

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MOTIF FOODWORKS, INC.,
Petitioner,

v.

IMPOSSIBLE FOODS, INC.,
Patent Owner.

Case IPR2023-00206
Patent No. 9,943,096

**PATENT OWNER'S PRELIMINARY RESPONSE
PURSUANT TO 37 C.F.R. § 42.107**

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I. INTRODUCTION

The Board should not institute *inter partes* review of claims 1-12 and 14-23 of U.S. Patent No. 9,943,096 (EX1001, “’096 patent”) because Petitioner Motif FoodWorks, Inc. fails to show that it has a reasonable likelihood of prevailing. Petitioner’s grounds are an exercise in improper and unsupported claim interpretation and impermissible mixing-and-matching designed to reach the claimed invention through hindsight, mischaracterizations of the references’ teachings, and illogical combinations.

For its first ground, Petitioner advances an anticipation argument based on Brown, which is not prior art to the challenged claims once the Office accounts for the full priority chain. However, even if Brown is considered to be prior art, Petitioner’s reliance on Brown is deficient because it requires stretching the meaning of a claim limitation—a food flavor additive composition—so as to render the claim term meaningless.

Petitioner’s grounds asserting obviousness of the claimed food flavor additive are no better. Petitioner’s reasoning for all its grounds is improperly premised on starting with the claimed invention in mind—namely, a food flavor additive having specific ingredients and that contains no animal products. The grounds then work backwards to pick and choose particular teachings of the references to arrive at the claimed invention. For instance, for its grounds based on

combining Giacino and Brown, Petitioner twists Giacino's disclosure in its attempt to justify its unsupported rationale that a POSA would have been motivated to make a flavor additive that contains no animal products for "health, environmental, ethical, or religious reasons"—a teaching found nowhere in the reference itself. Petitioner also relies on hindsight to argue that a POSA would have turned to Brown's "muscle replica" to modify Giacino's flavor additive to include an isolated heme-containing protein.

For its grounds based on combining Giacino, Conrad, and Crane, Petitioner makes the unsupported assertion that a POSA, starting with Giacino's flavor compositions, would turn to Conrad's teaching to add *actual animal blood* to a wheat-filler for mixed meat products to address the discoloration impact of the wheat-filler on the meat to which Conrad teaches it should be added. Petitioner then adds a third reference, Crane, to teach that it was possible to produce recombinant functional heme-binding proteins. However, Crane never discusses food products (and instead, *e.g.*, blood transfusions), and Petitioner fails to show Crane is analogous art or that a POSA looking to Conrad's teachings to add animal blood to meat/wheat mixtures would look instead to recombinant technology relevant to blood transfusions.

Petitioner uses hindsight and fails to provide a supportable motivation or rationale to combine the cited references. Petitioner also ignores the extensive

unexpected results and teachings that support no reasonable expectation of success with the combinations. The '096 patent reflects the work of Patent Owner Impossible Foods, Inc. ("Patent Owner"), which is widely recognized as being the first to incorporate heme-containing proteins into plant-based meat products. EX2002 (Goldfine, "A brief history of Impossible Foods: how 'bleeding' plant-based burgers started a food industry trend"). Impossible Foods' innovations did not come overnight—"five years of research and hundreds of iterations" brought a final version of a plant-based meat product able to recreate the aromas, taste, and texture of animal meat such that "[m]ore than 1,500 consumers couldn't tell the difference between a meat burger and the Impossible burger...." *Id.*

For the reasons detailed below, institution of *inter partes* review should be *denied*.

II. OVERVIEW OF THE '096 PATENT

The '096 patent recognizes that "current plant-based meat substitutes have largely failed to cause a shift to a vegetarian diet," owing to the "fail[ure] to replicate the experience of cooking and eating meat." *Id.*, 1:46-49. Prior substitute products contrasted with meat products by providing "a texture and mouthfeel that are more homogenous than that of equivalent meat products." *Id.*, 1:50-52. Also absent was the ability of these plant-based substitutes to "replicate aromas, flavors,

and other key features associated with cooking meat.” *Id.*, 1:52-55. While prior substitute products appeal to an established vegetarian/vegan base, these products “have failed to appeal to the larger consumer segment accustomed to eating meat.” *Id.*, 1:55-59.

The ’096 patent provides “methods and compositions for modulating the flavor and/or aroma profile of consumable products,” including plant-based food products. *Id.*, 1:66-2:3. By adding such compositions, plant-based food products can be made “to give the cooked consumable food product a particular meaty taste and smell” and “hav[e] a cooked flavor and/or aroma profile that is more meat like.” *Id.*, 2:66-3:14, 19:3-20; EX2002 (“The Impossible Burger bleeds, sizzles and tastes just like meat...”). The compositions described can be formulated to be free of animal products, thus adding to its desirability and ability to improve the meat flavor of plant-based food products. *See* EX1001, Abstract.

III. CLAIM CONSTRUCTION

A claim subject to *inter partes* review receives its plain and ordinary meaning, interpreted in light of the specification of the patent in which it appears. *See* 37 C.F.R. § 42.100(b). The terms of the challenged claims do not require express construction in order to reach a decision denying institution, but Petitioner’s Ground 1 can only succeed by adopting an erroneous claim construction. Petitioner erroneously interprets “flood flavor additive composition”

refer to each and every food item of every kind simply because it will have some flavor. Petitioner does this so that it can mischaracterize Brown's muscle replica as the claimed food flavor additive composition. By arguing Brown's muscle replica is the claimed food flavor additive composition, Petitioner stretches the claim term far beyond its plain and ordinary meaning. Pet., 11 (stating POSA "would understand its plain meaning as a composition that, when added to other consumable food products, modulates their flavor and/or aroma"). Patent Owner disagrees with Petitioner's application of the claim term to read on Brown's "muscle replica" in such a way as to render the term food *flavor additive* composition entirely meaningless.

Petitioner's first argues that the term "food flavor additive composition" is covers "meat substitutes that are end products *directly* consumed by the consumer (not just additives to meat substitutes)." Pet., 11 (original emphasis). Petitioner reasons that this conclusion is warranted based on Impossible's contentions that Petitioner's meat replica products infringe the claimed "food flavor additive composition." *Id.* Petitioner's argument that Impossible's infringement contentions somehow lead to the conclusion that the end products themselves are "food flavor additive compositions" is nonsensical. A meat-substitute end product can still infringe the claimed food flavor additive composition because it ***contains*** a food flavor additive composition that meets the elements of the claims. This is

akin to alleging a smartphone as infringing because it contains a patented chip. Merely because Impossible has contended that Petitioner's meat substitutes infringe the claimed invention does not support Petitioner's expansive reading of a "food flavor additive composition" to encompass meat replica products as a whole.¹

Petitioner next argues that because Brown's muscle replica is a component that has flavor and is added to a meat substitute, it constitutes a "food flavor additive composition." Pet., 11-12, 20-22. But adopting Petitioner's unjustified interpretation would transform any component of a food product into a "food flavor additive composition" merely because it has flavor and is added to the food product. Indeed, it is hard to imagine any component that would not satisfy this claim limitation under Petitioner's interpretation. Petitioner's application of this claim term to Brown's "muscle replica" is contrary to the plain and ordinary meaning of the term and, again, renders the claim term entirely meaningless.

