

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MOTIF FOODWORKS, INC.,
Petitioner,

v.

IMPOSSIBLE FOODS INC.,
Patent Owner.

IPR2022-00887
Patent 10,863,761 B2

Before DONNA M. PRAISS, CHRISTOPHER M. KAISER,
and JEFFREY W. ABRAHAM, *Administrative Patent Judges*.

PRAISS, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314

INTRODUCTION

A. Background

Motif Foodworks, Inc. (“Petitioner”) filed a Petition (Paper 1, “Pet.”) requesting an *inter partes* review of claims 1–17 of U.S. Patent No. 10,863,761 B2 (Ex. 1001, “the ’761 patent”). Impossible Foods Inc. (“Patent Owner”) filed a Preliminary Response. Paper 6 (“Prelim. Resp.”).

We have authority to determine whether to institute an *inter partes* review. 35 U.S.C. § 314(b); 37 C.F.R. § 42.4(a) (2020). The standard for instituting an *inter partes* review is set forth in 35 U.S.C. § 314(a), which provides that an *inter partes* review may not be instituted unless “there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.”

After considering the Petition, the Preliminary Response, and the evidence of record, we determine that Petitioner has not demonstrated a reasonable likelihood that it would prevail with respect to at least one challenged claim. Accordingly, we do not institute an *inter partes* review of any challenged claim on any asserted ground.

B. Related Matters

The parties identify as a related matter the litigation *Impossible Foods Inc. v. Motif FoodWorks, Inc.*, Case No. 22-cv-00311 (D. Del.), filed on March 9, 2022, alleging infringement of the ’761 patent. Pet. 4; Paper 5, 1. According to Petitioner, no contentions or claim constructions have been exchanged and no claim construction order has issued in the litigation. Pet. 15.

C. The Asserted Grounds of Unpatentability

Petitioner contends that claims 1–17 of the ’761 patent are unpatentable based on the following grounds (Pet. 19–20):¹

Claim(s) Challenged	35 U.S.C. §²	Reference(s)/Basis
1–11, 13, 14, 16, 17	102	McMindes ³
15	103	McMindes ⁴
1–11, 13–17	103	McMindes, Ljublinskij ⁵
1–11, 13–17	103	McMindes, Sonac ⁶

¹ Petitioner also relies on declarations from Dr. Rodrigo Tarté (Ex. 1006), Sylvia D. Hall-Ellis, Ph.D. (Ex. 1051), and Carl Batt, Ph.D. (Ex. 1052).

² Without the benefit of provisional application No. 61/572,205, which Petitioner disputes (Pet. 14), the ’761 patent has an effective filing date before March 16, 2013. Ex. 1001, code (63). Accordingly, patentability is governed by the versions of 35 U.S.C. §§ 102 and 103 prior to amendment by the Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112–29, 125 Stat. 284 (2011).

³ WO 2006/041966 A1, pub. Apr. 20, 2006 (Ex. 1003).

⁴ Petitioner separately lists knowledge of a person having ordinary skill in the art (“POSITA”), but we do not list it here because the level of ordinary skill in the art plays a significant role in any obviousness analysis 35 U.S.C. § 103. Pet. 19; *see Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966) (“Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined.”); *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (“[T]he level of skill in the art is a prism or lens through which a judge, jury, or the Board views the prior art and the claimed invention.”).

⁵ RU 2274003 C2, pub. Aug. 20, 2005 (Ex. 1004 with certified English language translation).

⁶ Sonac brochure, Harimix proteins: Color enhancement of meat (Ex. 1005). According to the Petition, the company Sonac Loenen B.V.’s line of food colorants called “Harimix proteins” has been publicly available since at least

Claim(s) Challenged	35 U.S.C. § ²	Reference(s)/Basis
12	103	McMindes, Crane, ⁷ Ljublinski, Sonac
12	103	McMindes, Proulx, ⁸ Ljublinski

D. The '761 Patent

The '761 patent, titled “Methods and Compositions for Consumables,” issued on December 15, 2020. Ex. 1001, codes (45), (54). According to the patent, existing meat substitute compositions extrude soy/grain mixtures “which largely fail to replicate the experience of cooking and eating meat.” *Id.* at 1:42–45. The patent describes the common product limitations as “texture and mouthfeel that are more homogenous than that of equivalent meat products.” *Id.* at 1:45–48. Because these products fail to replicate aromas, flavors, and other features associated with cooking meat, the patent states they are largely sold pre-cooked with artificial flavors and aromas built in. *Id.* at 1:48–51. The '761 patent describes the invention as overcoming these shortcomings with “methods and compositions which more accurately replicate the characteristics that consumers value in the preparation and consumption of meat.” *Id.* at 1:56–58.

