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EXHIBIT A

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

JARROW FORMULAS, INC.
Respondent and Requester
v.

SOFT GEL TECHNOLOGIES, INC.
Patent Owner and Appellant

Appeal 2015-004072
Reexamination Control 95/002,411
Patent 8,147,826 B2
Technology Center 3900

Before CHUNG K. PAK, RICHARD M. LEBOVITZ, and JEFFREY B. ROBERTSON, *Administrative Patent Judges*.

LEBOVITZ, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on the appeal by Patent Owner from the Patent Examiner's final rejection of claims 1, 2, and 5–15 in the above-identified *inter partes* reexamination of United States Patent 8,147,826 B2. The Board's jurisdiction for this appeal is under 35 U.S.C. §§ 6(b), 134, and 315 (pre-AIA). We affirm.

EXHIBIT A

STATEMENT OF THE CASE

The patent in dispute in this appeal is United States Patent 8,147,826 B2 ("the '826 patent") which issued April 3, 2012. Patent Owner and the real party in interest is Soft Gel Technologies, Inc. Appeal Br. 1. Patent Owner is also the Appellant in this appeal.

Jarrow Formulas, Inc. ("Requester") requested *inter partes* reexamination of the '826 patent under 35 U.S.C. §§ 311–318 and 37 C.F.R. §§ 1.902–1.997. Request for *Inter Partes* Reexamination dated September 15, 2012 ("Request"). Requester is the Respondent in this proceeding.

In the Right of Notice of Appeal ("RAN"), the Examiner rejected claims 1, 2, and 5–15 as follows:

1. Claims 1, 2, and 6–15 under 35 U.S.C. § 103(a) as obvious in view of Khan '786,[1] Nazzal,[2] Fenaroli[3] with Exhibits B-F,[4] Folkers,[5] Chopra,[6] and Davidson.[7] RAN 6.

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[1] U.S. Patent No. 7,588,786 B2, issued September 15, 2009, to Mansoor A. Khan and Sami Nazzal.
[2] Sami Mahmoud Nazzal, Eutectic-Based Self-Nanoemulsified Drug Delivery Systems For Solid Oral Dosage Forms (August 2002) (Ph.D. dissertation, Texas Tech University)
[3] Giovanni Fenaroli, Fenaroli's Handbook of Flavor Ingredients, vol. 1, p. 389, 2nd edition, CRC Press, Inc. 1975.
[4] Wouter A. Duetz et al, "Biotransformation of D-Limonene to (+) *trans*-Carveol by Toluene-Grown *Rhodococcus opacus* PWD4 Cells," 67(6) Applied Environmental Microbiology 2829–2832 (June 2001) (Exhibit B); Luigi Mondello et al., "Multidimensional Capillary GC-GC for the Analysis of Real Complex Samples. 3. Enantiomeric Distribution of Monoterpene Hydrocarbons and Monoterpene Alcohols of Mandarin Oils," 46(1) J Agric. Food Chem. 54-61 (Jan. 19, 1998) (Exhibit C); World Health Organization, 56 IARC Monographs on the Evaluation of Carcinogenic Risks to Humans 135-162 (1993) (Exhibit D,

2. Claims 1, 2, and 6–15 under 35 U.S.C. § 103(a) as obvious in view of Khan '786, Fenaroli with Exhibits B-F, Motoyama[8] in combination with Patent Owner's alleged admissions regarding Motoyama, and Chopra. RAN 10.

3. Claims 5 and 7 under 35 U.S.C. § 103(a) as obvious in view of Khan '786, Fenaroli with Exhibits B-F, Motoyama in combination with Patent Owner's alleged admissions regarding Motoyama, and Steele.[9] RAN 14.

4. Claims 1, 2 and 5–15 on the ground of nonstatutory obviousness-type double patenting over amended claims 1–24 in Reexamination Control 95/002,396 of U.S. Patent No. 8,124,072. RAN 15. This is a provisional rejection. *Id.*

In their Appeal Brief, Patent Owner did not provide arguments for the obvious type double-patenting rejection. We thus summarily affirm this rejection.

There are related appeals and trials. Patent Owner identifies two District Court actions related to the current reexamination which involves Khan '786: Civil Action No. 2:10-cv-08301-PSG-JCx (C.D. Cal.) and Civil Action No. 2:11-cv-00164-PSG-JCx (C.D. Cal.). Appeal Br. 1. There are also two related *inter partes* reexaminations, 95/002,396 and 95/002,405, which have been appealed to

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"IARC"); JBT Corporation, http://www.jbtcorporation.com (Jan. 15, 2012) (Exhibit E); Sigma-Aldrich Corp., Certificates of Origin for d-limonene and l-limonene (January 31, 2013) (Exhibit F).

