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Paper 43
Date: April 26, 2023

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FLORIDA FOOD PRODUCTS, LLC,
Petitioner,

v.

KERRY GROUP SERVICES INT'L LTD.,
Patent Owner.

IPR2022-00006
Patent 11,071,304 B2

Before CHRISTOPHER L. CRUMBLEY, CHRISTOPHER M. KAISER, and JULIA HEANEY, Administrative Patent Judges.

CRUMBLEY, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

Florida Food Products, LLC ("FFP") filed a Corrected Petition (Paper 12, "Pet.") requesting the Board institute an *inter partes* review of claims 1–5 of U.S. Patent No. 11,071,304 B2 (Ex. 1001, "the '304 patent"). Kerry Group Services International Ltd. ("Kerry"), which identified itself as the owner of the '304 patent, filed a Preliminary Response to the Petition. Paper 17. We subsequently granted authorization for FFP to file a limited Reply to the Preliminary Response (Paper 20), followed by a Sur-Reply from Kerry (Paper 23).

Upon consideration of the Petition and the evidence, we determined that FFP had demonstrated a reasonable likelihood that it would prevail with respect to at least one claim of the '304 patent. Paper 26 ("Decision on Institution" or "DI"). Pursuant to the Supreme Court's decision in *SAS Institute Inc. v. Iancu*, 138 S. Ct. 1348, 1355 (2018), and USPTO Guidance,[1] we instituted review of all challenged claims on all asserted grounds. *Id*.

Following institution of trial, Kerry filed a Patent Owner Response (Paper 31, "PO Resp."), FFP filed a Reply (Paper 33, "Reply"), and Kerry filed a Sur-reply (Paper 34, "Sur-reply").

In support of their respective positions, FFP relies on the testimony of Steven W. Baldwin, Ph.D. (Ex. 1002, "Baldwin Declaration") and Kerry relies on the testimony of Andrew L. Milkowski, Ph.D. (Ex. 2001, "Milkowski Declaration"; Ex. 2014, "Second Milkowski Declaration").

[1] "If the PTAB institutes a trial, the PTAB will institute on all challenges raised in the petition." *See* USPTO, Guidance on the Impact of SAS on AIA Trial Proceedings (April 26, 2018) (available at https://www.uspto.gov/patents-application-process/patent-trial-and-appeal-board/trials/guidance-impact-sas-aia-trial) ("USPTO Guidance").

Kerry took cross-examination testimony of Dr. Baldwin via deposition and submitted the transcript (Ex. 2015); FFP did the same with Dr. Milkowski (Ex. 1037).

An oral hearing was held on January 24, 2023, and a transcript of the hearing is included in the record (Paper 42, "Tr.").

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons discussed below, we determine that FFP has shown by a preponderance of the evidence that claims 1–5 of the '304 patent are unpatentable.

A. Related Proceedings

The parties have not indicated any related administrative or judicial proceedings involving the '304 patent, but do discuss the Board's previous decision in an appeal (Appeal 2020-006388) involving the application that issued as the '304 patent. Pet. 66–67; Paper 17.

B. The '304 Patent

The '304 patent, entitled "Method and Composition for Preparing Cured Meat Products," issued July 27, 2021, with claims 1–5. Ex. 1001, codes (54), (45), 12:30–61. The '304 patent describes a curing agent comprising a plant-based nitrite, prepared using an organism capable of converting the naturally-occurring nitrates in a plant material into nitrites. *Id*. at code (57). The patent also describes curing or preserving meat using this curing agent. *Id*.

According to the '304 patent, methods of curing or preserving meat, including by treating the meat with nitrite, have been practiced for many years. *Id*. at 1:4–9. In one such method, nitrate-containing substances are

applied to meat, and then bacteria or other organisms convert the nitrate to nitrite. *Id*. at 1:9–14. The '304 patent discloses that the presence of nitrite gives the meat a distinct color and flavor, but existing methods presented several problems including the processing time required for the organisms to convert the nitrate to nitrite after contacting the curing agent to the meat. *Id*. at 1:15–24. The '304 patent proposes a solution in which the curing agent is prepared outside the meat curing process, so as to speed up the process and simplify the number of steps involved. *Id*. at 1:34–44.

