obviousness over Giacino and Brown

193. Brown teaches a POSITA how heating a composition containing leghemoglobin and flavor precursors (e.g., pea flour oil, and glucose) produces volatile compounds having “the aroma of cooked meat” that are “consistent[ly]

EX1003 (Tarté Dec.), ¶193.

49. Amino acids often serve as the building blocks of protein. A POSITA would understand that proteins themselves are not considered Maillard reactants, however. Indeed, these

EX2020 (McGorin CC Dec.), ¶49.

40. Brown also teaches heat-reacting a well-known Maillard precursor, glucose, with pea flour in the presence of leghemoglobin. *E.g.*, Ex. 1003, ¶81. “Pea flour” is itself not a Maillard precursor. However, certain amino acids are the

EX1181 (McGorin Reply Dec.), ¶40.

PO Sur-reply, 13-16.



Grounds 2A-2B: Obviousness over Giacino and Brown

193. Brown teaches a POSITA how heating a composition containing leghemoglobin and flavor precursors (e.g., pea flour, oil, and glucose) produces volatile compounds having “the aroma of cooked meat” that are “consistent[ly]

EX1003 (Tarté Dec.), ¶193.

Even if considered, PO’s contentions fail. First, lipid oxidation is a non-issue for claims 1-7, 9-12, 14-16, 18-20, and 22-24 because Giacino’s compositions do not require lipids.⁴ Ex. 1181, ¶¶60-68; Ex. 1182 (Quan Tr.), 87:19-92:5 (PO’s expert

Reply, 17.

Q. Okay. And elsewhere in your declaration, you discussed Giacino’s compositions lacking a lipid, correct?

A. Yes, correct.

PO Sur-reply, 13-16.

EX2033 (McGorrin Tr.), 24:5-25:3.



Grounds 2A-2B: Obviousness over Giacino and Brown

193. Brown teaches a POSITA how heating a composition containing leghemoglobin and flavor precursors (*e.g.*, pea flour, oil, and glucose) produces volatile compounds having “the aroma of cooked meat” that are “consistent[ly]

EX1003 (Tarté Dec.), ¶193.

amino acids including cysteine and methionine. Accordingly, a POSITA would recognize that there are certain similarities between the Giacino and Brown compositions, including the presence of Maillard precursors (ribose and glucose, respectively) which are both reducing sugars.

EX1181 (McGorin Reply Dec.), ¶40.

Grounds 2A-2B: Obviousness over Giacino and Brown

Glucose and ribose are dissimilar:

disclosed in the '816 Provisional. In my experience, chemical structure can be significant because it affects the compounds' chemical reactivity. For example, 5-carbon sugars (e.g., ribose) are more reactive in the Maillard reaction than 6-carbon sugars (e.g., glucose). Compounds with slower reactivity may be less successful at achieving the desired aroma profile with limited cooking time constraints.

EX1005 (McGorin Dec.), ¶¶96.

Is -- ribose is a five-carbon molecule?
A. I believe so.
Q. And glucose is a six-carbon molecule?
A. Yes.

PO Sur-reply, 13-16.

EX2033 (McGorin Tr.), 30:3-6.

Grounds 3A-3D: Obviousness over Giacino, Conrad, and Crane

Grounds 3A-3D: Obviousness over Giacino, Conrad, and Crane

Institution Decision found Petition's rationale insufficient:

required by claim limitations 1[a] and 10[a]. Pet. 46–50, 53. We preliminarily agree with Patent Owner that the Petition does not adequately explain how Crane may be considered analogous art in view of its biological focus for producing recombinant heme-binding proteins. Prelim. Resp. 23; Ex. 1014, code (57), ¶ 21. Patent Owner's arguments in this regard highlight the Petition's insufficient rationale for modifying Giacino and Conrad's food product compositions with Crane's teachings.

Inst. Dec., 34-35.

Grounds 3A-3D: Obviousness over Giacino, Conrad, and Crane

Dr. Qian confirms Petition's deficiencies:

methods for preparing such additives and food products. Thus, I agree with the Board that Crane is not “from the same field of endeavor” as the '096 patent,

EX2030 (Qian Dec.), ¶86.

much less food products that replicate meat. Thus, I agree with the Board that Crane is not “reasonably pertinent” to the problem faced by the inventors of the '096 patent.

EX2030 (Qian Dec.), ¶87.

POR, 36-40.



Grounds 3A-3D: Obviousness over Giacino, Conrad, and Crane

Dr. Qian confirms Petition's deficiencies:

89. First, it is my opinion that Petitioner fails to sufficiently explain why a POSA would have sought to incorporate the blood fraction of Conrad into a flavor additive composition like Giacino. Specifically, Giacino relates to “artificial meaty flavoring compositions,” which can be used to flavor food products. EX1015(Giacino), 1:19-20. In contrast, Conrad relates to a mixed meat product, where, due to the general expense of meat itself, “some” of the meat is replaced with a wheat product, which can include actual animal blood or a fraction of blood.

EX2030 (Qian Dec.), ¶89.

90. Furthermore, it is also my opinion that Petitioner fails to sufficiently explain why a POSA would then take the Giacino flavoring composition modified with Conrad's blood fraction, and substitute out the blood fraction with Crane's recombinant heme-containing protein, with any expectation that the recombinant protein of Crane would impart the same flavor characteristics as the blood fraction of Conrad.

POR, 41-48.