¹ In addition, Petitioner is not referring to "contentions," but rather to general infringement allegations in the second amended complaint. Pet., 11 (citing EX1116). Preliminary infringement contentions have not been served, making Petitioner's attempt to draw any claim construction conclusion premature.

By contrast, a food flavor additive composition is an *additive* that varies or adjusts the flavor and/or aroma profile present in a consumable food product. This is illustrated by the '096 patent and other art relied upon by Petitioner. For example, the '096 patent describes food flavor additives that are added to replica products to change the product's flavor and aroma profile "before, during, or after cooking of the consumable food product." EX1001, 3:49-51, 3:54-56.

The '096 patent also compares meat replicas (having their own replica structural components) containing food flavor additives (*e.g.*, flavor precursors) to those without. *See* EX1001, 7:23-27, 32:49-33:24 (Example 11), FIG. 2. The food flavor additive modulated the flavor of the meat replica by increasing the amount of beefy flavor compared to replicas without the additive. *Id.*; *see also id.*, 20:30-52 (Example 2). Nowhere does the '096 patent equate a food flavor additive to a structural replica component (like the muscle replica component) of the meat replica product. *See id.*, 20:1-10 (Table 4), 20:30-52 (distinguishing between replica burgers and flavor precursor compositions).

Contrary to Petitioner's arguments, Brown's "muscle replica" is not a "food flavor additive composition" as the '096 patent describes the term. For instance, Brown makes clear that a "muscle replica" is a structural component of a meat substitute product meant to replicate the skeletal muscle tissue fibers of meat. *See* EX1012, [0025], [0072], [00244], [00265], [00305], FIG. 12. Brown indicates that

the “muscle replica” may be combined with other structural elements of meat, including a connective tissue replica and a fat tissue replica, to form a meat replica product that approximates the physical organization of meat. *Id.*, [00189], [00269]-[00270] (ground beef patties formed by muscle replica, connective tissue replica, and fat tissue replica), [00297], FIGS. 16-17; *see also* Pet., 15-16. Simply because Brown’s “muscle replica” may contain flavor meant to replicate the flavor of muscle tissue does not necessarily transform a “muscle replica” itself into a “food flavor additive composition.”

This understanding is also supported by prior art. Giacino, for example, identifies exemplary additives as “alginates, allspice, ascorbic acid, basil, capsicum extract, or[e]gano extract, pyroligneous acid, sage oil, sodium citrate, thyme, monosodium glutamate, and the like.” EX1015, 9:14-18. In terms of its flavor compositions, Giacino states that “a small but effective amount of the flavor composition is added to the food to impart” or “enhance” a type of meat flavor. *Id.*, 9:28-48. Other art describes “additives such as sucrose esters, tripolyphosphate, disodium sulfosuccinate, or alginates” as being used “to improve ‘wettability’ as well as vanillin and other flavorings to give them a more rounded profile.” EX1034, 262. In other words, even Petitioner’s own art does not equate “additives” to structural elements of a food product, but rather as ingredients used as flavor enhancers.

Petitioner's assertions that a "muscle replica" is the claimed "food flavor additive composition" is inconsistent with the plain and ordinary meaning of the term in view of the specification of the '096 patent. Because Petitioner relies on this unsupported meaning of the term to argue that Brown anticipates the claimed food flavor additive composition, Petitioner's Ground 1 fails.

IV. GROUND 1 FAILS

Petitioner asserts that Brown (EX1012) anticipates claims 1-5, 7-9, 23, and 24 of the '096 patent based on its disclosure of a "muscle replica." Pet., 13, 20. As detailed below, Petitioner's Ground 1 fails because Brown is not prior art to the '096 patent. Petitioner's ground also fails on the merits because Petitioner's assertions that a "muscle replica" is the claimed "food flavor additive composition" are baseless.

A. Brown is not prior art

Petitioner asserts that the '096 patent is not entitled to its earliest claimed priority date of January 11, 2013, and thus Brown qualifies as prior art to the '096 patent. *See* Pet., 5-10, 14-16. As noted by Petitioner, the '096 patent claims priority to U.S. Patent Application No. 13/941,211 (the "'211 application"), filed on July 12, 2013. Petitioner applies the '211 application's filing date as the earliest priority date of the '096 patent and does not establish that the '211 application fails to provide written description support for the challenged claims. *See* Pet., 6

(merely asserting, in a footnote and without evidence, the '211 application “also fails to provide written description support” for the challenged claims), 15.

The '211 application itself claims priority to U.S. Provisional Application 61/671,069 (the “'069 provisional”), filed on July 12, 2012, which contains substantially the same content as the '211 application, and also claims priority to Brown and its provisional application, U.S. Provisional Application 61/572,205 (the “'205 provisional”). The '069 provisional also contains substantially the same content as Brown, including the disclosures relied upon by Petitioner in its grounds of challenge. *See* EX2012, [00189], [00364], [00376]-[00377], [00380]-[00381]; *cf.* Pet., 20-23.

Reference to the '069 provisional, Brown, and the '205 provisional was unintentionally omitted from the '096 patent's priority chain. Impossible has taken measures to correct this unintentional omission through the filing of a petition and certificate of correction with the Office for those patents within the affected family that are currently not subject to an *inter partes* review proceeding. *See* EX2001. For the '096 patent, Impossible will seek authorization with the Board to file a motion asking the Board to cede its jurisdiction so that Impossible can seek a certificate of correction from the Director. 37 C.F.R. § 1.323. When granted, Brown would fail to qualify as prior art under pre-AIA provisions, and thus

Petitioner’s Ground 1 (and Grounds 2A-2B, which also rely on Brown, *infra*, section IV) fails for at least this reason.

Moreover, as discussed in more detail below, even if Brown qualifies as prior art, Ground 1 fails on the merits.

B. Petitioner’s Ground 1 fails on the merits

Petitioner relies on Brown’s “exemplary composition for a ‘muscle replica’” as allegedly anticipating independent claims 1 and 10. Pet., 20-23. Petitioner argues that a “muscle replica” is a “food flavor additive composition”² because the ’096 patent “does not require any specific form” for its food flavor additive compositions and the term “is, per its plain an ordinary meaning, a composition that, when added to a food product, modulates the food product’s flavor and/or aroma.” Pet., 21. Petitioner, however, fails to sufficiently explain how Brown’s description of a “muscle replica” comports with the claimed “food flavor additive composition” of the ’096 patent.

² Although recited in the preamble, the term “food flavor additive composition” is recited in the body of the claims. Further, Petitioner raises no argument that the term “food flavor additive composition” is entitled to no patentable weight. Pet., 20-23.

As noted above, Brown describes a “muscle replica” as a component designed to replicate a structural part of actual meat, muscle tissue. *Supra*, section III. While the ’096 patent does not necessarily limit the form in which the food flavor additive composition may take, Petitioner provides no explanation or evidence showing that a POSA would have understood a “muscle replica” to be a “food flavor additive” consistent with the ’096 patent and the general understanding in the art of what constitutes a “food flavor additive.” Instead, as discussed above, Petitioner’s application of the term “food flavor additive composition” to encompass Brown’s “muscle replica” effectively reads out any meaning of the term “food flavor additive.”