The particular curing agent described in the '304 patent is substantially free of non-natural nitrate or nitrite, meaning there is no nitrate or nitrite artificially added to the plant material. *Id*. at 2:58–64. Preferably, the plant material is a plant derivative that contains at least about 50 ppm nitrate, such as celery. *Id*. at 2:14–19. The plant derivative can then be subjected to additional steps, including heat treatment or sterilization that reduces the naturally-occurring microbial load. *Id*. at 3:5–8. Organisms capable of converting nitrate to nitrite, such as preferably *S. carnosus*, are added to the plant material, after which fermentation is conducted at any suitable temperature. *Id*. at 3:15–52. Once a predetermined nitrite level is reached in the curing agent, the organisms can be inactivated using known methods such as pasteurization, after which the curing agent can be stored or used to cure meat. *Id*. at 4:38–49.

C. Challenged Claims

FFP challenged the patentability of claims 1–5 of the '304 patent. Pet. 29. Claims 1 and 5 are independent; claim 1 is illustrative and reads as follows, with line breaks added for readability:

> 1. A process for preserving a meat or meat product comprising
>
> contacting the meat or meat product to be preserved with a curing agent comprising a plant-based nitrite and an added organism,
>
> the plant-based nitrite being derived from a plant material comprising at least about 50 ppm nitrate and the organism,
>
> wherein the plant material is heat treated prior to addition of the organism so as to have a reduced microbial load relative to a naturally occurring microbial load of the plant material,
>
> the organism inactivated, wherein the organism was capable of converting nitrate to nitrite before the inactivation, and
>
> preserving the contacted meat or meat product.

Ex. 1001, 12:31–44. Claim 5 is similar to claim 1, but is directed to a cured meat product having been treated with a curing agent according to the process of claim 1. *Id*. at 12:52–61.

D. Prior Art and Asserted Grounds of Unpatentability

FFP contends that the challenged claims are unpatentable based on the following grounds, each asserted under 35 U.S.C. § 103(a):[2]

Claim(s) Challenged	**References**
1–5	Voorde,[3] Hara[4]

[2] The Leahy-Smith America Invents Act ("AIA") includes revisions to 35 U.S.C. §§ 102, 103 that became effective on Mar. 16, 2013. Pub. L. No. 112–29, §§ 3(b), 3(c), 3(n)(1), 125 Stat. 284, 287, 293 (2011). Because the '304 patent claims priority to a provisional application filed June 11, 2007, we apply the pre-AIA version of § 103 to this Decision.

[3] Belgian Patent Application Publication No. 1014557A6 to Van de Voorde et al., granted December 2, 2003. An English translation of Voorde was submitted as Exhibit 1003.

[4] U.S. Patent No. 3,911,146 to Hara et al., issued October 7, 1975 (Ex. 1023).

Claim(s) Challenged	References
1, 4, 5	Fast,[5] Voorde, Yamamoto[6]
2	Fast, Voorde, Yamamoto, Stumpf[7]
3	Fast, Voorde, Yamamoto, Kurihara[8]

Pet. 29. FFP contends that Voorde, Fast, Yamamoto, and Kurihara are prior art to the '304 patent under 35 U.S.C. §§ 102(a) and (b), while Hara and Stumpf are prior art under §§ 102(a), (b), or (e). *Id*. at 30. Kerry did not argue that any of the asserted references are not prior art to the '304 patent. We determine, based on the entirety of the trial record, that all references listed above are prior art to the '304 patent.

II. ANALYSIS

A. Legal Standards

To prevail in its challenge, Petitioner must demonstrate by a preponderance of the evidence that the claims are unpatentable. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d) (2019). A claim is unpatentable under 35 U.S.C. § 103 if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time of the invention to a person having ordinary skill in the

[5] European Patent Application Publication EP 0805205 A1 to Fast et al., published November 5, 1997 (Ex. 1019).

[6] Japanese Unexamined Patent Application Publication No. 2001/352935 to Yamamoto, published December 25, 2001. An English translation of Yamamoto was submitted as Exhibit 1024.

[7] U.S. Patent No. 4,806,373 to Stumpf et al., issued February 21, 1989 (Ex. 1025).

[8] Japanese Unexamined Patent Application Publication No. 48-82054 to Kurihara et al., published November 2, 1973. An English translation of Kurihara was submitted as Exhibit 1018.

art. *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in evidence,[9] objective indicia of obviousness or non-obviousness, such as commercial success, long-felt but unsolved needs, and failure of others. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

To show obviousness, it is not enough to merely show that the prior art includes separate references covering each separate limitation in a challenged claim. *Unigene Labs., Inc. v. Apotex, Inc.*, 655 F.3d 1352, 1360 (Fed. Cir. 2011). "This is so because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known." *KSR*, 550 U.S. at 418–419.

