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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte RICHARD STUART SILVER and ERIK WHALEN-PEDERSEN

Appeal 2014-009240
Application 11/279,157
Technology Center 1700

Before MICHAEL P. COLAIANNI, WESLEY B. DERRICK, and
MONTÉ T. SQUIRE, *Administrative Patent Judges*.

COLAIANNI, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134 the final rejection of claims 1-24 and 26-31. We have jurisdiction over the appeal pursuant to 35 U.S.C. § 6(b). Appellants waived oral arguments regarding this appeal scheduled for October 18, 2016.

We AFFIRM and denominate a NEW GROUND OF REJECTION pursuant to 37 CFR 41.50(b).

Appellants' invention is directed to enzyme compositions stabilized with coffee-derived materials (Spec. ¶ 1).

Claim 1 is illustrative:

1. A stabilized enzyme composition comprising an enzyme and an effective amount of coffee-derived ingredients to stabilize the enzyme, wherein the stabilized enzyme composition does not contain non-coffee enzyme stabilizers

Appellants appeal the following rejections:

1. Claims 1-24 and 26-31 are rejected under 35 U.S.C. § 112, first paragraph, as lacking written descriptive support for the stabilization of all enzymes.
2. Claims 1-24 and 26-31 are rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement for forming a stabilized enzyme for all enzymes.
3. Claims 1-24 and 26-31 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particular point out and distinctly claim the subject matter which the inventor regards as the invention.

4. Claims 1-10 and 26-28 are rejected under 35 U.S.C. § 103(a) as unpatentable over Colton (US 4,983,408 issued Jan. 8, 1991) in view of Fardiaz (*Antimicrobial activity of Coffee (Coffea robusta) Extractm*, ASEAN Food Journal Vol. 10, Nov. 3, 1995), and Habich (WO 2005/074705 A1 published Aug. 18, 2005), or Colton in view of Habich and Daglia (*Antibacterial Activity of Coffee*, J. Agric. Food Chem. 42, pp 2270-2272 (1994)).
5. Claims 11-24 and 29 are rejected under 35 U.S.C. § 103(a) as unpatentable over Colton in view of Fardiaz, Habich, and Sachslehner (*Hydrolysis of isolated coffee mannan and coffee extract by mannanases of Sclerotium rolfsii*, Journal of Biotechnology 80, pp 127-134 (2000)) or Colton in view of Habich, Daglia, and Sachslehner.

FINDINGS OF FACT & ANALYSIS

REJECTION (3): § 112, ¶ 2

The Examiner finds that it is unclear whether “stabilized enzyme” includes physical, biochemical, or microbiological stabilization (Ans. 8). The Examiner finds that Appellants’ reliance on ¶ 23 of the Specification for the meaning of stabilized enzyme is an impermissible reading of the limitations from the Specification into the claims (Ans. 18).

Appellants argue that the original application describes “enzyme stabilizers” as inhibiting microbial growth and preserving enzyme activity

during drying, storage and/or abuse (App. Br. 27). Appellants contend that a “stabilized enzyme” as recited in the claims and read in light of the Specification means that the enzyme is both microbially and enzymatically stable (Reply Br. 2-3).

To satisfy 35 U.S.C. § 112, ¶ 2 the question to be answered is whether the ordinarily skilled artisan would understand what is claimed when that claim is read in light of the specification. *Orthokinetics, Inc. v. Safety Travel Chairs, Inc.*, 806 F.2d 1565, 1576 (Fed. Cir. 1986).

In the present appeal, the Specification at ¶ 23 describes that coffee-derived stabilizers provide stability to enzymes for both microbial and enzymatic activity. In other words, a person of ordinary skill in the art would understand that “stabilized enzymes” within the meaning of the claims as read in light of the Specification to include enzymes stabilized with respect to microbial and enzymatic activity. We are not impermissibly reading limitations into the claims. Rather, the claim phrase “stabilized enzyme” as interpreted in light of the Specification requires stabilization of both microbial and enzymatic activity of the enzyme by coffee-derived stabilizers. On this record, we reverse the Examiner’s 35 U.S.C. § 112, ¶ 2 rejection.

REJECTION (1): §112, ¶ 1, WRITTEN DESCRIPTION

Appellants’ arguments focus on claims 1, 3, 13, 14, and 20 (App. Br. 21-22). We select claims 1 and 3 as representative.

The Examiner finds that the claims broadly disclose a stabilized enzyme composition but the Specification only discloses hydrolase enzymes

such as mannanase, cellulase, glucanase, hemicellulose, lipase, esterase, protease, arabinase, galactanase, arabinogalactanase, nuclease, pectinase, isomerase, amylase, liginase, and mixtures thereof (Ans. 2-3). The Examiner finds that Appellants exemplify only the mannanase enzyme, a single species of the hydrolase enzymes (Ans. 3-4). The Examiner finds that hydrolases comprise a large number of enzymes and the single species (i.e., mannanase) is not sufficient to show written descriptive support for all enzymes (Ans. 4-5).