Because Petitioner fails to adequately establish that a “muscle replica” would have been understood to be a “food flavor additive composition,” Petitioner’s Ground 1 fails.

V. GROUNDS 2A-2B FAIL

Petitioner’s Ground 2A challenges claims 1-12, 14-17, and 20-24 as obvious over the combination of Giacino (EX1015) and Brown. Ground 2B challenges claims 18-19 as obvious over the combination of Giacino, Brown, and MacLeod (EX1024). For both grounds, Petitioner argues “Giacino discloses every limitation of the independent claims except ‘an isolated heme-containing protein,’” which Petitioner contends a POSA would have been motivated to add to Giacino’s flavor

compositions in view of Brown. Pet., 26-27. As an initial matter, as explained above, Brown is not prior art to the '096 patent when its priority claim is corrected to include unintentionally omitted references to the '069 provisional, Brown, and the '205 provisional. *Supra*, section III.A. Moreover, even on the merits, Petitioner fails to establish that the combination of Giacino and Brown discloses each and every limitation of the claims and that a POSA would have been motivated to combine the references as proposed.

A. Petitioner fails to establish that the combination of Giacino and Brown discloses a food flavor additive composition that “contains no animal products”

Independent claims 1 and 10 recite that “the food flavor additive composition contains no animal products.” Although Petitioner asserts that “Giacino’s artificial meaty flavoring compositions do not contain animal products,” Petitioner effectively concedes that Giacino does not expressly disclose this limitation because Petitioner presents an obviousness analysis to establish that this claim element is met. Pet., 32-33 (“Giacino allows for—and indeed motivates—the use of” non-animal products). Petitioner’s arguments, however, fail to establish that the combination of Giacino and Brown comprises a “food flavor additive composition” that “contains no animal products” because Petitioner’s analysis rests on selective readings and mischaracterizations of Giacino, and makes conclusory assertions that find no support in the reference.

To start, Petitioner begins its analysis on misleading and selective readings of Giacino. Petitioner argues that “Giacino teaches, as one example, a meaty flavoring composition that includes thiamine, taurine, vegetable protein hydrolysate, cysteine, and a monosaccharide, such as a ribose.” Pet., 32. To be clear, this is not an actual example of a flavor composition disclosed in Giacino. Rather, it is a composition that Petitioner selectively stitches together from various disclosures of Giacino. *See id.* (citing EX1015, 2:5-8, 2:53-60, 3:23-25, 3:43-46, 5:1-10, 6:1-4).

This selective reading of Giacino is further illustrated by Petitioner’s assertion that “Giacino further teaches that for the hydrolyzed protein ingredient, non-animal, vegetable hydrolysates ‘are preferred’” (*id.* (citing EX1015, 3:23-25)), but Petitioner conveniently omits that Giacino teaches animal and fish hydrolysates are also “[s]uitable.” EX1015, 3:21-23. Petitioner also contends that “[w]ith respect to thiamine, Giacino expressly teaches that it is sourced from yeast” (Pet., 32 (citing EX1015, 5:68-70)), but Giacino actually states “[t]hiamine containing materials such as yeast ***and other natural products*** can be used as a source of thiamine.” EX1015, 5:68-70 (emphasis added). In other words, Giacino is not so limited as Petitioner would like it to appear.

Petitioner’s mischaracterization of Giacino continues in its attempt to fashion an alleged motivation in Giacino to avoid animal products in its

compositions. As an initial matter, Petitioner begins with the faulty premise that Giacino's flavor compositions *could* be made from non-animal sources, and thus a POSA *would* have made such compositions in view of Giacino. For instance, in addition to asserting that Giacino "does not teach or suggest" or "indicate" that its compounds (specifically, cysteine, taurine, and ribose) "are sourced from previously live animals," Petitioner contends that a POSA "would understand that Giacino *allows for*" the use of compounds "from non-animal sources." Pet., 26, 32 (emphasis added). Petitioner also contends that "it was well-known that cysteine *could be* obtained from non-animal sources." *Id.*, 32 (emphasis added). However, the mere possibility that a composition *could* be made from non-animal sources is insufficient to establish that a reference teaches or suggests such compositions. *See Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015) (obviousness requires showing whether a POSA "not only could have made but would have been motivated to make the combinations or modifications of prior art to arrive at the claimed invention").

With regards to motivation, Petitioner's evidence on this point is lacking. Petitioner simply provides a conclusory and unsupported statement that a POSA "would have been motivated to use non-animal sourced cysteine, taurine, and ribose to keep the meaty flavoring composition (and thus the food product to which it is ultimately added) free of animal products for those individuals that refrain

from consuming animal products for health, environmental, ethical, or religious reasons.” Pet., 33. Giacino provides no discussion of using non-animal sourced cysteine, taurine, and ribose in its meaty flavoring compositions, nor does it discuss a desire to make its compositions “free of animal products.” Petitioner’s assertion merely assumes as a conclusion the unproven hypothesis that a POSA, reading Giacino, would have even wanted to make its flavoring compositions “free of animal products for those individuals that refrain from consuming animal products for health, environmental, ethical, or religious reasons.”

Furthermore, Petitioner follows up this statement with another mischaracterization of Giacino by asserting that using compounds sourced from non-animal products “is also consistent with Giacino’s teachings that ‘the actual meat such as beef, pork, chicken, turkey, duck...[can be] *actually undesirable*’ in the meaty flavoring composition.” *Id.* (citing EX1015, 1:27-30) (original alterations and emphasis). Yet, Giacino’s discussion on this point is in the context of an entirely different problem—not one rooted in Petitioner’s alleged motivation. Instead, when Giacino’s discussion is considered in its entire context, Giacino is discussing difficulties that may arise from the use of *actual* meat itself to add meat flavor to a food product. In particular, Giacino states:

Food products enhanced with meat-like flavors are well-known and have long been used. There is considerable demand for meat-flavored products in which the actual meat such as beef, pork, chicken, turkey, duck and the like is not needed or is actually undesirable. For

example, in the preparation of some sauces, bouillons, broths and purees, the meat flavor is desired, but it is necessary to cook the food with the desired meat and then to remove the meat by straining or some similar operation to obtain the final product ready for use.

EX1015, 1:27-35; *see also id.*, 1:36-39 (stating also that “where weight space or storage capability are a problem, e.g., when a convenience food is prepared, the presence of the actual meat may be undesirable because it will deteriorate in storage and spoil the food”). Thus, Giacino is discussing the tradeoffs from using actual meat itself for meat flavor in food products (*e.g.*, added steps, such as straining, or risk of deterioration or spoilage). This speaks nothing to whether the compounds (*e.g.*, cysteine, taurine, ribose) used to create Giacino’s flavor compositions are *sourced* from animals, and indeed, this is illustrated by the fact that Giacino itself still contemplates the use of animal-sourced products in its compositions. *See* EX1015, 3:10-12 (suggesting use of “meat or meat scraps or other meat protein concentrates”), 3:21-23 (“Suitable materials are hydrolyzed proteinaceous substances illustrated by animal, fish or vegetable hydrolysates.”). Petitioner’s reliance on Giacino’s statement that “actual meat” can be “actually undesirable” due to commercial tradeoffs associated with the use of actual meat to impart meat flavor to food products is not the same motivation relied upon by Petitioner—*i.e.*, “to keep the meaty flavoring composition (and thus the food product to which it is ultimately added) free of animal products for those

individuals that refrain from consuming animal products for health, environmental, ethical, or religious reasons.”