On the other hand, an obviousness analysis "need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *Id*. at 418; *accord In re Translogic Tech., Inc.*, 504 F.3d 1249, 1259 (Fed. Cir. 2007). However, a petitioner cannot satisfy its burden of proving obviousness by employing "mere conclusory statements." *In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016). Instead, a petitioner must articulate a reason why a person of ordinary skill in the art would have combined or modified the prior

[9] Neither party has submitted any evidence of objective indicia of obviousness or non-obviousness.

art references. *In re NuVasive, Inc.*, 842 F.3d 1376, 1382 (Fed. Cir. 2016); *see also Metalcraft of Mayville, Inc. v. The Toro Co.*, 848 F.3d 1358, 1366 (Fed. Cir. 2017) ("In determining whether there would have been a motivation to combine prior art references to arrive at the claimed invention, it is insufficient to simply conclude the combination would have been obvious without identifying any reason why a person of skill in the art would have made the combination."); *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015) ("[O]bviousness concerns whether a skilled artisan 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.") (citing *InTouch Techs., Inc. v. VGO Commc'ns, Inc.*, 751 F.3d 1327, 1352 (Fed. Cir. 2014)).

B. Level of Ordinary Skill in the Art

The level of skill in the art is a factual determination that provides a primary guarantee of objectivity in an obviousness analysis. *See Al-Site Corp. v. VSI Int'l, Inc.*, 174 F.3d 1308, 1323 (Fed. Cir. 1999) (citing *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966)). The level of skill in the art also informs the claim-construction analysis. *See Teva Pharm. USA, Inc. v. Sandoz, Inc.*, 574 U.S. 318, 332 (2015) (explaining that claim construction seeks the meaning "a skilled artisan would ascribe" to the claim term "in the context of the specific patent claim" (emphasis omitted)).

FFP contends that a person of ordinary skill in the art at the time of the invention would have had:

> a master's or doctorate degree in food science, biology, chemistry, or a similar field; or a bachelor's degree in food science, biology, chemistry, or a similar field along with at least 2-3 years of experience in food preservatives generally or more specifically 2-3 years of experience in the chemistry associated

> with food preservation and nitrates/nitrites [and] would have known that the USDA regulated nitrites for curing meat and would have been able to find these USDA regulations affecting meat products.

Pet. 23–34 (citing Ex. 1002 ¶ 48).

Kerry's recitation of the level of ordinary skill in the art is nearly identical. Prelim. Resp. 13–14 (citing Ex. 2001 ¶¶ 43–44). To the extent the parties' formulations of the level of skill differ, the differences do not appear to be material to any dispute between the parties or any issue of patentability that we must resolve. We determine that the level of ordinary skill the parties propose is consistent with the challenged patent and the asserted art, and adopt that level for purposes of this Decision.

C. Claim Construction

In an *inter partes* review filed on or after November 13, 2018, we construe claims "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), including construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent." 37 C.F.R. § 42.100(b); *see Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). Furthermore, we expressly construe the claims only to the extent necessary to resolve the parties' dispute. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Ltd.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) ("[W]e 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 the Petition, FFP addressed the construction of only one claim phrase, but also submitted that the construction of that phrase does not affect our decision in this case. Pet. 24. Specifically, FFP asked us to adopt a construction that "clarifies that the nitrite results from the added organism reducing the plant nitrate." *Id*. at 25. Kerry does not address this construction, and we agree with FFP that construction of that claim phrase has no effect on our decision herein. Thus, we need not adopt it. *See Nidec*, 868 F.3d at 1017; *Vivid Techs.*, 200 F.3d at 803.

At institution, we noted Kerry's argument that claim 1 is a method claim that contains a "nested" product-by-process element. DI 8–10. Specifically, Kerry argued that the method of claim 1 involves the use of a " 'curing agent' that is defined by the process of making it: it contains a plant-based nitrite 'derived from a plant material comprising at least about 50 ppm nitrate and the organism, wherein the plant material is heat treated prior to addition of the organism.'" *Id*. We noted at the time that

