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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/871,303	08/30/2010	Katharina Reichelt	085158-536103	1514

30678 7590 09/26/2019

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ART UNIT	PAPER NUMBER
1612	

NOTIFICATION DATE	DELIVERY MODE
09/26/2019	ELECTRONIC

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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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Ex parte KATHARINA REICHELT, JAKOB PETER LEY, PETRA HOFFMANN-LÜCKE, MARIA BLINGS, SUSANNE PAETZ, and THOMAS RIESS

_____

Appeal 2018-000173
Application 12/871,303
Technology Center 1600

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Before FRANCISCO C. PRATS, JEFFREY N. FREDMAN, and TIMOTHY G. MAJORS, *Administrative Patent Judges*.

MAJORS, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant[1] submits this appeal under 35 U.S.C. § 134 involving claims to a flavoring mixture. The Examiner rejected the claims as obvious. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

[1] Appellant identifies the Real Party in Interest as Symrise AG. Appeal Br. 2.

STATEMENT OF THE CASE

Appellant's invention "relates to a flavoring mixture comprising one or more sweet-tasting substances as well as phyllodulcin." Spec. 1:25–26. As the Specification explains, "the object of the invention was to provide orally-consumable, sweet-tasting products which have a reduced amount of sugar and/or sweetener compared to products with a comparable sweetness sensation." *Id.* at 4:8–11. According to the Specification, with "the flavoring mixture according to the invention . . ., a surprising synergistic [sweetness sensation] effect is present." *Id.* at 8:19–25.

Claims 1, 4–7, 25, and 28–34 are on appeal. Independent claim 1 is illustrative, and reads:

> 1. A flavoring mixture comprising:
> (i) sucrose;
> (ii) an extract of *hydrangea dulcis* obtained from a solvent comprising ethanol, the extract comprising from 0.5 to 30 wt.% of phyllodulcin and/or a salt thereof and from 0.01 to 30 wt.% of hydrangenol and/or a salt thereof, wherein the weight percent of the phyllodulcin and hydrangenol and/or salts thereof is based on the dry weight of the extract; and
> wherein a ratio of a sucrose equivalence of a concentration of the sucrose of group (i) to a sucrose equivalence of a concentration of the phyllodulcin of group (ii) is ≥ 4, and the flavoring mixture synergistically enhances the sweetness of an aqueous composition comprising the flavoring mixture in comparison to an otherwise identical aqueous composition without the extract of *hydrangea dulcis*.

Appeal Br. 19 (Claims App.).

The other independent claim, claim 25, is similar to claim 1, but does not recite that the extract is obtained from a solvent comprising ethanol. Appeal Br. 19. Claim 25 also differs from claim 1 because claim 25 recites at least one additional substance be included in the flavoring mixture, such as hesperetin and/or phloretin. *Id.*

The claims stand rejected[2] as follows:

Claims 1, 4–7, 25, 28, 29, 33, and 34 under 35 U.S.C. § 103(a) as obvious over Sakai.[3] Final Act. 4–7.[4]

Claims 30–32 under 35 U.S.C. § 103(a) as obvious over Sakai in further view of Rezk[5] and Buchholz.[6] Final Act. 7–8.

This is the second appeal to the Board related to U.S. Application No. 12/871,303. In an earlier appeal, the Board reversed the Examiner's rejection of the then-pending claims as anticipated by Sakai, and entered a new ground of rejection of those claims for obviousness. *See Ex parte Reichelt*, Appeal No. 2014-000308 (PTAB Mar. 15, 2016).

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[2] The Examiner withdrew a new matter rejection under 35 U.S.C. § 112, first paragraph. *See* Adv. Act. dated Jan. 25, 2017.
[3] Sakai et al., US 7,332,522 B2, issued Feb. 19, 2008.
[4] The Examiner also identifies claims 18–21 as subject to this rejection, but those claims had already been canceled and, thus, are not subject to the rejection on appeal. *See* Amdt. dated Aug. 31, 2016.
[5] Bashir M. Rezk et al., *The antioxidant activity of phloretin: the disclosure of a new antioxidant pharmacophore in flavonoids*, 295 Biochemical and Biophysical Research Communications 9–13 (2002). The Examiner uses the name "Bashir" to describe this reference. Final Act. 7.
[6] Buchholz et al., US 2006/0188591 A1, published Aug. 24, 2006.