The '761 patent describes the negative impact of consuming meat on human health and also the negative environmental impact of animal farming as the background for shifting to a vegetarian diet and plant-based meat

as early as January 3, 2008. Pet. 21; Ex. 1006 ¶¶ 154–156; Ex. 1054, 170; Ex. 1051 ¶¶ 242–247.

⁷ US 9,085,766 B2, iss. July 21, 2015 (Ex. 1012).

⁸ Proulx, Amy et al., *Iron Bioavailability of Hemoglobin from Soy Root Nodules Using a Caco-2 Cell Culture Model*, 54 J. AGRIC. FOOD CHEM. 1518–1522 (2006) (Ex. 1009).

substitutes. *Id.* at 1:18–40. Nevertheless, the ’761 patent discloses embodiments in which “the muscle replica and/or meat substitute product comprising the muscle replica” and/or “the fat replica and/or meat substitute product comprising the fat replica are partially derived from animal sources.” Ex. 1001, 25:42–45, 27:17–19.

E. Illustrative Claim

Claims 1–17 of the ’761 patent are challenged. Claim 1, the sole independent claim, is illustrative. We reproduce claim 1 below:

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

Ex. 1001, 49:12–20.

ANALYSIS

A. Level of Ordinary Skill in the Art

Petitioner asserts that a person of ordinary skill in the art (POSITA) “would have a Bachelor of Science degree in food sciences, biology, chemistry, microbiology, or a related discipline” and also “a Master’s degree or Ph.D. in food science or at least three years of experience working as a food scientist.” Pet. 14 (citing Ex. 1006 ¶ 36; Ex. 1052 ¶ 37). Patent Owner does not offer an alternative definition of a POSITA. Accordingly, for the purposes of this Decision, we adopt Petitioner’s proposal regarding the level of one of ordinary skill in the art. The level of ordinary skill in the art is also

reflected by the prior art of record. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001).

B. Claim Construction

Petitioner represents that none of the '761 patent claim terms require construction because they have a plain meaning, and proceeds to provide a POSITA's understanding of the following recitations in claim 1: "muscle replica," "fat tissue replica," and "approximates the physical organization of meat." Pet. 15–18. With regard to "muscle replica," Petitioner states that "a POSITA would understand that it must encompass compositions that mimic at least one muscle property such as color, appearance, or texture before or after cooking." *Id.* at 15 (citing EX1006 ¶¶ 166–167). As to "fat tissue replica," Petitioner notes that the patent describes one embodiment wherein the fat replica is an emulsion. *Id.* at 16–17.

Petitioner also provides a POSITA's understanding of "connective tissue replica" recited in dependent claim 2, stating that "a POSITA would understand that it must encompass compositions that mimic at least one connective tissue property such as texture or appearance before or after cooking." *Id.* at 18 (citing EX 1006 ¶¶ 185–186).

Patent Owner agrees that no construction is required for the claims, but argues that "[a]nimal muscle is not a replica of muscle—it is actual animal muscle," and, therefore, disputes Petitioner's arguments that equate "muscle replica" and "connective tissue replica" with actual muscle and animal meat. Prelim. Resp. 7, 10. Patent Owner also disputes Petitioner's characterization of "fat tissue replica" as a simple oil-in-water emulsion. *Id.* at 9–10.

After considering the parties’ arguments and evidence, discussed in more detail below, we find that we only need to construe the term “muscle replica” and, specifically, “replica,” recited by claim 1 in order to determine whether or not to institute trial. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Matal*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (“we need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

In an *inter partes* review proceeding based on a petition filed on or after November 13, 2018, a patent claim shall be construed using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. § 282(b). 37 C.F.R. § 42.100(b) (as amended Oct. 11, 2018). This rule adopts the same claim construction standard used by Article III federal courts, which follow *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc), and its progeny. Under this standard, the words of a claim are generally given their “ordinary and customary meaning,” which is the meaning the term would have to a person of ordinary skill at the time of the invention, in the context of the entire patent including the specification. *See Phillips*, 415 F.3d at 1312–13. It is the use of the words in the context of the written description and customarily by those skilled in the relevant art that accurately reflects both the “ordinary” and the “customary” meaning of the terms in the claims. *Ferguson Beauregard/Logic Controls, Div. of Dover Res., Inc. v. Mega Sys., LLC*, 350 F.3d 1327, 1338 (Fed. Cir. 2003).

[The claims] are part of a fully integrated written instrument, consisting principally of a specification that concludes with the claims. For that reason, claims must be read in view of the

specification . . . [T]he specification is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.
Phillips, 415 F.3d at 1315 (citations omitted) (internal quotation marks omitted).