> [t]he law of product-by-process claims "developed in response to the need to enable an applicant to claim an otherwise patentable product that resists definition by other than the process by which it is made." *In re Thorpe*, 777 F.2d 695, 697 (Fed. Cir. 1985). But "[t]he patentability of a product does not depend on its method of production." *Id*. (citing *In re Pilkington*, 411 F.2d 1345, 1348 (CCPA 1969)). Thus, while the scope of a product-by-process claim for infringement purposes is limited by the process, when determining patentability the claim is considered only in view of the resulting product. *See Amgen Inc. v. F. Hoffman-La Roche Ltd.,* 580 F.3d 1340, 1370 n.14 (Fed. Cir. 2009) ("a patent is invalid if a product made by the process recited in a product-by-process claim is anticipated by or obvious from prior art products, even if those prior art products are made by different processes"). Only if the process of manufacture results in "structural and functional differences" in the product can the process distinguish the claim over the prior art. *Id.* at

> 1370; *see Greenliant Sys., Inc. v. Xicor LLC*, 692 F.3d 1261, 1268 (Fed. Cir. 2012). Analysis of a product-by-process element "nested" within a method claim does not differ from the analysis of a product-by-process claim itself. *Biogen MA Inc. v. EMD Serono, Inc.*, 976 F.3d 1326, 1334 (Fed. Cir. 2020) ("The nesting of the product-by-process limitation within a method of treatment claim does not change the proper construction of the product-by-process limitation itself.").

Id. at 8–9.

In view of this precedent, at institution we preliminarily construed claim 1 as containing a nested product-by-process limitation, which defines the claimed curing agent as containing a plant-based nitrite derived using a particular process involving heat treatment prior to introduction of the nitrite-producing organism.[10] We were not persuaded on the then-existing record, however, that this process imparts any structural or functional differences to the recited curing agent product, as opposed to curing agents produced by other means. We noted Kerry's contention that "the variations inherent in the biological processes for producing plant-derived nitrite, in addition to selecting the plant material and organism, result in qualitative differences in the curing agent that, when applied to meat, affect taste, smell,

[10] We also considered, but rejected, Kerry's interpretation of *In re Thorpe*, 777 F.2d at 697, that a product-by-process claim requires a "product-to-product analysis." DI 14 n.11. Kerry attempts to preserve this argument for trial, incorporating by reference the arguments contained in its Preliminary Response in a footnote in its Response. PO Resp. 24 n.8. But "[a]rguments must not be incorporated by reference from one document into another document." 37 C.F.R. § 42.6(a)(3). We do not consider Kerry to have appropriately preserved this argument for trial. *See* Paper 27, 9 ("any arguments for patentability not raised in the response may be deemed waived"); *see also* Consolidated Trial Practice Guide, 94. Even if Kerry had preserved the arguments, we would not consider them persuasive for the same reasons given in our Decision on Institution.

texture, and color, while also impacting the safety of the product." *Id*. at 10 (quoting Paper 17, 23 (citing Ex. 2001 ¶¶ 127–131)). But we found that Dr. Milkowski had not provided any evidence of these "qualitative differences" beyond citations to FFP's marketing materials. *Id*. (citing Ex. 2001 ¶ 129 n.23). On the preliminary record, therefore, we construed the product-by-process element of claim 1 to not be limited by the process steps recited.[11]

During trial, Kerry continued to argue that the process of deriving the plant-based nitrite recited in claim 1 results in a final product having qualitative differences from those made from other processes. PO Resp. 47–48. According to Kerry, the process "provides a curing agent that gives meat products consistently unique and predictable flavor, smell, and/or color characteristics, all of which are expected by consumers and meat processors." *Id*. at 48 (citing Ex. 2001 ¶¶ 127–131, 181; Ex. 2014 ¶¶ 102–104). And Dr. Milkowski provided additional testimony as to these differences, contending that prior art processes such as Voorde resulted in "the accumulation of varying microbial generated byproducts, all of which a [person of ordinary skill in the art] would appreciate impact qualitative characteristics." Ex. 2014 ¶ 103. Kerry argues that the process of claim 1, on account of its heat treating step, eliminates microbes and avoids these byproducts.

FFP does not directly contest these assertions, nor does it argue that the process steps of claim 1 are product-by-process elements that should not carry patentable weight. FFP stresses that its Petition provides analysis

[11] We also applied this reasoning to the interpretation of claim 5, which the parties agreed is a product-by-process claim in its entirety. DI 10 n.10.

regarding the process limitations of claims 1 and 5, such that even if the process steps of the product-by-process limitations do carry patentable weight, the ultimate determination regarding obviousness would not change. Reply 5 (citing Pet. 30–55).