Petitioner’s arguments are examples of a tortured hindsight reconstruction: start with the assumption that Giacino is a food flavor composition that contains no animal products and work backwards to map Giacino’s teachings to the claimed element. But, as explained above, Petitioner’s assertions have no basis in the reference itself. Petitioner thus fails to establish that the combination of Giacino and Brown discloses a food flavor additive composition that contains “no animal products.”

B. Petitioner fails to establish that the combination of Giacino and Brown discloses “wherein cooking the food flavor additive composition results in the production of at least two volatile compounds which have a meat-associated aroma”

Claim 1 also recites that, upon cooking the food flavor additive composition, “the production of at least two volatile compounds which have a meat-associated aroma” results. Petitioner argues that a POSA “would understand that heating Giacino’s composition, which includes cysteine, thiamine, and ribose, induces a Maillard reaction that produces a myriad of volatiles (at least two) known to have a meat-associated aroma.” Pet., 34. Petitioner’s argument fails because Petitioner’s contentions rely on inherency, which Petitioner fails to establish.

To be clear, Giacino does not expressly disclose “the production of at least two volatile compounds which have a meat-associated aroma” when its products

are heated, nor does Petitioner contend otherwise. Moreover, to the extent Brown discloses the production of volatile compounds having a meat-associated aroma, it is with respect to a muscle replica, which does not meet the requirements of the claims as explained above. *See* section IV.B, *supra*. Instead, Petitioner's arguments are based on inherency, but Petitioner fails to reach the high threshold of establishing inherency in obviousness, which requires a showing that the claimed volatile compounds will be ***necessarily*** present as a result of the ***combined*** references' disclosure. *See Alcon Research, Ltd. v. Apotex Inc.*, 687 F.3d 1362, 1369 (Fed. Cir. 2012) (requirement that the claimed property be "necessarily present" in the prior art); *In re Oelrich*, 666 F.2d 578, 581 (C.C.P.A. 1981) (Inherency "may not be established by probabilities or possibilities," and "[t]he mere fact that a certain thing *may* result from a given set of circumstances is not sufficient."); *PAR Pharm., Inc. v. TWI Pharm., Inc.*, 773 F.3d 1186, 1195 (Fed. Cir. 2014) (Inherency is a "high standard," that is "carefully circumscribed in the context of obviousness.").

First, Petitioner ignores the language of the claims, which recite that the volatile compounds "have a meat-associated ***aroma***." Instead, Petitioner equates discussion of "flavors" in Giacino with the claimed "aroma" to support its contention that "heating Giacino's composition, which includes cysteine, thiamine, and ribose, induces a Maillard reaction that produces a myriad of volatiles (at least

two) known to have a meat-associated aroma.” Pet., 33-34 (citing EX1015, 6:15-17 (“[t]he meat *flavor* of the compositions...is developed by heating the pre-mix compositions”) (emphasis added)); *see also id.*, 6:20-31 (“it is preferred to carry out the reaction at temperatures of from about 200°F, to about 420°F, until the desired *flavor* development is achieved” (emphasis added)), 2:4-7 (“the invention, in its broad aspect involves heating a mix composition comprising taurine and thiamine at an elevated temperature for a period of time whereby a meaty flavor is developed”). Yet Petitioner provides no explanation or evidence to the assumption that a “meaty flavor” is the same as the claimed “meat-associated aroma.”

Moreover, Petitioner fails to meet the high standard to showing inherency—namely, that the combination of specific ingredients relied upon (stitched together by Petitioner and nowhere expressly disclosed in Giacino (Pet., 32), as mentioned above, *supra*, section V.A) *necessarily* results in the claimed volatile compounds.

Accordingly, Petitioner’s Grounds 2A-2B fail for this additional reason.

C. Petitioner fails to establish that a POSA would have been motivated to combine Giacino and Brown

Petitioner argues that, based on Brown, a POSA “would have been motivated to add leghemoglobin to a flavoring composition, such as Giacino’s, that already includes flavor precursors...to provide a cooked meat aroma and flavor.”

Pet., 30. Petitioner’s rationale to combine Giacino and Brown, however, is insufficient because, apart from relying on hindsight, it fails to provide reason why

a POSA would have even turned to Brown’s “muscle replica” for guidance on forming flavor compositions like those of Giacino’s.

First, Petitioner fails to explain why a POSA would have been motivated to turn to the “muscle replica” product of Brown. As noted above, the muscle replica of Brown is a product designed to “replicate[] or approximate[] key features of animal skeletal tissue.” EX1012, [00305]; *supra*, section III. In contrast, Giacino relates to “artificial meaty flavoring compositions and to processes for preparing them.” EX1015, 1:12-25. Giacino compares its artificial compositions to “sauces, bouillons, broths and purees” that are made using actual meat. *Id.*, 1:30-35.

Giacino also compares its compositions to other prior-art artificial flavoring compositions that “have centered, to a large extent, around utilizing a spectrum of spices..., or the use of meat extracts....” *Id.*, 1:51-59. In other words, Giacino is not concerned with replicating the “key features” of a specific structural component of meat (*i.e.*, muscle). Petitioner fails to explain why a POSA seeking to produce a flavor composition in view of Giacino would even turn to Brown’s teachings on how to form a product designed to structurally replicate muscle.

Moreover, Petitioner’s basis for why a POSA would even seek to modify Giacino’s compositions rests on hindsight. In particular, Petitioner attempts to create motivation by arguing that Giacino “expressly invites incorporating additional ingredients to its compositions to modulate their flavor” based on

Giacino’s alleged disclosure that ““various other materials and ingredients can be incorporated into the compositions to provide a variety of flavor characteristics’ that build upon the ‘basic flavor’ of its flavoring compositions.” *See* Pet., 28 (citing EX1015, 2:38-41), 30. Petitioner, however, omits that Giacino discloses that the “basic flavor” of its flavor compositions, which “has a marked meat flavor,” is based on “the discovery that taurine has the ability to impart these [meaty] characteristics when employed as a reactive component.” EX1015, 2:8-13, 2:47-51. Giacino notes that this basic flavor “is perfectly well suited, without the inclusion of additional ingredients to be used as a meat flavor imparting agent....” *Id.*, 1:58-63. While Giacino references the possibility of additional ingredients, this is not an open invitation. Giacino lists the other ingredients contemplated for use with its compositions. *See id.*, 4:67-5:10. Petitioner points to nothing in Giacino that would suggest to a POSA that would lead a POSA to consider it appropriate to add leghemoglobin, as part of a structural component of a meat replica, in combination with its flavor additive components.

Accordingly, Petitioner fails to establish that a POSA would have been motivated to combine Giacino and Brown as proposed, and thus, Grounds 2A-2B fail.