As Petitioner indicates, the '761 patent states the “muscle tissue replica approximates the taste, texture or color of an equivalent muscle tissue derived from an animal source.” Ex. 1001, 5:34–36; Pet. 15. The '761 patent describes many meat products comprising a high proportion of striated skeletal muscle in which individual muscle fibers are organized in an isotropic fashion and that replicas may mimic muscle by being “formed into asymmetric fibers” that “replicate muscle fibers” using extrusion and other methods known in the art. Ex. 1001, 25:48–50, 26:44–57; Pet. 15–16. These portions of the '761 patent support Patent Owner’s position that “muscle replica” is not actual muscle because actual muscle tissue is “not a replica” of muscle tissue. Prelim. Resp. 8.

Petitioner directs us to the '761 patent’s disclosure that “[i]n some embodiments, the muscle replica and/or meat substitute product comprising the muscle replica are partially derived from animal sources.” Ex. 1001, 25:42–45; Pet. 16. Petitioner asserts that claim 1 encompasses “replicas made with animal products” because claim 12, which depends from claim 1, recites “wherein said beef replica product contains no animal products.” Ex. 1001, 50:26–28; Pet. 16. However, as Patent Owner points out, the '761 patent discloses components derived from an animal source such as myoglobin, an isolated and purified heme-containing protein. Ex. 1001, 37:30–47, 38:25–32; Prelim. Resp. 8. The '761 patent describes muscle replica being “partially *derived* from animal sources” or “entirely *derived*

from non-animal sources.” Ex. 1001, 25:42–48 (emphasis added). The ’761 patent lists a number of components present in animal muscle tissue that may be included in the muscle replica and specifically describes protein components that are isolated, purified proteins or artificially designed proteins to emulate physical properties of animal muscle tissue. Ex. 1001, 26:59–27:43. Therefore, based on the context of “muscle replica” as used in the ’761 patent written description, the term “muscle replica” may include components derived from animal sources; however, animal muscle tissue itself is not “muscle replica.” As such, a “replica” does not encompass the actual material that it replicates or approximates.

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

To determine whether or not to institute trial, we need not construe any of the remaining terms for which Petitioner proposes a construction. Accordingly, we do not construe any other term expressly. *See Nidec*, 868 F.3d at 1017.

C. Asserted Anticipation by McMindes

Petitioner argues that McMindes anticipates claims 1–11, 13, 14, 16, and 17 of the ’761 patent. Pet. 22–54. Patent Owner disagrees. Prelim. Resp. 11–43.

Among other limitations, claim 1 of the ’761 patent recites “a muscle replica comprising 0.1%–5% of a heme-containing protein, at least one

sugar compound and at least one sulfur compound.” Ex. 1001, 49:13–15. The remaining challenged claims all depend from claim 1. *Id.* at 45:21–49, 50:12–25, 50:29–38, 50:41–47. Accordingly, all of the challenged claims incorporate the limitations of claim 1. 37 C.F.R. § 1.75(c). Therefore, to demonstrate the anticipation of any challenged claim, Petitioner must show that the asserted prior art discloses “a muscle replica comprising 0.1%–5% of a heme-containing protein, at least one sugar compound and at least one sulfur compound.”

Petitioner first argues that McMIndes discloses a “muscle replica” because it discloses elements prepared from “a soy protein material selected from the group consisting of a soy protein flour, a soy protein concentrate, a soy protein isolate and mixtures thereof.” Pet. 24 (quoting Ex. 1003 ¶ 13). Petitioner also asserts that McMIndes teaches “flavor ingredients” are “mixed and extruded with the soy protein material,” and that “McMIndes teaches that ‘the extrudate resembles from a cubic chunk of meat to a steak filet’ and the extrusion process can be adjusted to ‘decrease[] the cubic chunk-like nature of the extrudate and increase[] the filet-like nature of the extrudate.’” *Id.* at 24 (quoting Ex. 1003 ¶¶ 53, 80).

Petitioner separately addresses the claim limitation reciting “comprising 0.1%–5% of a heme-containing protein,” noting that McMIndes “expressly contemplates the use of real meat” in its product, and arguing that beef contains heme-containing proteins myoglobin and hemoglobin. Pet. 25. Petitioner’s contention that McMIndes anticipates this limitation is based on calculations of heme-protein percentages derived using an exemplary product in McMIndes’s disclosure containing “up to 50% of a meat” and 50% non-meat material. Pet. 26; Ex. 1003 ¶¶ 2, 108, 109, 115. Petitioner’s

Figure A below depicts the McMIndes product that is relied upon for this limitation, which Petitioner refers to as McMIndes’s “hybrid product.” Pet. 26.