Because, as discussed below, we agree with FFP that the record proves that the prior art teaches or suggests the process steps of claims 1 and 5, we agree that a determination as to whether the product-by-process elements carry patentable weight is moot. We, therefore, decline to make any finding regarding whether Kerry has proven that the process results in a product having qualitative differences, and need not further construe the product-by-process limitations of the claims.

D. Competency of Dr. Baldwin to Provide Expert Testimony

Before turning to the merits of FFP's grounds, we must first address Kerry's challenge to the competency of FFP's expert, Dr. Baldwin, to provide testimony as to the person of ordinary skill in the art. According to Kerry, FFP relies on Dr. Baldwin to establish its reason to modify the references as part of its obviousness analysis. PO Resp. 8. Kerry argues that this testimony should be given little to no weight, because of Dr. Baldwin's "demonstrated lack of competency in the area of meat science and curing." *Id*. According to Kerry, while Dr. Baldwin has expertise as a synthetic organic chemist, he has no familiarity with meat curing and does not belong to any of the professional organizations that a person of ordinary skill in the art, such as Dr. Milkowski, would belong to. *Id*. at 10–12, 14. Kerry highlights Dr. Baldwin's testimony that he familiarized himself with the technology of meat curing in an "afternoon," because "it's not an area I follow," and that he only became familiar because of his involvement in this

proceeding, which required a "crash course" to prepare him. *Id*. at 12–13 (citing Ex. 2015, 28:18–21, 38:10–16, 135:10–17).[12]

FFP defends the competency of Dr. Baldwin to testify, noting that as of the time of the invention he "had spent nearly forty years teaching organic chemistry at premier universities," and his credentials as an organic chemist were and are "impeccable." Reply 3. FFP argues that the relevant art "includes" organic chemistry, and that the curing agent of the '304 patent is prepared independent of the actual curing of meat. *Id*. (citing Ex. 1037 37:7–13). According to FFP, Kerry's emphasis on the science of "meat curing" is new, was not reflected in prior arguments to the Office during prosecution, and is "perfunctory" in the patent. *Id*. at 4. FFP emphasizes that the dispute between the parties, and the only modification to the prior art that must be made, is whether it would have been obvious to sterilize a medium before adding a starter culture, and this is a subject that is within Dr. Baldwin's expertise, not specific to "meat science." *Id*.

Upon review, we do not believe it is proper to adopt a blanket approach that would assign weight to the entirety of Dr. Baldwin's

[12] In its Sur-Reply, Kerry raises for the first time that, under its definition of the level of skill in the art, Dr. Baldwin is not himself a person of ordinary skill and therefore is not allowed to offer expert testimony from the perspective of a skilled artisan, citing *Kyocera Senco Indus. Tools Inc. v. ITC*, 22 F.4th 1369, 1376–78 (Fed. Cir. 2022). *See* Sur-Reply 15 n.1. To the extent that Kerry is seeking to disqualify Dr. Baldwin's testimony in its entirety under *Kyocera*, we consider this to be a new argument that differs from Kerry's initial argument that Dr. Baldwin's testimony should be afforded little or no weight due to his lack of familiarity with the field of the '304 patent. Because new arguments made for the first time in sur-reply are not permitted, we will only focus on Kerry's initial challenge to the testimony of Dr. Baldwin.

testimony, regardless of the subject of his particular opinions. It is clear that Dr. Baldwin has expertise in some areas of chemistry, while Dr. Milkowski's experience is focused on other areas and emphasizes food chemistry. These differences in expertise may impact how we weigh the testimony of both witnesses, but that determination should be made in the context of a specific subject and based on the applicability of each witness's background to the opinions. Therefore, we decline to adopt Kerry's proposed approach of giving Dr. Baldwin's testimony "little to no weight," and instead will weigh the expertise of both witnesses in evaluating their testimony on specific areas of dispute, if necessary.

E. Obviousness Over Voorde and Hara

FFP contends that claims 1–5 are unpatentable under 35 U.S.C. § 103(a), as their subject matter would have been obvious over the combined disclosures of Voorde and Hara. Pet. 30–43. FFP relies on the testimony of Dr. Baldwin to support its contentions. *Id*.