Appellants argue that the Specification provides numerous examples of mannanase and how coffee-derived stabilizers provide stability to mannanase (App. Br. 21). Appellants contend that there is no requirement that multiple species of a genus need to be provided. *Id.* Appellants argue that their disclosure shows possession of the claimed invention. *Id.* Appellants contend that they listed several hydrolase enzymes that may be used with the present invention and that the Examiner's alleged variation between enzymes can be accommodated by the coffee-derived stabilizers and the knowledge of the ordinarily skilled artisan (App. Br. 21). Appellants argue that the Examiner's applied prior art teaches that enzymes have been stabilized by non-coffee derived stabilizers such that one of ordinary skill in the art would have understood that Appellants were in possession of all enzymes stabilized by coffee-derived stabilizers (App. Br. 22).

Whether a specification complies with the written description requirement is a question of fact. *Regents of the University of California v. Eli Lilly & Co.*, 119 F.3d 1559, 1566 (Fed. Cir. 1997). "A written description of an invention involving a chemical genus, like a description of

a chemical species, “requires a precise definition, such as by structure, formula, [or] chemical name,” of the claimed subject matter sufficient to distinguish it from other materials.” *Eli Lilly*, 119 F.3d at 1568. A description of a genus may be achieved by reciting a representative number of species of the genus falling within the scope of the genus or by reciting the structural features common to members of the genus, which features constitute a substantial portion of the genus. *Eli Lilly*, 119 F.3d at 1569.

In the present appeal, claim 1 merely recites the phrase “stabilized enzymes” which is generic to all enzymes. The Specification lists several hydrolase enzymes according to Appellants (App. Br. 21). The Specification includes examples that use the specific hydrolase enzyme mannanase (Spec. ¶¶ 26-42). While the Specification discloses several hydrolase enzymes, the claims are directed to the genus of “stabilized enzymes.” Appellants’ narrow showing several hydrolase enzymes in the Specification does not evince possession of the genus of “stabilized enzymes” which includes all possible enzymes.

Claim 3 is on a different footing because it is limited to the specifically disclosed hydrolase enzymes in the Specification. The Examiner has not established that Appellants were not in possession of the use of the enzymes recited in claim 3 in a composition stabilized by coffee-derived stabilizer. Indeed, Appellants’ examples are directed specifically to mannanase one of the recited hydrolase enzymes (Spec. ¶¶ 26-42).

On this record, we affirm the Examiner’s 35 U.S.C. § 112, ¶ 1 rejection for lack of written description of claims 1, 2, 4, 6, 7, 9-12, 17, 19-

21, 23, 24, and 26-31. We reverse the Examiner's 35 U.S.C. § 112, ¶ 1 rejection for lack of written description of claims 3, 5, 8, 13-16, 18, and 22.

REJECTION (2): § 112, ¶ 1: ENABLEMENT

Appellants argue the subject matter of claims 1, 3, 13, 14, and 20 (App. Br. 24-25). We select claims 1 and 3 as representative.

The Examiner finds that claim 1 includes all enzymes, whereas the Specification discloses a handful of hydrolases and specifically exemplifies only mannanase (Ans. 5-7). The Examiner finds that the scope of claim 1 is not enabled for the broadly disclosed enzymes (Ans. 6, 15-17).

Appellants argue the Specification provides numerous examples showing how coffee materials provide enzyme stability to enzymes such as mannanase (App. Br. 24). Appellants contend that the Specification describes that coffee-derived materials inhibit microbial growth and preserve enzyme activity during storage such that the Specification provides details regarding the function of the coffee ingredient for performing enzyme stability. *Id.* Appellants contend that the Examiner's reliance on the Maneepun¹ reference on page 7 of the Answer to show that a hydrolase such as protease is not necessarily stable in association with coffee ingredients is not the state of the art (App. Br. 24). Appellants argue that Maneepun does

¹ The Maneepun reference is not present in the Patent Office's electronic record database. Nevertheless, we were able to locate it in using the Examiner's citation on page 17 of the Answer. The Examiner makes findings regarding Maneepun that are not disputed by Appellants (Ans. 17-18; Reply Br. 6-9). Findings of the Examiner not shown to be erroneous may be accepted as fact. *In re Kunzmann*, 326 F.2d 424, 425 n.3 (CCPA 1964).

not disclose that coffee materials and/or coffee ingredients would not provide enzyme stability to proteases. *Id.*

“The specification must teach those skilled in the art how to make and use the full scope of the claimed invention without ‘undue experimentation.’” *In re Wright*, 999 F.2d 1557, 1561 (Fed. Cir. 1993). *See also, In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988). That *some* experimentation may be required is not fatal; the issue is whether the amount of experimentation required is “undue.” *Wands*, 858 F.2d at 736–37. Enablement, like obviousness, is a question of law which we independently review, although based upon underlying factual findings which we review for clear error. *See id.* at 735.