[5] U.S. Patent No. 4,824,669, issued April 25, 1989, to Karl Folkers and Kazumasa Muratsu.

[6] U.S. Patent No. 6,740,338 B1, issued on May 25, 2004, to Raj K. Chopra.

[7] U.S. Patent Application No. 2004/0001874 A1, published on Jan. 1, 2004, to Michael H. Davidson et al.

[8] Moyotama et al., Patent Application Laid-Open Disclosure S57-42616, published Mar. 10, 1982.

[9] Steele, D., EP 0 888 774 A2, published Jan. 7, 1999.

the Patent Trial and Appeal Board ("PTAB"), but which have not been decided. *Id.*

Claim

Claim 1 is the only independent claim on appeal and reads as follows (underlining and brackets indicate amendments relative to the original claims):

> 1. A method of preparing a soft gel capsule, comprising the steps of: (a) mixing coenzyme Q-10 with a sufficient quantity of d-limonene [a monoterpene] suitable to dissolve said coenzyme Q-10 and form a solution, with the proviso that said solution is not part of an emulsion, suspension, or elixir; wherein the amount of coenzyme Q-10 in said solution is about 15% up to about 60% coenzyme Q-10 by weight; (b) mixing said solution with an acceptable carrier to form a composition, with the proviso that said composition is not an emulsion, suspension, or elixir; and (c) encapsulating said composition in a soft gel capsule.

Background

The '826 patent teaches that CoQ-10 (coenzyme Q10),[10] commonly known as ubiquinone, is essential for the production of cellular energy. '826 patent, col. 1, ll. 21–24. The '826 patent describes clinical studies in which Q10 supplementation has been found to support blood pressure and cholesterol levels and improve cardiovascular health. *Id.* at col. 1, ll. 48–51. The '826 patent discloses that Q10 is sparingly soluble in most hydrophilic solvents, such as water, which limits its bioavailability. *Id.* at col. 1, ll. 55–59. The '826 patent characterized the invention as "the surprising discovery that ubiquinone (CoQ-10) can be readily dissolved in varying concentrations in monoterpenes." *Id.* at col. 2, ll. 49–51. This approach was said in the '826 patent to have satisfied the "need in

[10] For brevity, we use the abbreviation "Q10" throughout this decision. The Examiner also used the abbreviation "Q-10."

the art for an improved methodology to deliver increased amount of bioavailable CoQ-10 to an individual in need thereof." *Id.* at col. 1, ll. 60–62. The monoterpenes described in the '826 patent include limonene and carvone. *Id.* at col. 3, ll. 53–57.

CLAIM INTERPRETATION

Claim 1 is directed to a "method preparing a soft gel capsule." The method comprises three steps. The first step (a) comprises "mixing coenzyme Q-10 with a sufficient quantity of d-limonene suitable to dissolve said coenzyme Q-10 and form a solution." The Examiner construed the "mixing" step to result in dissolving the Q-10 in the d-limonene to form a solution. RAN 17:7–8. While the claim requires a sufficient quantity of d-limonene, it does not require pure d-limonene. It can be provided in other forms, including as a component of lemon oil as found by the Examiner.

The second step (b) of the claim requires mixing the solution with a carrier to form a composition, and the third step (c) is directed to encapsulating the composition in a soft gel capsule. While the Examiner construed step (a) to require that a solution is made, the Examiner stated that the claim does not require "the d-limonene solubilized coenzyme Q-10 . . . to remain dissolved in the final composition." RAN 5. Patent Owners did not challenge the Examiner's claim construction. Appeal Br. 6–7.

The claim excludes the solution and composition from being "part of an emulsion, suspension, or elixir."

REJECTION 1 INVOLVING KHAN '786

With respect to step (a), the Examiner found that Khan '786 and Nazzal describe dissolving Q10 in a sufficient quantity of lemon oil, which contains 90% or more limonene. RAN 7. The Examiner found the d-limonene is the main constituent of lemon peel oil. *Id.* The Examiner found that Khan '786 and Nazzal describe melting the Q10 and lemon oil to form a solution. *Id.*

The Examiner also found that each of Khan '786 and Nazzal describes steps (b) and (c) of claim 1, including mixing the solution with a carrier polyoxyl 35 castor oil and then encapsulating it in a soft gel. *Id.* The Examiner stated that both Khan '786 and Nazzal describe "the method of first solubilizing coenzyme Q10 in essential oils such as lemon oil, then mixing it with other ingredients to form a composition that can be filled into a soft gelatin capsule (Khan, Fig. 4; col. 4, lines 35-52; Nazzal, Fig. 4.13; pages 112, 125 and 169)." *Id.* at 6.