Voorde discloses a method of heat treating meat products to reduce discoloration, comprising treating the meat with a solution containing nitrite. Ex. 1003, 1. Voorde uses a vegetable material containing nitrate as a starting material, and then converts the nitrate into nitrite. *Id*. at 3. Multiple methods of conversion are disclosed, including "allowing the natural enzymatic and/or microbiological conversion processes to run their course" or, optionally, "additional micro-organisms or . . . so-called starter cultures can be added for this purpose." *Id*. at 5–6. Conversion to nitrite is further stimulated by heating, preferably to a temperature higher than 50 ºC, because "at these temperatures undesired micro-organisms are killed and the materials is thus (partially) sterilized." *Id*. at 6. Voorde warns against

heating higher than 80 ºC, however, to avoid excessively reducing the enzymatic and microbiological conversion processes. *Id*. at 7.

Voorde, in its background section, also discusses Hara as disclosing "a method for preserving the color of animal tissue during heat treatment in which no chemical nitrite and/or nitrate is used." *Id*. at 1–2. Voorde notes that Hara calls for sterilizing the liquid phase containing the water-soluble plant ingredients immediately after its preparation. *Id*. at 2. Hara states that "[e]xposure to a temperature of about 90 ºC . . . for about 30 minutes, is effective." Ex. 1023, 1:59–64.

FFP contends that a person of ordinary skill in the art would have had reason to combine these disclosures of Voorde and Hara, especially in view of Voorde's express citation to Hara. Pet. 43. FFP also notes that both references relate to plant-based curing solutions for preserving meat. *Id*. As such, a person of ordinary skill "would have looked to Hara for background steps not improved upon in Voorde, such as heating the vegetables, concentrating curing solutions, and processing the curing solutions to make it last for months." *Id*. (citing Ex. 1002 ¶¶ 162–163).

With few exceptions, Kerry does not contest FFP's assertions as to the disclosure of Voorde or how it teaches the elements of the challenged claims. We find that, on these uncontested elements, FFP has proven by a preponderance of the evidence that Voorde discloses a process meeting these elements. We now turn to resolving the parties' dispute as developed during trial.

1. Reason to Combine

Kerry contends that a person of ordinary skill would not have combined Voorde and Hara, because the modification is a "substantial

rewriting" of Voorde that a person of ordinary skill would have had no reason to make. PO Resp. 24–29. Specifically, Kerry argues that Voorde does not disclose starting with a sterile medium because it only heats to 50–60°C to promote the conversion of nitrite to nitrate. *Id*. at 25. Furthermore, Kerry notes Voorde's express warning to not heat higher than 70°C to avoid reducing the enzymatic and microbiological activity of the process. *Id*.

According to Kerry, FFP proposes a "fundamentally different heating and cooling procedure" than Voorde, which would require heating Voorde's plant material to 100°C, killing natural enzymes and microbes, then cooling the material to 50–60°C before adding a starter culture. *Id*. at 26. Kerry argues that FFP's modification is based not on Dr. Baldwin's expertise, but rather on his "unscientific" testimony that washing and heating a vegetable before treatment is a common matter of "routine sterilization." *Id*. at 27 (citing Ex. 1002 ¶¶ 97–98, 119). And rather than the moderate heating of Voorde, Kerry emphasizes that Dr. Baldwin's proposal is to "sterilize" the plant material at a temperature well beyond that disclosed by Voorde. *Id*. at 29. This is allegedly supported by FFP's and Dr. Baldwin's reliance on Hara as part of the combination, which discloses boiling and steaming plant material at 100°C. *Id*. at 30–31. Kerry argues that a person of ordinary skill, if combining the references in the manner FFP proposes to "kill germs" as contended by Dr. Baldwin, would have resulted in a modified process that heats to a temperature that destroys Voorde's stated purpose of encouraging microbial conversion processes. *Id*.

FFP responds that its ground is entirely consistent with Voorde's teachings of heating the medium, noting that the claims do not require a "sterile medium." Reply 12–13. FFP notes the claims only require heating

to "reduce microbial load," which Dr. Milkowski admits would result from Voorde's heating to 50–60°C. *Id*. Furthermore, FFP argues that even if a person of ordinary skill in the art would have decided to apply Hara's heating step to its full extent of 100°C, it would have been obvious for the person of ordinary skill in the art to let the mixture cool before adding a starter culture, as Voorde explicitly teaches to avoid high temperatures. *Id*. at 13–14. FFP notes that both experts agree that sterilizing a medium before adding a starter culture was well-known in chemistry and food science at the time of the invention. *Id*. at 14 (citing Ex. 1002 ¶¶ 97–98; Ex. 1037, 122:24–123:4; Ex. 2014 ¶ 68). As such, FFP contends that Voorde does not teach away from sterilizing its medium before adding a starter culture. *Id*. at 18–19.