In the present appeal, Appellants’ claim 1 is directed broadly to any “enzyme.” The Specification discloses that enzymes preferred for use in the present invention are hydrolases and lists seven hydrolase enzymes (Spec. ¶ 11). The Specification further discloses that incorporating enzymes in coffee processes may carry a degree of complexity (Spec. ¶ 12). The Specification only provides working examples using the mannanase enzyme with the coffee-derived stabilizers (Spec. ¶¶ 26-42).

The Examiner finds that the art is unpredictable as evidenced by Maneepun that teaches that the autolysis of proteases (one of the hydrolases in Appellants’ list of preferred enzymes) is a factual phenomenon (Ans. 18). The Examiner finds that proteases may be unstable by their very nature and Appellants’ evidence does not show that all enzymes are stabilized by coffee derived materials. *Id.* Appellants do not respond to or otherwise show reversible error with these findings of the Examiner. Rather, Appellants rely

on the declaration of David C. A. Neville (hereinafter the “Neville Declaration”) as showing that one of ordinary skill in the art would have been able to use coffee-derived stabilizers to stabilize any enzyme (Reply Br. 7-8). Although the Neville Declaration at ¶ 11 opines that one of ordinary skill in the art would have understood from the Specification’s disclosure of the list of hydrolases how to stabilize a variety of different enzymes, no objective evidence has been proffered that such stabilization would have been a matter routine skill in the art not requiring undue experimentation.

Contrary to the Neville Declaration, the Examiner cites to Maneepun as showing that proteases autolyze and it is unpredictable whether coffee-derived materials would in fact stabilize all enzymes, including proteases. Indeed, Appellants’ Specification describes that including enzymes in coffee materials presents a “degree of complexity.” Appellants’ Specification only exemplifies the use of mannanase with the coffee-derived stabilizers. Given the breadth of claim 1, the narrow showing in the Specification, and the Examiner’s evidence of unpredictability in the art via the Maneepun reference, we conclude that the Examiner has met the initial burden of establishing a prima facie case that the scope of claim 1 is not enabled by the very limited showing in the Specification.

Claim 3, which lists fifteen hydrolases that may be used as the enzyme in claim 1, is not enabled for the same reasons noted above. Specifically, the Examiner has provided evidence that protease, a hydrolase enzyme, autolytically degrades and stabilization is achieved using physicochemical principles that result in modification of NH₂ groups of

proteases. It is unpredictable if all the listed hydrolases will be stabilized in accordance with coffee-derived materials of the claimed invention absent undue experimentation. Indeed, the Specification discloses that combining enzymes with the coffee-derived materials may involve a complexity. It is noteworthy that the examples in the Specification only include soluble coffee as the coffee-derived material (Spec. ¶¶ 26-27). The Specification discloses that coffee-derived materials includes soluble coffee, roast and ground coffee, coffee oils, spent (i.e., partially extracted) coffee grounds, ground green coffee beans, aqueous coffee extract, green coffee bean extracts, and the like, as well as mixtures thereof (Spec. ¶ 21). Given the disclosed complexity of combining enzymes and coffee-derived materials, and the breadth of the claims, the preponderance of the evidence favors the Examiner's conclusion of lack of enablement for the listed enzymes of claim 3.

On this record, we affirm the Examiner's § 112, first paragraph, rejection for lack of enablement.

REJECTIONS (4) AND (5): §103

The Examiner's findings and conclusions regarding Colton, Fadiaz, Habich, and Daglia are located on pages 9 to 12 of the Answer. The Examiner's rejection is based upon Colton teaching the use of enzymes with coffee, but Colton fails to teach that the coffee ingredients stabilize the enzymes (Ans. 9). The Examiner finds that Daglia and Fadiaz teach that coffee has antimicrobial properties such that Colton's combination of an enzyme with coffee-derived materials would provide microbial stability to the enzyme (Ans. 9-10, 11-12). The Examiner finds that Habich teaches

using gum Arabic and at least one plant protein to provide thermo-stability to enzyme compositions (Ans. 10). The Examiner finds that coffee, like gum Arabic contains arabino galactans, such that Habich would have suggested using coffee to provide thermo-stability to enzymes (Ans. 10). The Examiner concludes that it would have been expected that hydrolytic enzymes such as cellulase or mannanase and coffee derived ingredients to be stable both microbially and thermally (Ans. 11).