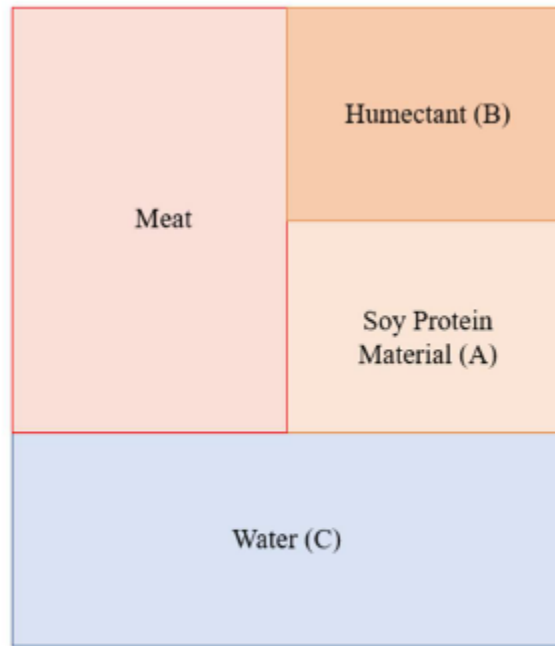


Figure A

Figure A above shows the proportions of a soy protein material (A), a humectant (B), water (C), and McMIndes’s meat component in a proportion that equals components A and B combined. Pet. 23. Petitioner contends a person of ordinary skill in the art would have been able to calculate the myoglobin weight percent in McMIndes’s hybrid product, and would have determined that the myoglobin percentage range in the McMIndes hybrid product “*falls entirely within* the claimed heme-protein range.” *Id.* at 27–32; Ex. 1006 ¶¶ 232, 233, 248 (“The myoglobin is contained in the lean muscle portion of the beef.”). Petitioner relies on McMIndes’s flavor ingredients to meet the sugar and sulfur compounds required by claim 1. Pet. 32–34; Ex. 1006 ¶ 257.

“A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros., Inc. v. Union Oil Co. of Cal.*, 814 F.2d 628, 631 (Fed. Cir. 1987). “Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.” *In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999) (citations omitted); *see PAR Pharm., Inc. v. TWI Pharms., Inc.*, 773 F.3d 1186, 1195–96 (Fed. Cir. 2014) (inherency “may not be established by probabilities or possibilities.”). In addition, a prior art reference “must not only disclose all elements of the claim within the four corners of the document, but must also disclose those elements ‘arranged as in the claim’” in order to anticipate under 35 U.S.C. § 102. *NetMoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1369 (Fed. Cir. 2008) (quoting *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1548 (Fed. Cir. 1983)).

After considering Petitioner’s arguments, we determine Petitioner has not established that McMIndes discloses a “a muscle replica comprising 0.1%–5% of a heme-containing protein, at least one sugar compound and at least one sulfur compound” as claim 1 requires. Petitioner attempts to separate this claim limitation into two parts, first addressing “muscle replica” and then addressing “comprising 0.1%-5% of a heme-containing protein.” For “muscle replica,” Petitioner directs us to the portions of McMIndes disclosing materials prepared from soy. For “comprising 0.1%-5% of a heme-containing protein,” however, Petitioner relies on something different, namely McMIndes’s hybrid product.

Claim 1 requires that the muscle replica itself comprises 0.1%-5% of a heme-containing protein. Petitioner does not direct us to any disclosure in McMIndes demonstrating that the soy-based material corresponding to the claimed “muscle replica” comprises heme-containing protein at all, let alone the claimed range. Instead, Petitioner’s argument that McMIndes meets claim 1’s requirement that the “muscle replica compris[e] 0.1%–5% of a heme-containing protein” depends on a product that contains 50% actual beef, not merely some component derived from actual beef, combined with McMIndes’s non-meat composition. Pet. 25–28.

For the reasons discussed above, we determine claim 1’s “muscle replica” does not encompass animal tissue itself. Petitioner, however, relies on a product that contains animal tissue itself to demonstrate that its muscle replica comprises 0.1%-5% of a heme-containing protein. As a result, Petitioner has not adequately established McMIndes discloses “a muscle replica comprising 0.1%–5% of a heme-containing protein, at least one sugar compound and at least one sulfur compound” as claim 1 requires. Moreover, Petitioner’s attempt to address separately “muscle replica” and “comprising 0.1%-5% of a heme-containing protein” is unavailing, as it effectively rewrites the claim language.

To the extent that Petitioner contends it relies on McMIndes’s optional meat-free embodiment for disclosing “a muscle replica,” Petitioner does not adequately identify the embodiment relied upon nor explain how that embodiment meets claim 1’s requirement that the muscle replica comprise “0.1%–5% of a heme-containing protein, at least one sugar compound and at least one sulfur compound.” *See* Pet. 23 (describing McMIndes’s product shown in Petitioner’s Figure A as including “meat (optionally)”; *id.* at 24

(describing McMindes’s disclosure as providing “multiple elements that mimic one or more muscle properties” including McMindes’s “soy protein material selected from the group consisting of a soy protein flour, a soy protein concentrate, a soy protein isolate and mixtures thereof.”).