VI. GROUNDS 3A-3D FAIL

Petitioner's Ground 3A challenges claims 1-2, 4-7, 9-12, 14-15, and 20-24 as obvious over the combination of Giacino, Conrad (EX1013), and Crane (EX1014). Ground 3B challenges claims 3 and 16 as obvious over the combination of Giacino, Conrad, Crane, and Proulx (EX1019). Ground 3C challenges claims 3 and 16 as obvious over the combination of Giacino, Conrad, Crane, and Perret. Ground 3D challenges claims 18-19 as obvious over the combination of Giacino, Conrad, Crane, and MacLeod.

For these grounds, Petitioner again seeks to modify Giacino's flavor compositions to incorporate "an isolated heme-containing protein," but does so by combining Giacino with Conrad and Crane. As discussed below, Petitioner's grounds fail for several reasons. First, Petitioner's proposed combination depends on Crane, which is not analogous art. Second, the grounds are premised on tortured readings of the applied references in an attempt to fashion together the claimed invention, and thus the grounds lack a reasoned basis that a POSA would have been motivated to combine the references with a reasonable expectation of success. Moreover, Petitioner fails to establish that its proposed combination discloses each and every limitation of the claims. For these reasons, Petitioner's Grounds 3A-3D fail.

A. Petitioner fails to show Crane is analogous art

Petitioner's Grounds 3A-3D rely on replacing Conrad's animal blood having hemoglobin with Crane's recombinant heme proteins in order to arrive at a food flavor additive composition recited in the claims. *See* Pet., 48-59. As threshold matter, Petitioner's grounds fail because Petitioner does not establish (indeed, does not even attempt to establish) that Crane is analogous art under the proper legal framework.

"A reference qualifies as prior art for an obviousness determination only when it is analogous to the claimed invention." *Airbus S.A.S. v. Firepass Corp.*, 941 F.3d 1374, 1379 (Fed. Cir. 2019). A reference is analogous art when the reference is either (1) "from the same field of endeavor, regardless of the problem addressed" by the reference, or (2) "if the reference is not within the field of the inventor's endeavor," the reference "still is reasonably pertinent to the particular problem with which the inventor is involved." *Donner Tech., LLC v. Pro Stage Gear, LLC*, 979 F.3d 1353, 1359 (Fed. Cir. 2020). Petitioner makes no attempt to establish Crane as analogous art under this legal framework.

First, Petitioner fails to establish that Crane is "from the same field of endeavor" as the '096 patent. As Petitioner acknowledges, "[t]he '096 patent claims are directed to food-flavor additive compositions that 'modulate the flavor and/or aroma of consumable food products.'" Pet., 3 (alterations and emphases

omitted); *see also* EX1001, 1:22-25 (stating the field of invention “relates to food products”). Yet, nowhere does Crane even mention flavor additives, or even food products generally, much less how to prepare such additives and food products. Instead, Crane is expressly directed to “methods of producing recombinant functional heme-binding proteins...and methods of identifying agents that modulate the activity of heme-binding proteins.” EX1014, Abstract. Thus, Petitioner fails to show Crane is analogous art under the first part of the test. *See Airbus*, 941 F.3d at 1381 (affirming non-analogous art finding when a reasonable factfinder could not conclude that “a reference that is expressly directed to exercise equipment and fails to mention the word ‘fire’ even a single time” would “fall[] within the field of fire prevention and suppression”).

Second, Petitioner fails to show is “reasonably pertinent to the particular problem with which the inventor is involved.” As noted by the Federal Circuit, this test “ultimately rests on the extent to which the reference of interest and the claimed invention relate to a similar problem or purpose.” *Donner Tech.*, 979 F.3d at 1359. As described in the ’096 patent, the problem solved by the inventors was to provide meat-like-food products that overcome the limitations of prior-art meat substitutes, “which largely fail to replicate the experience of cooking and eating meat,” “fail[] to cause a shift to a vegetarian diet,” and lack “appeal to the larger consumer segment accustomed to eating meat.” EX1001, 1:46-62. The ’096

patent explains that “[i]t would be useful to have improved plant-based meat substitutes which better replicate the aromas and flavors of meat, particularly during and/or after cooking.” *Id.*, 1:59-62; *see also id.*, 1:66-2:3 (“Provided herein are methods and compositions for modulating the flavor and/or aroma profile of consumable food products....”).

In contrast, Crane is directed to the problem of producing recombinant heme-binding proteins with complete heme incorporation. *See* EX1014, [0003]-[0005]. Entirely absent from Crane is any mention that the recombinant heme-binding proteins with complete heme incorporation produced by its methods are relevant to improving meat-associated flavors or aromas in food flavor additives, or even food products in general. Indeed, the uses that Crane does identify for the recombinant heme-binding proteins produced by its methods stand in stark contrast to the production of food products. *See, e.g., id.*, [0062] (“Recombinant hemoglobin preparations are used as effective and safe oxygen carriers as an alternative to blood transfusion.”), [0063] (“preclinical screening assays that are designed to predict drug metabolism and toxicity”), [0066] (production of “bio-ethanol and chemical feedstocks for commercial use”). Petitioner fails to demonstrate Crane’s facially distinct problem would have been viewed by a POSA as “reasonably pertinent” to the problem faced by the inventors of the ’096 patent,

which was not directed to how to generate recombinant proteins, but instead how to generate meat substitutes that accurately replicate meat.

Accordingly, for the reasons above, Petitioner fails to show that Crane is analogous art to the '096 patent. Because Petitioner's Grounds 3A-3D rely on Crane to replace the animal-sourced blood of Giacino and Conrad in its combination, the ground necessarily fails because Crane is not within the scope and content of prior art in an obviousness determination. At a minimum, Crane's status as non-analogous art undermines their rationale for obviousness because the petition fails to establish why a POSA would be motivated to look to Crane—a reference entirely unrelated to food products—for guidance on how to supplement a food flavor additive composition. *See In re Klein*, 647 F.3d 1343, 1350-1351 (Fed. Cir. 2011) (“If [a reference] is directed to a different purpose, the inventor would accordingly have had less motivation or occasion to consider it.”) (citing *In re Clay*, 966 F.2d 656, 659 (Fed. Cir. 1992)).

B. Petitioner's combination of Giacino, Conrad, and Crane is illogical, conclusory, and transparent hindsight

Notwithstanding Petitioner's failure to establish Crane as analogous art, Petitioner's purported reasons as to why a POSA would have been motivated to combine Giacino, Conrad, and Crane to arrive at the claimed invention are premised on an illogical and unsubstantiated rationale. Petitioner's analysis starts with a flavor composition of Giacino that, by Petitioner's own assertions, already

achieves the flavor of meat. *See* Pet., 47 (Giacino’s compositions “better replicate the ‘true flavor’ of meat”). Petitioner then turns to Conrad’s “wheat meat,” a product designed to add bulk to actual meat, and its incorporation of blood to the wheat-based extender. *Id.*, 47-48. Petitioner proposes incorporating that same blood into Giacino’s flavor compositions for the same purported reason mentioned in Conrad, but Petitioner provides no explanation as to why a POSA would have sought to use a blood meant for a wheat-filler in mixed meat products like Conrad’s in a flavor composition like Giacino’s. A further confounding feature underlying its combination is Petitioner’s subsequent abandonment of Conrad’s blood in favor of an entirely different substitute—the recombinant heme proteins disclosed in Crane, a molecular biology reference that says nothing about food products. *See id.*, Pet., 48-49.