DISCUSSION

The issue on appeal is whether a preponderance of the evidence on this record supports the Examiner's conclusion of obviousness.

Claim 1

The Examiner finds that Sakai teaches a composition comprising 0.0366% of phyllodulcin and 20% sucrose. Final Act. 4. (citing Sakai 19:36–54 (Example 6). Citing, in substantial part, to the Board's discussion from the earlier appeal, the Examiner finds that a composition, such as disclosed in Sakai's Example 6, would provide a sucrose equivalence ratio of approximately 1.85. Final Act. 4–5.[7] Again citing the Board's earlier decision, the Examiner further concludes that even higher sucrose equivalence ratios, such as ≥ 4 in claim 1 as amended, would have been obvious based on optimization of Sakai absent evidence of unexpected results (or other objective indicia) from Appellant. *Id.* at 5–6.

Concerning other limitations of claim 1, the Examiner finds:

> In regard to the amended phrase "an extract of hydrangea dulcis [obtained from a solvent comprising ethanol] comprising

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[7] Independent claim 1 from the earlier appeal required a sucrose equivalence ratio of ≥ 2, which the Board found was close to the ratio of 1.85 derivable from the amount of sucrose and phyllodulcin in Sakai's Example 6 (pertaining to a feed for animals). *See Reichelt*, slip op. at 10–11. Based on arguments and evidence advanced by Appellant previously, the Board noted a sucrose equivalence range for pure phyllodulcin (300–800) and a sucrose equivalence value for sucrose of 1. *Id.* at 5. And the Board accepted the method urged by Appellant for calculating a ratio of sucrose equivalence: (wt% sucrose x 1 / wt% phyllodulcin x 300). *Id.* at 10–11. Neither Appellant nor the Examiner suggest that this method is inapplicable to the claims as amended. Accordingly, we apply that same method here for calculating the sucrose equivalence ratio.

> from 0.5 to 30 wt.% of phyllodulcin and/or a salt thereof and from 0.01 to 30 wt% of hydrangenol and/or salt thereof, wherein the w[e]ight percent of the phyllodulcin and hydrangenol and/or salts thereof is based on the dry weight of the extract", it is noted that the phrase merely identifies a source of extract. The amount of phyllodulcin is controlled by the sucrose equivalence ratio.

Final Act. 6. The Examiner, thus, questions whether the extract as claimed must include the recited amounts of *both* phyllodulcin and hydrangenol, and further posits that the type of solvent used for obtaining the extract (i.e., the solvent comprising ethanol) does not result in any structural difference in the claimed flavoring mixture. *See* Ans. 3 ("It is not apparent the 'flavoring mixture' comprises hydrangenol."); Adv. Act. 2 (asserting "that the patentability of a product does not depend on its method of production") (citing *In re Thorpe*, 777 F.2d 695, 698 (Fed. Cir. 1985)).

In any event, the Examiner finds that Sakai describes preparing extracts of *hydrangea dulcis*, just as the pending claims recite *hydrangea dulcis* as the extract's source, and that, based on the Specification, such extracts "should preferably contain" amounts of phyllodulcin and hydrangenol within the claimed ranges. Final Act. 6 (citing Spec. 9:52–10:10). Moreover, according to the Examiner, "the prior art compositions are taught to comprise both phyllodulcin and hydrangenol (*see* Claim 1 at col. 24; col. 5, lines 56–57) . . . [and] also that Sakai teaches ethanol extraction at col. 10 lines 35–40." Final Act. 6. Hence, the Examiner concludes, the subject matter of claim 1 would have been obvious. *Id.* at 7.