Thus, Petitioner has not established a reasonable likelihood of prevailing in showing McMindes anticipates claims 1–11, 13, 14, 16, and 17.

D. Asserted Obviousness Based on McMindes

Petitioner argues that claims 1–17 of the ’761 patent would have been unpatentable as obvious over McMindes alone or in combination with various secondary references. Pet. 54–73. Patent Owner disagrees. Prelim. Resp. 43–54.

Among other limitations, claim 1 of the ’761 patent recites “a muscle replica comprising 0.1%–5% of a heme-containing protein, at least one sugar compound and at least one sulfur compound.” Ex. 1001, 49:13–15. The remaining claims challenged under 35 U.S.C. § 103 (claims 2–17) all depend from claim 1. *Id.* at 49:21–50:47. Accordingly, all of the challenged claims incorporate the limitations of claim 1. 37 C.F.R. § 1.75(c). Therefore, to show the obviousness of any challenged claim, Petitioner must show that the asserted prior art teaches or suggests “a muscle replica comprising 0.1%–5% of a heme-containing protein, at least one sugar compound and at least one sulfur compound.” Ex. 1001, 49:13–15. We separately address each of Petitioner’s obviousness challenges below as to this claim limitation.

1. Obviousness of Claim 15 over McMindes

Claim 15 depends from claim 1 and recites “wherein said plant protein is an oil body protein.” Ex. 1001, 50:39–40. Petitioner contends a

POSITA would have recognized the value of an oil body protein as an emulsification promoter and would have been motivated to use them in foodstuffs such as McMIndes's product. Pet. 54–55.

Petitioner relies solely on McMIndes for the limitations recited in claim 1. *Id.* at 54 (referring back to Petitioner's anticipation by McMIndes argument for the limitations of claim 1). For the reasons discussed above, we construe "muscle replica" as "a composition approximating the taste, texture or color of an equivalent muscle tissue derived from an animal source; the muscle replica may include components derived from an animal source, but does not include muscle tissue itself." Because Petitioner has not established that McMIndes discloses a "muscle replica," as construed herein, that comprises "0.1%–5% of a heme-containing protein, at least one sugar compound and at least one sulfur compound" as recited in claim 1, Petitioner has not established a reasonable likelihood of prevailing in showing claim 15 would have been obvious over McMIndes.

2. *Obviousness of Claim 1 over McMIndes and Ljublinskij*

Petitioner argues that claim 1 of the '761 patent would have been unpatentable as obvious over McMIndes in combination with Ljublinskij, and that dependent claims 2–11 and 13–17 would have been obvious over the combination for the same reasons provided in the anticipation analysis of claims 2–11, 13–14, and 16–17, and the obviousness analysis of claim 15. Pet. 56–63.

Petitioner first refers back to its anticipation argument that McMIndes discloses a "muscle replica" because it discloses elements prepared from "a soy protein material selected from the group consisting of a soy protein flour, a soy protein concentrate, a soy protein isolate and mixtures thereof."

Id. at 56; *see id.* at 24 (quoting Ex. 1003 ¶ 13). Petitioner also refers back to its assertion that McMIndes teaches flavor ingredients are mixed and extruded with the soy protein material, which flavor ingredients Petitioner argues encompass the claimed “sugar compound” and “sulfur compound,” and which extrudate Petitioner asserts resembles meat. *Id.* at 63; *see id.* at 24 (citing Ex. 1003 ¶¶ 53, 80).

Petitioner again separately addresses claim 1’s recitation “comprising 0.1%–5% of a heme-containing protein,” arguing first that McMIndes’s hybrid product “contains only some of the heme-containing proteins present in the same amount of natural meat” and “[b]ecause Ljublinskij teaches that 2.4%–4.0% of hemoglobin is an effective fortificant, a POSITA would be motivated to incorporate Ljublinskij’s hemoglobin at a concentration within the claimed range to improve the nutritional profile of McMIndes’s product.” Pet. 58 (citing Ex. 1003 ¶¶ 4, 8, 12; Ex. 1004, 14:21–15:5, 6:36–40; Ex. 1006 ¶¶ 368, 370–371). This argument, however, suffers from the same deficiency described above, as it relies on supplementing the heme-containing proteins in the hybrid product in McMIndes with hemoglobin from Ljublinskij. As a result, the proposed combination relies on a product that contains animal tissue itself to demonstrate that its muscle replica comprises 0.1%–5% of a heme-containing protein.