The only basis that Petitioner advances for supporting its rationale to combine the three references is reasoning that can be found nowhere in the reference. That is, Petitioner’s alleged reasoning why a POSA, starting with Giacino’s flavor composition, would look to Conrad’s wheat-based filler for meat and then to Crane’s recombinant heme proteins, is based on the alleged motivation “to create a meat-flavored composition that closely mimics the attributes of conventionally sourced meat...to encourage consumption by consumers who

ordinarily enjoy consuming conventionally sourced meat.” Pet., 46. However, none of the references relied upon by Petitioner cite any such desire.

As with Petitioner’s combination of Giacino and Brown, rather than being based on an articulated rationale rooted logically in the prior art’s teachings, Petitioner’s combination of Giacino, Conrad, and Crane is a litigation-driven claim mapping exercise that merely reconstructs the claimed invention through hindsight. Such a rationale is insufficient to establish obviousness and thus Petitioner’s grounds fail for this additional reason.

1. Petitioner’s motivation to combine Giacino with Conrad is deficient

Petitioner’s combination first relies on the modification of Giacino in view of Conrad. *See* Pet., 47. While Petitioner contends that Giacino discloses meaty flavoring compositions (Pet., 46), Petitioner nevertheless asserts that a POSA would have turned to Conrad and sought to add “hemoglobin”—*i.e.*, blood—to “improve the meat flavour of the final product.” Pet., 47. Petitioner’s reasoning, however, is unavailing because it fails to address and account for the distinct products and purposes of Giacino and Conrad—a flavor composition on the one hand, and a wheat-based extender for mixed meat products on the other—and fails to explain why a POSA would have sought a solution disclosed by one (the addition of blood) and applied it to the other.

First, Petitioner ignores the differences between the compositions disclosed in Giacino and the products disclosed in Conrad. For instance, Conrad is directed to a mixed meat product where, due to the general expense of meat itself, “some” of it is replaced with a meat replacement product made from wheat (*i.e.*, “wheat meat”). EX1013, 1:25-40. Because the wheat meat “has a brown-yellow color deriving partly from the brown bran and partly from the yellow gluten,” Conrad discloses that its “colour can advantageously be transferred into meat colour by adding thereto up to 15% by weight of blood, preferably the hemoglobin part separated off from blood....” *Id.*, 4:3-8. Conrad also states that “[t]he addition of blood/hemoglobin further gives a desired taste improvement as it improves the meat flavour of the final product.” *Id.*, 4:13-16. Thus, Conrad is directed to the production of a wheat-based product designed to replace some portion of meat itself, thereby extending the meat and making the meat product cheaper. However, because Conrad is effectively diluting actual meat with a product that is decidedly not meat in terms of both color and taste, Conrad discloses adding in animal blood to recover color and taste lost by the addition of the wheat to mixed meat.

Giacino is not directed to any wheat-based product, but taurine-based reaction mixtures for flavoring compositions. Petitioner fails to explain why a POSA would have been motivated to modify Giacino to “improve” its meat flavor, when the reference itself already achieves a “perfectly well suited” meat flavor

(EX1015, 3:58-63), in view of a reference that seeks to add blood to a meat-based product to recoup flavor lost by its extension with a non-meat-based product. In other words, the references concern two different products directed to two different problems. *Personal Web Tech., LLC v. Apple, Inc.*, 848 F.3d 987 (Fed. Cir. 2017) (Board reversed where no adequate explanation of “*how* the combination of the [obviousness] references was supposed to work”) (original emphasis). Petitioner’s purported reasons for combining the two references fail to account for these differences and Petitioner fails to explain how a POSA would have understood Giacino’s taurine-based flavor composition as having the same problems in relation to flavor as Conrad’s wheat-based extender for mixed meat products that Conrad seeks to solve with blood. Moreover, Petitioner ignores the component differences in the products themselves—one is a flavor additive, the other is a wheat-based filler for minced meat—and fails to explain how a POSA would have understood that any improvement to flavor caused by the addition of blood to one type of product would necessarily occur in the other wholly different product type.

Accordingly, for this reason, Petitioner’s rationale for combining Giacino and Conrad fails to satisfy its burden in establishing a reasonable likelihood of success on the merits.

2. Petitioner's motivation to further combine Giacino and Conrad with Crane is deficient

Petitioner's tortured analysis of the prior art to reach the claimed invention is further highlighted by its reliance on Crane. In particular, Petitioner's grounds rely on an additional step—not only would a POSA seek to add blood to purportedly add additional flavor to Giacino's flavor compositions, the POSA would further be motivated to substitute that blood with an entirely different composition, namely, heme-containing proteins produced recombinantly using the methods disclosed in Crane. *See* Pet., 48-49. In addition to failing to establish Crane was analogous art (*see supra*, section VI.A), Petitioner's alleged reasons for supporting the combination are premised on mischaracterizations and strained readings of the applied references that fail to provide an objective-based rationale supporting a finding of obviousness.

Further, Petitioner's reliance on Crane as supporting the motivation to replace Conrad's blood with recombinant heme-proteins is likewise a hindsight-driven leap that is not supported by the reference. Pet., 48-49. For instance, Petitioner generally points to Crane's disclosure that its recombinant heme proteins are suitable for "commercial applications." Pet., 48 (citing EX1014, Abstract, [0021], [0024]). However, nothing in Crane's general reference to "commercial applications" suggests using its recombinant heme proteins in flavoring compositions for use in food products. EX1014, [0024] (stating generally that

“these proteins are completely functional and are more suitable for research clinical, and commercial applications”); *see also id.*, [0062]-[0063], [0066]; *supra*, section VI.A (noting applications discussed in Crane). Petitioner’s attempt to rely on a general, nondescript reference to “commercial applications” as an untaught reason to use Crane’s recombinant heme proteins in flavor compositions is unsound and unsubstantiated.

Further, Petitioner argues that using Crane’s recombinant heme proteins “would have also been a cost-effective option and would have produced the proteins with a high degree of purity.” Pet., 48. But Crane does not characterize its recombinant heme proteins as “a cost-effective option” in terms of its option as an ingredient in a food flavor additive, especially relative to any cost-effectiveness of Conrad’s blood. Simply because Crane’s heme-proteins can be purified (*e.g.*, for blood transfusions) provides no rationale for combining Crane with Giacino and Conrad. *See Belden*, 805 F.3d at 1073 (Fed. Cir. 2015) (standard is “would have” made the proposed combination, not “could have”).