Appellant makes essentially three arguments. First, Appellant contends, the rejection fails to account for an extract of *hydrangea dulcis* as claimed—particularly that the extract must include *both* phyllodulcin and

hydrangenol. Appeal Br. 8–9 ("Sakai does not use an extract of *hydrangea dulcis* that includes a combination of both phyllodulcin and hydrangenol."). According to Appellant, Sakai uses only *purified* phyllodulcin or hydrangenol, not an extract that includes both. *Id.* at 9. Second, Appellant contends the optimization theory advanced in the rejection is flawed. According to Appellant, the claims have been amended "to provide for a sucrose equivalence ratio of ≥ 4, which is more than double the ratio of Example 6 of Sakai," and further that "[i]t is improper to find that the claimed sucrose equivalence would be obvious to derive by optimizing the amount of phyllodulcin in Sakai." *Id.* at 12 ("One would not optimize the amount of phyllodulcin in Sakai for enhancing sweetness because Sakai is directed to improving liver function (not enhancing sweetness). ***Sakai does not mention sweetness nor does it consider sucrose equivalence*** . . . ."). Third, Appellant contends they have presented evidence of unexpected results: namely improved stability with ethanol-based extracts versus pure phyllodulcin, and an unexpected sweetness enhancement that is provided when sucrose is used in combination with certain amounts of the extract. Appeal Br. 10–11, 14–17. According to Appellant, the Examiner simply dismisses this evidence rather than considering the rejection anew in light of the entire record. *Id.* at 17.

For the reasons explained below, we reverse the rejection on appeal.

At the outset, we emphasize that the claims now on appeal are not the same as the claims at issue in the earlier appeal. The claims now specify that part (i) of the mixture is sucrose, and that part (ii) is an extract of *hydrangea dulcis* that includes both phyllodulcin and hydrangenol in the

recited concentration ranges. Appeal Br. 19. Furthermore, the amended claims now require a sucrose equivalence ratio ≥ 4, doubling the ≥ 2 ratio of the earlier claims that we found was close to the 1.85 ratio derivable from one of Sakai's example compositions. *See Reichelt*, slip op. at 9–11. And the amended claims now also recite a functional property that is provided by the claimed flavoring mixture—"the flavoring mixture synergistically enhances the sweetness of an aqueous composition . . . in comparison to an otherwise identical aqueous composition without the extract of *hydrangea dulcis*." Appeal Br. 19; *see also id.* at 21 (claim 25). We consider the Examiner's findings, and the new arguments and evidence against the claims *as amended* and, accordingly, cannot simply rely on discussion set forth in the Board's decision from three years ago.

On this record, we disagree with the Examiner's position that it is unclear that the present claims require the extract in the flavoring mixture include both phyllodulcin *and* hydrangenol. *See, e.g.*, Ans. 3. That is apparent from a plain reading of the claims. The Examiner cites disclosure in Sakai that suggest phyllodulcin and hydrangenol might be used in combination, but Sakai does not clearly describe use of an *extract* that includes both of those compounds within the ranges recited in the claims.[8]

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[8] Appellant is correct that Sakai does not "use" (i.e., exemplify) both phyllodulcin and hydrangenol in its compositions, and Appellant is also correct that Sakai exemplifies purified/isolated compounds. Appeal Br. 8–9; Sakai 17:20–18:24 (Example 1 (isolation process for phyllodulcin), Example 2 (isolation process for hydrangenol); Sakai 19:37–20:10 (Example 6 (use of isolated phyllodulcin in feed composition), Example 7 (use of isolated hydrangenol in feed composition))). Of course, the teachings of the prior art are not limited to the art's working examples. *Merck & Co. v. Biocraft*

See Sakai, claim 1 ("[A] therapeutically effective amount of at least one member selected from the group consisting of phyllodulcin, hydrangenol, and thunberginol A, . . .").