Petitioner does state that “[a] POSITA would understand Ljublinskij’s hemoglobin could be used in meat replicas that are either hybrid meat-plant products *or purely plant-based products* in order to achieve a concentration of heme-protein equivalent to natural muscle and hence the corresponding color of such meat.” Pet. 59 (citing Ex. 1006 ¶ 369) (emphasis added). Although the reference to “purely plant-based products” may refer to

animal-free embodiments in McMIndes, Petitioner does not clearly articulate that it is relying on an embodiment of McMIndes that does not contain any animal tissue in combination with hemoglobins from Ljublinksij as corresponding to the claimed muscle replica. Petitioner's failure to clearly articulate its challenge violates our rules, and is inadequate to satisfy Petitioner's burden on institution. *See* 37 C.F.R. § 42.104(b)(4) (requiring, *inter alia*, that "[t]he petition must specify where each element of the claim is found in the prior art patents or printed publications relied upon").

To the extent that Petitioner is relying on a combination that includes an entirely animal-free embodiment of McMIndes, Petitioner contends that "a POSITA would be motivated to incorporate Ljublinskij's hemoglobin at a concentration between 0.1–5.0%, precisely as claimed in the '761 patent" to attain desirable coloration of the McMIndes product. Pet. 59.

This argument is not persuasive, as Petitioner relies on the '761 patent itself for the exact amount of heme protein that a person of ordinary skill in the art would have incorporated into McMIndes's animal-free product to achieve a desirable color. Pet. 59 (citing Ex. 1001, 34:50–55, 37:24–26). In this regard, we agree with Patent Owner that Petitioner's suggested motivation to combine McMIndes and Ljublinskij is guided by improper hindsight. *See* Prelim. Resp. 45–46.

We recognize Petitioner's assertion that "McMIndes's 'preferred' concentration of colorant is 'between 0.1% to 5%.'" Pet. 59 (citing Ex. 1003 ¶ 91). This statement in McMIndes, however, refers to the concentration of colorants such as caramel color and other food dyes, and McMIndes provides great detail for coloring a soy protein containing food product, including the use of carmine as "an internal color" and caramel as "the

external color” to achieve contrasting red and brown coloring. Ex. 1003 ¶¶ 86–91. Petitioner asserts a person of ordinary skill in the art would substitute Ljublinskij’s hemoglobin for these colorants because it purportedly provides “a more natural meat-like coloring than these ingredients,” but Petitioner does not direct us to evidence demonstrating that the use of hemoglobin achieves this result. Pet. 60. Petitioner cites to paragraph 372 of the Tarté Declaration to support its assertion, but that paragraph parrots the language in the Petition, and Dr. Tarté does not provide the underlying facts supporting his testimony. *See* 37 C.F.R. § 42.65(a) (“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.”). Thus, we find Petitioner does not provide adequate support for its assertions regarding the substitution of Ljublinskij’s hemoglobin for the colorants of McMindes at all, let alone in the amounts recited in claim 1.

In addition, Petitioner’s attempt to address separately “muscle replica” and “comprising 0.1%-5% of a heme-containing protein” is unavailing, as it effectively rewrites the claim language.

Accordingly, Petitioner has not established a reasonable likelihood of prevailing in showing claim 1, as well as its dependent claims, would have been obvious over McMindes in combination with Ljublinskij.

3. *Obviousness of Claim 1 over McMindes and Sonac*

Petitioner argues that claims 1–11 and 13–17 of the ’761 patent would have been unpatentable as obvious over McMindes in combination with Sonac, and that dependent claims 2–11 and 13–17 would have been obvious over the combination for the same reasons provided in the anticipation

analysis of claims 2–11, 13–14, and 16–17, and the obviousness analysis of claim 15. Pet. 63–65.

Petitioner again refers back to its anticipation argument that McMIndes discloses a “muscle replica” because it discloses elements prepared from “a soy protein material selected from the group consisting of a soy protein flour, a soy protein concentrate, a soy protein isolate and mixtures thereof.” *Id.* at 63; *see id.* at 24 (quoting Ex. 1003 ¶ 13). Petitioner also refers back to its assertion that McMIndes teaches flavor ingredients are mixed and extruded with the soy protein material, which flavor ingredients Petitioner argues encompass the claimed “sugar compound” and “sulfur compound,” and which extrudate Petitioner asserts resembles meat. *Id.* at 65; *see id.* at 24 (citing Ex. 1003 ¶¶ 53, 80). Petitioner again separately addresses claim 1’s recitation “comprising 0.1%–5% of a heme-containing protein” asserting that Sonac teaches adding a heme-containing protein (hemoglobin) as a colorant to meat products. Pet. 63.