Upon review, we find that a person of ordinary skill in the art would have had reason to modify Voorde in the manner FFP suggests. Voorde explicitly discloses the advantages of heating the medium, and there is no disagreement that heating to 50–52°C would have resulted in at least some reduced microbial load, which is all that the claims require.[13] Indeed, Voorde describes that as a result of heating to 50–52°C, its medium is "(partially) sterilized." Ex. 1003, 7. Kerry's argument that Voorde does not disclose starting with a "sterile medium" (PO Resp. 25) is unavailing; as discussed above, we do not interpret anything in claim 1 or the '304 patent

[13] At oral argument, Kerry raised for the first time a claim construction argument that "heat treating," as recited in the claims, requires heating to a level in excess of what is required in Voorde, and a person of ordinary skill would have understood the term to refer to sterilization. Tr. 33:4–34:19, 55:3–9. We decline to address this late-arising argument fully, but note that we find that the '304 patent does not support such a limited interpretation of the term "heat treating."

to require a sterile medium, and Kerry does not direct us to anything in the record that would persuade us otherwise.

Nor does it matter that, as Kerry argues, the purpose of Voorde's heating is to promote conversion of nitrite to nitrate, whereas the claims recite heating to reduce microbial load. *Id*. at 25, 27. That the prior art's purposes differ from those of the inventors does not diminish the prior art's teachings, and if a step taught by the prior art would accomplish both purposes that is sufficient. *See In re Lintner*, 458 F.2d 1013, 1016 (CCPA 1972) ("The fact that appellant uses sugar for a different purpose does not alter the conclusion that its use in a prior art composition would be prima facie obvious from the purpose disclosed in the references."); *see also In re Dillon*, 919 F.2d 688, 693 (Fed. Cir. 1990) (en banc).

Based on the foregoing, we find that Voorde would have taught the person of ordinary skill to heat treat a medium to around 50°C. FFP does not rely solely on Voorde's heating, however, but rather combines Voorde's disclosure with Hara, which teaches heating to a much higher temperature. Pet. 33–36; Ex. 1023, 3:3–6, 5:10–16. At oral argument, FFP's counsel stated that this combination was to provide "objective evidence" that heat treating to kill microbes was known, and that Hara was not relied on "for a physical combination of Voorde and Hara." Tr. 12:1–13:1. Referring to the Petition, this is not so clear; there, FFP states that "Hara . . . evidences the routine heating of vegetables before use," but then also contends that the person of ordinary skill would have found it obvious to "boil[] the plant material as in Hara." Pet. 34–35.

Even if we were to interpret FFP's combination of Voorde with Hara to require heating to 100°C, we disagree that this modification would be

inconsistent with Voorde or destroy its intended purpose, as Kerry argues. PO Resp. 34–46. Voorde explicitly discusses the use of a starter culture, which would have replaced any microbes destroyed by Hara's sterilization. Although Voorde discloses adding this starter culture prior to heating to the medium, we disagree with Kerry's argument that a person of ordinary skill would not have modified the process to add the starter culture subsequent to Hara's sterilization step, if there were concerns about destroying the beneficial microbes. Dr. Milkowski—who Kerry extensively argues is a person having ordinary skill in the art (PO Resp. 8, 10–12; Sur-Reply 12)—conceded on cross-examination that, if he were adding a starter culture, he would do so after heating. Ex. 1037, 88:19–89:6 ("Q: [Y]ou would want to add the microorganisms after the heating; right? A. Well, if I were doing it, I would do that.").

For these reasons, we conclude that a person of ordinary skill in the art, seeking to reduce microbial load in a plant material prior to converting nitrate to nitrite, would have combined Voorde and Hara's disclosures in the manner FFP suggests. At the very least, the skilled artisan would have looked to Hara as evidence that pre-treatment using heat could be beneficial to reduce microbial load, a disclosure confirmed by Voorde. In addition, Hara could have been relied upon for its disclosure of full sterilization by boiling, followed by cooling prior to the addition of a starter culture as disclosed in Voorde. Neither of these modifications would have been beyond the ordinary level of skill in the art, nor do we agree that they would have made Voorde's process unsuitable for its intended purpose.

2. Disclosure of Voorde and Hara in Combination

FFP contends that Voorde, as modified by Hara to heat the medium prior to adding a starter culture, teaches or suggests each element of claims 1–5. Pet. 30–43. As noted above, other than disputing whether such a modification would have been made, Kerry does not dispute the disclosures of the prior art. Dr. Milkowski also apparently agrees, testifying that Voorde discloses the elements of claim 1 except for expressly stating that heat treating would occur prior to adding a starter culture. Ex. 1037, 81:5–87:12.