The Examiner's invocation of Appellant's Specification as evidencing that extracts of *hydrangea dulcis* (in Sakai) will include the required amounts of both compounds does not demonstrate that the claim elements are met. Final Act. 6; Ans. 3. The Specification discloses that the extracts used for the invention "should" contain certain concentration ranges of phyllodulcin and hydrangenol, but those ranges are broader than what is claimed. *See* Spec. 10:3–10 (disclosing a phyllodulcin range in extracts from 0.1% to 50%, and a hydrangenol range from 0.01% to 50%). Accordingly, even if we read "should" as "necessarily will" as the Examiner appears to do, the Specification evidences that extracts of *hydrangea dulcis* may include less than 0.5% or more than 30% of phyllodulcin, and more than 30% hydrangenol—amounts outside the claimed ranges. In short, the Specification does not reveal that all extracts of *hydrangea dulcis* will include the narrower concentrations of phyllodulcin and hydrangenol that are claimed.

Labs., Inc., 874 F.2d 804, 807 (Fed. Cir. 1989) (explaining that "all disclosures of the prior art, including unpreferred embodiments, must be considered") (citation and internal quotation marks omitted). And, Sakai does elsewhere suggest that a Compound (I), which may include phyllodulcin or hydrangenol, might be provided as part of a mixture or be isolated. *See* Sakai 11:3–7 ("[C]ompound (I) . . . may be used in the form of a mixture of the extract, however, it may also be isolated as needed.").

Moving on, even if we agreed with the position that Sakai taught or suggested the use of extracts of *hydrangea dulcis* including both phyllodulcin and hydrangenol in its compositions, the rejection is for other reasons flawed. Appellant persuades us that the optimization theory advanced in the rejection lacks adequate support. Appeal Br. 12–14. Sakai is not concerned with sweetness or sweetness enhancement, and does not suggest that sucrose and extracts of *hydrangea dulcis* be used together for that purpose, nor does Sakai disclose any particular relationship between the amounts of sucrose and phyllodulcin that should be used. To the contrary, as Appellant points out, Sakai broadly concerns use of phyllodulcin or possibly other compounds extracted from *hydrangea dulcis* to improve liver functioning. *Id.* at 12–13.

Arriving at a sucrose equivalence ratio of ≥ 4 (as claimed) with Sakai's cited compositions requires a number of assumptions about how those compositions should be changed. Starting with Sakai's Example 6 (which is the focus of the rejection), the sucrose amount stays the same at 20%, numerous other admixed materials in the feed are also present in essentially the same concentrations, and only the amount of phyllodulcin changes.[9] Effectively, under those circumstances and to arrive at the claimed ratio, the amount of phyllodulcin (0.0366 wt %) in Example 6

[9] Consistent with the claims, Sakai's Example 6 would also require modification so that an extract is used and that extract must include both phyllodulcin and hydrangenol in the recited amounts. For simplicity, however, we focus on the amount of phyllodulcin here for purposes of illustrating and calculating the modification needed to derive a sucrose equivalence ratio in the amount claimed.

would have to be cut more than half (i.e., to about 0.0166 wt %). Then, we calculate a sucrose equivalence ratio: ((20% x 1)/(0.0166% x 300) = 4). Sakai, however, never actually describes using phyllodulcin in such low amounts. The only compound Sakai describes being used in such low concentrations is isolated Thunberginol A (e.g., at concentrations of 0.013%), and Sakai does not provide any results relative to the ability of those compositions to improve liver function. *See* Sakai 21:1–36 (Examples 11 and 12), 22:16–33 (no data for Examples 11 and 12). And, Sakai is silent on any specific relationship between sucrose and phyllodulcin (or any of the other compounds encompassed in Sakai's "compound (I)").

It is true, as the Board noted in the earlier appeal, Sakai elsewhere discloses that "compound (I)" (which encompasses multiple agents, one of which is phyllodulcin) may be provided in amounts from 0.001 to 100% if it is an "amount to give a content which enables the food and drink or the feed to exhibit liver function protecting or improving activity." Sakai 13:47–56. The Board also did reason previously that a phyllodulcin concentration of Sakai was, thus, an optimizable variable. But, as Appellant highlights, to the extent Sakai's phyllodulcin is optimizable or result-effective, its recognized optimization and effect pertains to liver function only. Appeal Br. 13 ("[T]here is no evidence of record showing that optimization for liver protective function relates to optimization of sweetness enhancement."). The range of hypothetical concentrations in Sakai is also exceptionally broad, and the record is wanting for evidence that lower amounts of phyllodulcin (e.g., 0.017%) as part of a composition having enough sucrose content from which we might derive a sucrose equivalence ratio that is

claimed, would provide a liver protection function. *See Genetics Inst., LLC v. Novartis Vaccines & Diagnostics, Inc.*, 655 F.3d 1291, 1306 (Fed. Cir. 2011) (reasoning that disclosure of very broad ranges may not invite routine optimization).