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EX2030 (Qian Dec.), ¶90.

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Grounds 3A-3D: Obviousness over Giacino, Conrad, and Crane

Petitioner does not dispute POR arguments:

Petitioner responds to PO's arguments concerning Grounds 2A-2B and 4A-4C, and **relies on the arguments made in the Petition for Grounds 1 and 3A-3D.**

Pet. Reply, I.

PO Sur-reply, I.



Grounds 4A-4C: Obviousness over Giacino, Proulx, and Conrad

Grounds 4A-4C: Obviousness over Giacino, Conrad, and Proulx

H. Challenges Based on the Combined Teachings of Giacino, Conrad, and Proulx

We have reviewed the parties' arguments and evidence. On this record, we have concerns whether Petitioner can show sufficiently that a POSITA would have had reason to modify Giacino's meaty flavoring compositions with Proulx's isolated soy leghemoglobin to fortify the compositions with heme iron and replace Conrad's blood sourced hemoglobin to the required "isolated heme-containing protein" of claim limitations 1[a] and 10[a]. Pet. 58–64. According to the Petition, the primary

Inst. Dec., 37-38.

Grounds 4A-4C: Obviousness over Giacino, Conrad, and Proulx

Dr. Qian confirms Petition's deficiencies:

101. First, regarding fortification, nothing in Giacino suggests that its flavor additives are intended to provide nutritional content to a food product.

EX2030 (Qian Dec.), ¶101.

102. Second, with respect to enhancing meaty flavor, for the reasons I discuss above (¶¶88-94), Petitioner does not explain why a POSA would expect that the addition of Conrad's blood fraction, which Conrad teaches is added to compensate for lost flavor and color in meat extended with wheat, would only enhance meaty flavor in a different product having a different compositional matrix, i.e., the concentrated flavor additive of Giacino. Moreover, Petitioner does not explain why a POSA would then equate that same effect to extend to the soy leghemoglobin of Proulx—a *plant* heme-protein that is added to a tortilla product not for flavor purposes.

EX2030 (Qian Dec.), ¶102.

POR, 50-51.



Grounds 4A-4C: Obviousness over Giacino, Conrad, and Proulx

Petitioner abandons Conrad:

III. GROUNDS 4A-4C: GIACINO, PROULX, PERRET, MACLEOD RENDER THE CLAIMS OBVIOUS

Thus, Petitioner can prevail based on Proulx's fortification motivation alone.

Conrad is unnecessary to the ground.

Pet. Reply, 22-23.

PO's remaining objections to Grounds 4A-4C are directed at Conrad, which is not necessary for the ground (except dependent claim 14). POR, 51 (citing Ex.

Pet. Reply, 28.

PO Sur-reply, 23-26.



Grounds 4A-4C: Obviousness over Giacino, Conrad, and Proulx

Petitioner's fortification rationale based on Proulx is meritless:

Garlic (*Allium sativum*) has several flavor compounds

EXI 186 (Jun), 330.

ABSTRACT: Yeast extracts are the concentrates of the soluble fraction of yeast and more particularly *Saccharomyces cerevisiae*. As food ingredients, yeast extracts are described for their nutritional composition and flavoring properties. They are produced principally from autolysis, but in some cases, acid or exogenous enzyme preparations are added. The main nutritional components of yeast extracts include partly hydrolyzed protein with 35–40% of free amino acid, and they also contain B vitamins and some trace elements. As flavoring ingredients in foods, they provide diverse flavors depending on the methods used for their production. These flavors include meaty, kokumi, umami, and salty taste along with taste masking properties. Yeast extracts are a source of amino acids,

EXI 183 (Tome), Abstract.

been pointed as an alternative strategy. Like salty, umami is also a basic taste and the major compound associated to umami is monosodium L-glutamate (MSG). The availa-

EXI 187 (Maluly), Abstract.

As a food ingredient, sodium has multiple uses, such as for curing meat, baking, thickening, retaining moisture, enhancing flavor (including the flavor of other ingredients), and as a

EXI 185 (FDA - Sodium), 3.

PO Sur-reply, 25-26.

Grounds 4A-4C: Obviousness over Giacino, Conrad, and Proulx

Petitioner's fortification rationale based on Proulx is meritless:

billions and trillions level! The definition of a flavor captures the notion that it is a powerful material whose significant function is flavor and not nutrition or functionality (Food and Drug Administration 1990).

EX1038 (Manley), 139-140.

POR, 50-51; PO Sur-reply, 24.



Grounds 4A-4C: Obviousness over Giacino, Conrad, and Proulx

Petitioner's unsupported rationale is hindsight-driven:

The primary purpose of the characterizing component, soy leghemoglobin protein, in LegH Prep is to create a flavor impact in ground beef analogue products. In addition, soy leghemoglobin has a nutritive value as a source of iron, analogous to the role of myoglobin as an

EX1052 (Impossible 2017 GRAS Notice), 7.

“Even if we were to consider Petitioner’s new argument regarding claim construction, we would not find it persuasive because Petitioner’s obviousness rationale incorporates an expectation of safety. Irrespective of whether the claims require safety, Petitioner cannot carry its burden to establish that the claimed methods would have been obvious[] without establishing that—as posited in the Petition—the POSA would have expected co-administration to be safe.”

*Teva Pharms. USA, Inc. v. Corcept Therapeutics, Inc.,
PGR2019-00048, Paper 51 at 18 (Nov. 18, 2020).*