We find that the combined disclosures of Voorde and Hara would have led a person of ordinary skill in the art to a process that has all the steps claimed in claim 1. For example, we find that Voorde discloses contacting a meat product with a curing agent comprising a plant-based nitrite and an added organism. Ex. 1003, 3, 6–7. Furthermore, Voorde discloses deriving its nitrite from a plant material comprising at least 50 ppm nitrate, as Voorde's Example 1 uses spinach containing 2826 ppm nitrate. Ex. 1003, 8–9. And we find that both Voorde and Hara disclose heating a plant material which would result in the material having a reduced microbial load, and Voorde discloses addition of an organism through its starter culture. Ex. 1003, 6; Ex. 1023, 3:3–6, 3:13–16. Finally, Voorde discloses sterilizing its nitrite-containing product for storage, which a person of ordinary skill in the art would have understood would have inactivated the added organism. Ex. 1003, 7; Ex. 1002 ¶ 127. In addition, we find that the combination of Voorde with Hara would also result in a process having the limitations of the dependent claims, for the reasons set forth by FFP in its Petition. Pet. 38–41. We note that Kerry does not separately address the dependent claims or argue their patentability separately from claim 1.

Regarding claim 5, which as noted above is directed to a meat product created by the process of claim 1, we find that its subject matter would have been obvious for the same reasons the process of claim 1 would have been obvious. Kerry argues that, by solely relying on its showings for claim 1, FFP has failed to make a prima facie case of obviousness against claim 5. PO Resp. 49–51. According to Kerry, because FFP did not compare a cured meat product produced by Voorde's process to the meat product of claim 5, there is no analysis of whether the product would be "compositionally and qualitatively distinctive." *Id*.

On the record before us, we disagree with Kerry's analysis. As noted above, we reject Kerry's interpretation of product-by-process precedent to require a "product-to-product" comparison of a single prior art reference to the claimed invention. Rather, we look to whether the "product-by-process claim is the same as or obvious from a product of the prior art" (*In re Thorpe*, 777 F.2d at 697), namely the product of the process that a person of ordinary skill in the art would have derived from the combined disclosures of Voorde and Hara, as outlined above in our analysis of claim 1. Because, as we found above, a person of ordinary skill would have arrived at the process of claim 1 based on Voorde and Hara's teachings, and Voorde discloses that its process can be used in the curing of meat products (Ex. 1003, 4), we conclude that a meat product produced using the process of claim 1 would have been obvious. Thus, claim 5 is also obvious over the disclosures of the prior art.

3. Conclusion as to Obviousness

For these reasons, we find that FFP has met its burden of showing that claims 1–5 would have been obvious over the combined disclosures of Voorde and Hara.

F. Remaining Obviousness Grounds

FFP also contends that the subject matter of claims 1–5 would have been obvious over various combinations of Fast, Voorde, Yamamoto, Stumpf, and Kurihara. Pet. 43–61. Because we have determined above that the same claims would have been obvious over the combined disclosures of Voorde and Hara, these additional challenges to the claims are moot and we decline to address them as unnecessary to our ultimate determination of unpatentability. *Cf. In re Gleave*, 560 F.3d 1331, 1338 (Fed. Cir. 2009).

III. CONCLUSION

For the foregoing reasons, we conclude that FFP has satisfied its burden of demonstrating, by a preponderance of the evidence, that claims 1–5 of the '304 patent are unpatentable,[14] and resolve the asserted grounds of unpatentability as follows:

[14] Should Kerry wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Kerry's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding. See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Kerry chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Kerry of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2).

Claim(s)	35 U.S.C. §	References	Claim(s) Shown Unpatentable	Claim(s) Not Shown Unpatentable
1–5	103(a)	Voorde, Hara	1–5	
1, 4, 5	103(a)	Fast, Voorde, Yamamoto[15]		
2	103(a)	Fast, Voorde, Yamamoto, Stumpf		
3	103(a)	Fast, Voorde, Yamamoto, Kurihara		
Overall Outcome			1–5	

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that Petitioner has established by a preponderance of the evidence that claims 1–5 of the '304 patent are unpatentable;

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

[15] As discussed above, we do not reach this or subsequent grounds because all claims are addressed by the first ground of unpatentability.

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