Sakai may well have recognized phyllodulcin content as a variable that affects a composition's properties, yet Appellant persuades us that those properties have no relevance to the properties of the mixture claimed here. It is only by chance that, via potential optimization for liver-protecting function, one might modify Sakai's compositions to arrive at the claimed favoring mixture. There is minimal, if any, evidentiary basis here to conclude that the ordinarily skilled person would reasonably expect that such a composition would provide the recited synergistic sweetness enhancement. Given the number of variables at issue, the vast breadth of concentrations in Sakai, and the wholly different purposes (liver function versus sweetness enhancement) for which Sakai and claimed compositions use extracts of *hydrangea dulcis*, we determine that the record lacks a sufficient basis to conclude that a composition having a sucrose equivalence ratio ≥ 4 would have been made through routine optimization of the cited art.

In short, upon considering the evidence of record, there is no apparent teaching in Sakai (or other evidence cited) to demonstrate a sufficient reason to modify Sakai's compositions by adjusting phyllodulcin amounts relative to the amounts of sucrose, nor to provide a reasonable expectation of success that, in so doing, one would form a flavoring mixture that "synergistically enhances" a composition's sweetness as claimed. A prima facie case for

obviousness requires "a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007). Even supposing a synergistic sweetness enhancement is inherent once the appropriate amounts (and ratio) of sucrose and phyllodulcin are used together, we still consider the extent to which the functional recitation of the claims would have been expected based on the evidence of record. *Cf. Honeywell International Inc. v. Mexichem Amanco Holding S.A.*, 865 F.3d 1348, 1355 (Fed. Cir. 2017) ("What is important regarding properties that may be inherent, but unknown, is whether they are unexpected."). There is insufficient evidence cited here from which we can conclude that the claimed sweetness enhancing property would have been expected in the compositions taught or suggested in Sakai. As noted above, to the extent Sakai suggests administering phyllodulcin, it is for its purported ability to improve liver function. *See* Sakai, Abst., 22:16–33 (results showing lower GPT activity as an indication of liver function disorder with administration of certain feeds containing phyllodulcin and other compounds).

We need not further address Appellant's argument on objective indicia of nonobviousness. Appeal Br. 14–17. For clarity, however, insofar as the Examiner suggests the Board considered but rejected such argument incident to the earlier appeal (*see, e.g.*, Ans. 7–8), that is not accurate. The rejection previously appealed was for anticipation, not obviousness. *Reichelt*, slip op. at 7–10. The particular arguments and evidence now advanced by Appellant concerning objective indicia of nonobviousness were

not specifically part of the earlier appeal and the claims have also been substantially amended as explained above.

For the above reasons, we reverse the rejection of claim 1.

Claims 4–7, 25, 28–34

For the reasons above, we also reverse the rejection of the claims that depend directly or indirectly from claim 1. *In re Fritch*, 972 F.2d 1260, 1266 (Fed. Cir. 1992) ("[D]ependent claims are nonobvious if the independent claims from which they depend are nonobvious."). For claims 30–32, the Examiner has not shown that Rezk and Buchholz make up for Sakai's deficiencies on this record as noted above. For substantially the same reasons as discussed for claim 1, we also reverse the rejection of independent claim 25 and its dependent claims (claims 33 and 34).

SUMMARY

We reverse the rejections for obviousness on appeal.

Claim(s) Rejected	Basis	Affirmed	Reversed
1, 4–7, 25, 28, 29, 33, 34	§ 103 Sakai		1, 4–7, 25, 28, 29, 33, 34
30–32	§ 103 Sakai, Rezk, Buchholz		30–32
Overall Outcome			1, 4–7, 25, 28–34

REVERSED