For the combination of Sonac and McMIndes, Petitioner relies on the same arguments presented above regarding the combination of Ljublinskij with McMIndes. Pet. 64. Specifically, Petitioner contends “[f]or the same reasons provided regarding Ljublinskij for coloration . . . a POSITA would be motivated to use Sonac’s Harimix colorants to achieve 0.1%–5% of a heme-containing protein in McMIndes’s beef replica to achieve real meat coloration.” Pet. 64 (citing Ex. 1006 ¶¶ 386, 388–392). Petitioner asserts that a POSITA would understand that a higher concentration of Harimix colorants than Sonac teaches “could be used to achieve the desired coloration in products that are meat-free or are only part meat.” *Id.* (citing Ex. 1006 ¶ 393). For the same reasons discussed, above, Petitioner’s

obviousness argument does not sufficiently explain what portions of McMIndes's disclosure would have been modified by a POSITA and how those portions would have been modified to form a "muscle replica" as required by claim 1.

To the extent Petitioner's argument relies on McMIndes's hybrid product containing meat, Petitioner has not established that McMIndes discloses a "muscle replica comprising 0.1%–5% of a heme-containing protein, at least one sugar compound and at least one sulfur compound" as construed herein. To the extent that Petitioner's argument relies on substituting Sonac's colorant for meat with McMIndes's colorants for a non-meat containing product, Petitioner does not establish sufficiently that a person of ordinary skill in the art would have had reason to make that substitution or that using different types of colorants for such different products are interchangeable. We recognize Petitioner's assertion that Sonac teaches that Harimix gives meat products a "natural color," but there is insufficient evidence to support a determination that the substitution would result in "better meat-like coloring" than those used in McMIndes. Pet. 63–64 (citing Ex. 1003 ¶ 388). At best, Dr. Tarté's testimony demonstrates Harimix provides a "meat color," whereas carmine (used in McMIndes) produces a "red/pink" color. Ex. 1003 ¶ 388. But Dr. Tarté does not explain sufficiently why one color is better than another, or address the fact that McMIndes does not use only carmine as its colorant.

Accordingly, Petitioner has not established a reasonable likelihood of prevailing in showing claim 1, as well as its dependent claims, would have been obvious over McMIndes in combination with Sonac.

4. *Obviousness of Claim 12 over McMindes and Crane and either Ljublinskij or Sonac*

Petitioner argues that claim 12 of the '761 patent would have been unpatentable as obvious over McMindes in combination with Crane and either Ljublinskij or Sonac. Pet. 65–70. Claim 12 depends from claim 1 and recites “wherein said beef replica product contains no animal products and less than 5% carbohydrates.” Ex. 1001, 50:26–28.

Petitioner contends the only animal products in McMindes’s hybrid product, Ljublinskij’s iron deficiency treatment, and Sonac’s colorant are heme-containing proteins, which a POSITA would understand are readily available from non-animal sources. Pet. 66. Petitioner relies on Crane’s disclosure of recombinantly overexpressed heme proteins as a non-animal source of hemoglobin, myoglobin, and leghemoglobin. *Id.* at 66–67; Ex. 1012, 4:27–29, 4:33–41, 5:44–49; Ex. 1052 ¶¶ 142, 144. Petitioner contends a POSITA would have been motivated to color or fortify McMindes’s meat-free product using globins such as hemoglobin derived from non-animal sources because Ljublinskij and Sonac teach adding hemoglobin for nutritive and/or coloration and McMindes discloses its products can be free of animal products for people who avoid meat products. *Id.* at 68–69.

It is not entirely clear whether, for this combination, Petitioner relies on McMindes’s hybrid product to teach or suggest the limitations of the challenged claims that recite “muscle replica.” Pet. 66 (referring back to Petitioner’s preceding anticipation and obviousness grounds for the elements of claim 1). To the extent that Petitioner does, because Petitioner relies on McMindes’s hybrid product that contains actual meat as disclosing the heme-containing proteins recited in claim 1, we determine McMindes does

not disclose the claimed “muscle replica comprising 0.1%–5% of a heme-containing protein, at least one sugar compound and at least one sulfur compound” for the reasons discussed above, and Petitioner’s arguments stemming from that premise likewise fail to establish a reasonable likelihood of prevailing in showing dependent claim 12 would have been obvious over McMIndes.

To the extent Petitioner relies on using either Ljublinskij’s or Sonac’s colorants to achieve 0.1%-5% of a heme-containing protein in McMIndes’s meat-free embodiment, we determine Petitioner’s obviousness analysis remains deficient for the reasons discussed above. Petitioner’s arguments regarding Crane do not cure the deficiencies discussed above, as Petitioner does not rely on Crane as disclosing the amount of heme-containing protein claim 1 requires. *See, e.g.*, Pet. 66–68 (relying on Crane for its disclosure of the source of its proteins, not its disclosure of an amount of protein).