Appellants argue that the Examiner's reasoning that Habich's teaching to use gum Arabic, which contains arabino galactans, as a stabilizer for enzymes would have suggested using coffee-derived ingredients that include arabino galactans is faulty (App. Br. 30-31). Appellants contend that the Neville Declaration establishes that arabino galactans found in coffee are very different than the arabino galactans found in gum Arabic (App. Br. 31). Appellants contend that Habich would not have suggested using coffee-derived arabino galactans as enzyme stabilizers. *Id.* Appellants refer to the declaration of Erik Whalen-Pedersen (hereinafter the "Whalen-Pedersen Declaration") as discussing that none of the cited references disclose or suggest using coffee-derived materials to stabilize enzymes (App. Br. 32).

Appellants' arguments are not persuasive because Habich discloses gum Arabic and/or a plant protein may be used as an enzyme stabilizer (Habich 5:27-30). Habich discloses that enzyme "stability" in the context of the disclosure "relates to all specifications of an industrial enzyme, which comprise aspects such as activity, specificity, shelf-life stability, mechanical stability, microbial stability, toxicity, chemical composition, and physical parameters . . . and thermal inactivation" (Habich 5:9-15). Habich further

discloses that the plant protein enzyme stabilizer may be derived from coffee including *Coffea Arabica* (Habich 19:8-9; 22:40-41). In other words, Habich explicitly teaches using coffee-derived plant proteins as stabilizers for enzymes. Habich discloses that enzymes that may be stabilized include cellulases as claimed by Appellants (Habich 25:4-5, 26-29).

We agree with the Examiner that Colton's coffee-derived material and enzyme mixture inherently possesses stability for the cellulase and mannanase enzymes due to coffee's anti-microbial properties as taught by Fadiaz and Daglia. We add that the Examiner's analysis based upon the similarity of the arabino galactans in gum Arabic and coffee is not necessary to our conclusion that the claimed invention would have been obvious. Rather, Habich explicitly states that coffee-derived plant proteins may be used a stabilizer for enzymes that include cellulases and mannanases. Habich further teaches that stability within the meaning of the Habich references includes microbial stability and enzyme activity (Habich 5:9-15). In other words, the coffee-derived enzyme stabilizer in Habich provides both microbial and thermal stability to the enzyme. This Habich teaching underscores the Examiner's finding that Fadiaz's and Dagilia's use of coffee-derived materials with Colton's enzyme would provide microbial stability to the enzyme. Accordingly, using coffee-derived material to impart thermal-stability in addition to antimicrobial properties to a cellulase or mannanase enzyme would have been obvious over the teachings of Colton, Habich, and Fadiaz or Daglia.

With regard to rejection (5), Appellants argue that Colton, Habich, Fadiaz or Daglia and Sachlehner fail to teach the use of soluble coffee, roast

and ground coffee, coffee oil, spent coffee grounds, ground green coffee beans, aqueous coffee extract, green coffee bean extract, and mixtures thereof (App. Br. 34). Contrary to Appellants' argument, Habich teaches the use of coffee as a stabilizer and Colton teaches using "expended coffee grounds" in the examples (Habich 22:40-41; Colton col. 4, ll. 37-38). Accordingly, the prior art teaches that coffee-derived materials for enzyme stabilization would have included using spent coffee grounds as the starting material.

On this record, we affirm the Examiner's § 103 rejections over Colton in view of Habich, and Daglia or Fadiaz. We further affirm the Examiner's § 103 rejection over Colton in view of Habich, Sachslehner, and Daglia or Fadiaz. Because we rely on different factual findings than the Examiner with regard to Habich teaching the use of coffee-derived plant proteins as enzyme stabilizers, we denominate our affirmance of these § 103 rejections new grounds of rejection.

DECISION

The Examiner's decision is affirmed.

This decision contains new grounds of rejection pursuant to 37 C.F.R. § 41.50(b) for claims 1–20. This section provides that "[a] new ground of rejection . . . shall not be considered final for judicial review."

Section 41.50(b) also provides that the Appellants, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of the appeal as to the rejected claims:

Appeal 2014-009240
Application 11/279,157

(1) *Reopen prosecution.* Submit an appropriate amendment of the claims so rejected or new evidence relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the proceeding will be remanded to the examiner. . . .

(2) *Request rehearing.* Request that the proceeding be reheard under § 41.52 by the Board upon the same record. . . .

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

ORDER

AFFIRMED & NEW GROUND OF REJECTION
PURUSANT TO 37 CFR § 41.50(b)