Petitioner also invokes its conclusory assertion that a POSA “would have also been motivated to use recombinantly sourced heme-containing protein to appeal to individuals who have concerns about environmental, health, and animal welfare impacts of consuming previously live animal products or who otherwise abstain from consuming such animal products.” Pet., 48. Aside from citations to

its expert (who does not even provide this reasoning, *see* EX1003, ¶¶310-11), Petitioner's assertions are unsupported by the references, as none of the references express a motivation to appeal to consumers "who have concerns about environmental, health, and animal welfare impacts of consuming previously live animal products or who otherwise abstain from consuming such animal products." As noted above, Giacino expressly contemplates the use of animal products in its flavor compositions (*see* EX1015, 3:10-12, 3:21-23), Conrad's express purpose is to use its wheat-based extender with actual meat (EX1013, 1:15-18), and Crane is wholly unrelated to food in general (EX1014, Abstract).

Finally, Petitioner argues that a POSA would have been motivated to replace Conrad's blood with Crane's recombinant heme proteins and add it to Giacino's flavor compositions because it would allegedly improve the compositions' nutrition. Pet., 48-49. Petitioner's argument again rest on hindsight and are unsupported and unsubstantiated by the references. Neither Conrad nor Crane discuss any nutritional benefit incurred from the consumption of blood or recombinant heme proteins. And more importantly, Giacino expresses no desire

that its compositions, which are *flavor additives*, are intended to impart any nutritional benefit in the first place.³

Accordingly, for these reasons, Petitioner fails to establish that a POSA would have been motivated to combine Giacino, Conrad, and Crane.

C. Petitioner fails to establish that a POSA would have had a reasonable expectation of success in combining Giacino, Conrad, and Crane

A POSA would not have had a reasonable expectation that combining Giacino, Conrad, and Crane would result in a flavor composition having acceptable organoleptic properties. First, Petitioner’s analysis relies on equating Conrad’s blood—in particular, “the hemoglobin part separated off from blood”—to the recombinant heme proteins for Crane, but, aside from conclusory expert testimony, neither Conrad nor Crane makes this connection. *See* Pet., 45, 47-48. As Petitioner’s expert admits, a POSA would “understand Conrad’s reference to the ‘hemoglobin part’ of blood used in Conrad’s ‘grain meat’/‘wheat meat’ products to

³ Moreover, as discussed below in section VIII, this rationale—adding heme-containing protein for nutritional supplementation—has already been considered. The claims were allowed because the Examiner found no motivation to include heme protein “in combination with the claimed sugars and amino acids to produce meat associated flavors.” EX1002, 1180.

mean *red blood cells*.” EX1003, ¶361 (emphasis added). Petitioner provides no objective evidence or explanation supporting the contention that the recombinantly-produced, isolated heme proteins of Crane would have been viewed as equivalent to the “red blood cells” of Conrad, such that a POSA would have expected the same properties of the latter to occur in the former and that the latter would impart the same effects when added to different products (wheat meat versus flavor composition). *See Motif Foodworks, Inc. v. Impossible Foods Inc.*, IPR2022-00887, Paper 7 at 20 (rejecting Petitioner’s substitution of colorants because “Petitioner does not establish sufficiently that a [POSA] would have had reason to make that substitution or that using different types of colorants for such different products are interchangeable”).

The evidence in the prosecution record also supports the unpredictable effect of heme proteins on flavor and aroma. Citing to the Proulx Thesis (*see* EX1148, 2715, citing to EX2003), Patent Owner emphasized that food products with heme could be adversely affected by off-flavors and rancidity, quoting Proulx’s work as recognizing that “[f]ortification [with] iron has *a potential negative effect on organoleptic quality* of maize products, in that soluble forms of iron can cause *oxidative rancidity*.” EX1148, 2715. Patent Owner submitted numerous declarations, including by Dr. Keith R. Cadwallader, who stated:

This is a significant discovery since a person having ordinary skill in the art would not have anticipated that the inclusion of a heme protein would have any beneficial effect on flavor. In fact, iron, and specifically heme iron, has been most often associated with *causing deleterious off-odor consequences in foods and especially meat products*.

Id., 2715-2716 (emphasis added). Petitioner's own evidence in the record supports this. *See, e.g.*, EX1028, 70 ("In general, total iron was not a good indicator of beef flavor attributes"); *id.* ("[H]eme iron been thought to be a pro-oxidant that may influence meat flavor due to its reaction to produce radicals that can promote lipid oxidation in biological systems."); EX1048, Abstract ("WOF (Warmed-Over Flavor) is catalyzed by the non-heme iron released from meat pigments during cooking."). Later published references, such as EX2013 (Chapter 7 of EX1033 and EX1034 submitted by petitioner) clearly teach that off-flavoring from lipid oxidation is an objectionable flavor in the food industry: "[t]race metals, particularly copper, cobalt, and iron, ***greatly increase the rate of LO*** [lipid oxidation]" and heat treatment of enzymes such as hemoglobin, "results in denaturation of the enzymes, [] free[ing] the iron to greatly enhance its catalytic properties" which is "particularly relevant in the formation of ***warmed-over off-flavor*** in cooked meats. EX2013 (emphasis added). A POSA, thus, would not have had a reasonable expectation of success of combining a heme iron-containing

protein into a meat product without deleterious effects, including off-flavors and off-odors, *see* EX1048, 2716, further emphasizing Petitioner’s hindsight exercise of mapping the prior art onto the ’096 patent claims.

Accordingly, for these reasons, Petitioner fails to establish that a POSA would have been motivated to combine Giacino, Conrad, and Crane with a reasonable expectation of success.

D. Petitioner fails to establish that the combination of Giacino, Conrad, and Crane discloses a food flavor additive composition that “contains no animal products”

Petitioner relies on the same reasoning its advances with respect to Grounds 2A-2B in arguing that the combination of Giacino, Conrad, and Crane disclose a food flavor additive composition that “contains no animal products.” Pet., 50 (incorporating by reference its Ground 2A-2B analysis). Thus, for the same reasons discussed above, Petitioner fails to establish that the combination discloses this element.

E. Petitioner fails to establish that the combination of Giacino, Conrad, and Crane discloses “wherein cooking the food flavor additive composition results in the production of at least two volatile compounds which have a meat-associated aroma”

Petitioner also relies on the same reasoning its advances with respect to Grounds 2A-2B in arguing that the combination of Giacino, Conrad, and Crane disclose a food flavor additive composition that, when cooked, “results in the

production of at least two volatile compounds which have a meat-associated aroma.” Pet., 50.

VII. GROUNDS 4A-4D FAIL

Petitioner’s Grounds 4A-4D swap out Crane for Proulx and largely advance the same combination based on Giacino, Conrad, and Crane in Grounds 3A-3D. However, for these grounds, Petitioner leads with the benefits to “nutritional content” that would allegedly be conferred by the addition of Proulx’s soy leghemoglobin. Pet., 58-59. As discussed above for Grounds 3A-3D, Giacino is directed to the production of *flavor additives* for food products. Nothing in Giacino suggests that the purpose of its flavor additives are also to provide nutritional content to a food product, and Petitioner’s basis for improving the alleged “nutritional content” of an additive that is not designed for that purpose is unsupported and baseless. Moreover, Petitioner’s reliance to Proulx’s alleged teaching regarding the improved bioavailability of heme iron compared to nonheme iron is also inapt as Conrad already includes a heme-containing protein and Petitioner does not explain why a POSA, already seeking to add Conrad’s

blood to improve upon the meat flavor of Giacino’s compositions, would seek to further replace that blood for “improved bioavailability of heme iron.”⁴

Further, Petitioner’s motivation to combine Giacino, Conrad, and Proulx fails for the same reasons discussed above. *See supra*, section VI.B.2. Indeed, Petitioner’s attempt to equate the “meat flavour” of Conrad’s “red blood cells” to Proulx’s “soy leghemoglobin” is even further afield (*see* Pet., 60-61), and Petitioner points to no basis in the references that a POSA would have reasonably expected Proulx’s “soy leghemoglobin” would result in a flavor composition having acceptable organoleptic properties. *See supra*, section VI.C.