Accordingly, Petitioner has not established a reasonable likelihood of prevailing in showing claim 12 would have been obvious over McMIndes in combination with Crane and either Ljublinskij or Sonac.

5. *Obviousness of Claim 12 over McMIndes, Proulx, and Ljublinskij*

Petitioner argues that claim 12 of the ’761 patent would have been unpatentable as obvious over McMIndes in combination with Proulx and Ljublinskij. Pet. 70–73. Claim 12 depends from claim 1 and recites “wherein said beef replica product contains no animal products and less than 5% carbohydrates.” Ex. 1001, 50:26–28.

Petitioner relies on Proulx’s disclosure to fortify food with iron to improve the iron content of foods and particularly the use of plant

leghemoglobin to fortify food based on its “similar bioavailability” with bovine hemoglobin. Proulx, 1518, Abstract; Pet. 70–71. Petitioner contends McMIndes would motivate a POSITA to create an improved beef replica by enriching the product with Ljublinskij’s hemoglobin within the claimed range and that a POSITA would be motivated to achieve Ljublinskij’s fortification levels in McMIndes’s meat-free product using functionally similar heme-containing proteins derived from non-animal sources as taught by Proulx. Pet. 71–72 (citing Ex. 1006 ¶¶ 422, 423; Ex. 1003 ¶ 113; Ex. 1009, 1518, 1521).

It is not entirely clear whether, for this combination, Petitioner still relies on McMIndes’s hybrid product to teach or suggest the limitations of the challenged claims that recite “muscle replica.” Pet. 70 (referring back to Petitioner’s preceding anticipation and obviousness grounds for the elements of claim 1). To the extent that Petitioner does, because McMIndes’s hybrid product does not disclose the claimed “muscle replica comprising 0.1%–5% of a heme-containing protein, at least one sugar compound and at least one sulfur compound” for the reasons discussed above, Petitioner’s arguments stemming from that premise likewise fail to establish a reasonable likelihood of prevailing in showing dependent claim 12 would have been obvious over McMIndes.

To the extent Petitioner relies on using Ljublinskij’s colorants to achieve 0.1–5% of a heme-containing protein in McMIndes’s animal-free embodiment, we determine Petitioner’s obviousness analysis remains deficient for the reasons discussed above. Petitioner’s arguments regarding Proulx do not cure the deficiencies discussed above, as Petitioner does not rely on Proulx as disclosing the amount of heme-containing protein claim 1

requires. *See, e.g.*, Pet. 70–71 (relying on Proulx for its disclosure of the source of its proteins, not its disclosure of an amount of protein).

Accordingly, Petitioner has not established a reasonable likelihood of prevailing in showing claim 12 would have been obvious over McMIndes in combination with Proulx and Ljublinskij.

E. Discretionary Denial

Patent Owner argues that we should exercise our discretion under 35 U.S.C. § 325(d) to deny institution under *Advanced Bionics, LLC v. MED-EL Elektromedizinische Gerate GmbH*, IPR2019-01469, Paper 6 (PTAB Feb. 13, 2020) (precedential). Prelim. Resp. 54. Patent Owner points out that the U.S. counterpart to McMIndes (US 2006/0035003, pub. Feb. 16, 2006), which forms the primary basis for every one of Petitioner’s challenges, was not only considered by the Examiner and cited on the ’761 patent itself, but used in the Examiner’s search strategy for finding relevant prior art references. *Id.* at 56–57; Ex. 2001, 1695–1698, 2366; Ex. 1002, 3021, 3133–37. Patent Owner asserts that the Examiner continued to consider McMIndes irrelevant to the claims after further limitations including a specific heme-containing protein content, yet Petitioner asserts material error in a perfunctory way that fails to take this into account. *Id.* at 58 (citing Pet. 78). Patent Owner also asserts that Petitioner’s obviousness grounds are a “re-hash of the same rationale to combine Proulx with Van den Briel advanced by the Examiner.” *Id.* at 60. Because we deny institution based on the merits of Petitioner’s unpatentability arguments, however, we need not decide whether to exercise discretion to deny institution.

CONCLUSION

Upon consideration of the Petition, the Preliminary Response, and the evidence presented, we determine that Petitioner has not shown a reasonable likelihood that it will prevail in showing that at least one of the challenged claims is unpatentable. Accordingly, we do not institute an *inter partes* review of any challenged claim based on any ground asserted in the Petition.

ORDER

It is hereby

ORDERED that, pursuant to 35 U.S.C. § 314, the Petition is denied, and no *inter partes* review is instituted.

IPR2022-00887
Patent 10,863,761 B2

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