Accordingly, for these reasons, Petitioner’s Grounds 4A-4D fail.

VIII. INSTITUTION SHOULD BE DENIED UNDER § 325(D)

Separately, the Board should deny institution under § 325(d) because Petitioner relies on substantially the same prior art or arguments previously

⁴ Moreover, as discussed below, the Examiner expressly considered Proulx’s teachings during prosecution and allowed the claims as it failed to support a motivation to include heme-containing proteins “in combination with the claimed sugars and amino acids to produce meat associated flavors.” *Infra*, section VIII.A.2.

considered by the Office, and Petitioner fails to show that the Office materially erred.

A two-part analysis applies to the Board’s authority to deny institution under § 325(d). *Advanced Bionics, LLC v. Med-El Elektromedizinische Geräte GMBH*, IPR2019-01469, Paper 6 at 9-10 (precedential). First, the Board considers whether “the same or substantially the same” art or arguments were previously presented to the Office. *Id.*, 8. If either is met, the Board then considers whether the petition demonstrates that the Office “erred in a manner material to the patentability of the challenged claims.” *Id.* In applying the two-part framework, the Board considers several nonexclusive factors set forth in *Becton, Dickinson & Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8 at 17-18 (PTAB Dec. 15, 2017) (precedential as to § III.C.5, first paragraph).

A. Petitioner presents substantially the same art and arguments previously considered by the Office

Two references from Petitioner’s grounds (Brown and Proulx) are listed on the face of the ’096 patent, were disclosed in an Information Disclosure Statement (“IDS”), and were considered by the Examiner. EX1001, 3. The Board has held that an IDS citation alone satisfies the first part of the *Advanced Bionics* test. *Husky Injection Molding Sys., Ltd. v. Plastipak Packaging, Inc.*, IPR2020-00438, Paper 24 at 10-11.

The Examiner also substantively evaluated at least Proulx during prosecution. Although the Examiner never cited Proulx in a prior art rejection during prosecution, the Examiner specifically cited Proulx in the reason for allowance, finding the claims patentable over its teachings. EX1002, 1180. In the reason for allowance, the Examiner specifically noted that the '096 claims are patentable because they claim flavor additives that “contain no animal products.” *Id.*, 1180. The Examiner then identified Proulx as disclosing “that hemoglobin from soy root nodules (i.e. non-animal heme-containing protein) is a good source of bioavailable iron and can be used as a food fortificant,” but the Examiner nevertheless found “there is no motivation to include the fortificant, in combination with the claimed sugars and amino acids to produce meat associated flavors.” *Id.*

Each of Petitioner’s grounds rely on a reference that allegedly teaches an isolated heme-containing protein (Brown, Crane, Proulx) and a reference that allegedly teaches a sugar and/or sulfur compound (Giacino) to arrive at the claimed food flavor additive composition that contains “no animal products.” *See Pet.*, 10-12. Petitioner expressly uses this same rationale as motivation to combine Giacino and Conrad with Crane and Proulx, but the Examiner already considered, and rejected, this rationale.

Accordingly, the same arguments that form the basis of Petitioner's grounds have previously been considered by the Office.

B. Petitioner fails to demonstrate that the Office materially erred

Petitioner makes no assertions that the Office materially erred in its consideration of Proulx, only making claims that the Examiner "did not have the benefit of expert testimony." Pet., 70-71. Petitioner's assertion is insufficient to establish material error. *See Advanced Bionics*, Paper 6 at 9 ("If reasonable minds can disagree regarding the purported treatment of the art or arguments, it cannot be said that the Office erred in a manner material to patentability.").

IX. CONCLUSION

Accordingly, for at least the reasons set forth above, institution of *inter partes* review should be *denied*.

Respectfully submitted,

Date: March 20, 2023

/Michael T. Rosato/

Michael T. Rosato, Lead Counsel
Reg. No. 52,182

CERTIFICATE OF COMPLIANCE

Pursuant to §42.24(d), the undersigned certifies that this paper contains no more than 14,000 words, not including the portions of the paper exempted by §42.24(b). According to the word-processing system used to prepare this paper, the paper contains 9,228 words.

Respectfully submitted,

Date: March 20, 2023

/Michael T. Rosato/

Michael T. Rosato, Lead Counsel
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X. APPENDIX

EXHIBIT NO.	DESCRIPTION
2001	Request for Certificate of Correction, Certificate of Correction and Petition to Accept Unintentionally Delayed Benefit Claims Under 37 C.F.R. §§ 1.78(c) and 1.78(e) for US Patent No. 9,700,067 and US Patent No. 10,172,381
2002	Goldfine, “A brief history of Impossible Foods: how ‘bleeding’ plant-based burgers started a food industry trend,” The Business of Business, https://www.businessofbusiness.com/articles/impossible-foods-plant-based-burgers-milk-food-industry-trend-data/ , Last Accessed July 27, 2022
2003	Proulx, “Diversified strategies for improving iron bioavailability of maize” Ph.D. Thesis, Iowa State University, 2007
2004	Declaration of Dr. Keith Cadwallader, excerpt from ’306 patent prosecution file history, submitted October 17, 2017
2005	Declaration of Dr. Celeste Holz-Schietinger (dated December 2, 2016), excerpt from ’306 patent prosecution file history, submitted October 17, 2017
2006	Declaration of Dr. Celeste Holz-Schietinger (dated August 17, 2017), excerpt from ’306 patent prosecution file history, submitted October 17, 2017
2007	Declaration of Dr. Devin Grant Peterson, excerpt from ’306 patent prosecution file history, submitted October 17, 2017

2008	Declaration of Dr. S. Christopher Davis, excerpt from '306 patent prosecution file history, submitted October 17, 2017
2009	Declaration of Dr. David Lipman, excerpt from '306 patent prosecution file history, submitted October 17, 2017
2010	U.S. Patent Publication No. 2012/0093994 to Hseih et al.
2011	Cerny, "Formation of aroma compounds from ribose and cysteine during the Maillard Reaction" <i>J. Agric. Food Chem.</i> 51:2714-2721 (2003)
2012	File History of U.S. Provisional Application 61/671,069 filed on July 12, 2012.
2013	G. Reineccius, Flavor Chemistry and Technology"2 nd Ed., 2006, Chap. 7, " <i>Off-Flavors and Taints in Foods</i> ", p.161-199

CERTIFICATE OF SERVICE

I certify that the foregoing Patent Owner's Preliminary Response and Exhibits 2001-2013 were served on this 20th day of March, 2023, on the Petitioner at the following electronic service addresses:

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