Additional publications were cited by the Examiner to reach limitations in the dependent claims. *Id.* at 8–9. Patent Owner has not argued these dependent claims separately.

Discussion

Before reaching the issue of whether the steps of claim 1 are met or suggested by Khan '786 and Nazzal, we shall begin with a discussion of the prior art. Since Khan '786 and Nazzal contain overlapping disclosures, we have focused the discussion on Khan '786.

Khan '786 describes SNEDDS, which is an acronym for the eutectic-based semisolid self-nanoemulsified drug delivery system (SNEDDS) which serves as a self-emulsifying vehicle for a drug. Khan '786, col. 2, ll. 32–35. SNEDDS

comprises polyoxyl 35 castor oil (also referred to as "Cremophor") as a surfactant, essential oils, and a pharmacologically effective drug. *Id*. at col. 2, ll. 35–39. The preferred drug is Q10. *Id*. at col. 2, ll. 47–49. The essential oils are preferably volatile oils selected from the group comprising menthol, spearmint oil, peppermint oil, lemon oil, and anise oil. *Id*. at col. 2, ll. 43–45. Khan '786 teaches that Q10 forms a eutectic mixture with the essential oil that depresses the melting temperature of Q10, enabling it to become an "oily phase" at body temperature or below. Khan '786 teaches:

> An increase in percent essential oil causes a gradual decrease in the melting temperature of CoQ_{10}. At sufficient concentration of the volatile oil it becomes feasible to convert CoQ_{10} into an oily phase at or below body temperatures.

Id. at col. 6, ll. 36–40. Khan '786 made these observations about melting temperature depression with several essential oils, including lemon oil. *Id*. at col. 6, ll. 24–36.

Khan '786 teaches that the eutectic mixture formed upon melting facilitates the administration of poorly soluble drugs, such as Q10, to patients by improving their "dissolution." *Id.* at col. 1, 15–18; col. 2, ll. 59–61; col. 5, ll. 47–50.

Khan '786 explains:

> A SNEDDS contains an isotropic mixture of oil, surfactant, co-surfactant and drug, which forms a fine oil-in-water emulsion when introduced into an aqueous medium under gentle agitation. In a eutectic-based SNEDDS, the melting point depression method allows the oil phase containing the drug itself to melt at body temperature from its semisolid consistency and disperse to form emulsion droplets in nanometer size range.

Id. at col. 2, ll. 52–59 (emphasis added).

Thus, when SNEDDS, comprising Q10 and lemon oil (the "essential oil"), is exposed to body temperature it melts. *Id.* at col. 7, ll. 49–51. "Extra time provided by HPMC capsules [containing Q10 and lemon oil] allows the formula to completely melt at body temperature before its exposure to body fluids." *Id.* at col. 10, ll. 33–36. Once exposed to the body fluids, the SNEDDS will self-emulsify in the fluid ("dissolution medium") delivering the drug. *Id.* at col. 18, ll. 58–60.

We next turn to the claim. For step a) of dissolving Q10 in d-limonene, the Examiner cited the teachings discussed above involving melting Q10 in lemon oil. RAN 7. As indicated above, lemon oil contains d-limonene. *Id.* The Examiner identified Khan '786, Figure 4 and column 4, lines 35-52, and Nazzal, Figure 4.13 and pages 112, 125 and 169 as teaching b) mixing the solution with a carrier to form a composition and c) encapsulating the composition into a capsule. *Id.* at 6–7.

The disclosure of Khan '786 at column 4, lines 35–52, does not describe the form in which Q10 and lemon oil (the source of d-limonene) are encapsulated into a capsule. It states: "The SNEDDS produces a semi-solid mass which is filled into soft or hard gelatin capsules. In a preferred embodiment, the SNEDDS are filled into hydroxypropyl methylcellulose (HPMC) capsules." Khan '786, col. 4, ll. 50–54. Further on, Khan '786 describes a preferred dosage form: "The SNEDDS is [sic, in] this preferred solid dosage form contained an oily mix of CoQ_{10} and lemon oil in a ratio of 1:1. Cremophor EL and Capmul MCM-C8 were added to the oily mix at a final concentration of 26.9% w/w each." *Id.* at col. 5, ll. 39-43. This passage characterizes the Q10 and lemon oil as an "oily mix" but describes it as having been subjected to melting prior to forming the solid dosage form, not dissolved in it as required by step (a) of claim 1. Patent Owner disputes

that the melting described in Khan '786 would dissolve the Q10 as in step (a) of the claim.

Example II of Khan '786 describes forming the oily mix by melting. *Id.* at col. 11, ll. 61–65. However, as argued by Patent Owner, the oily mix is subsequently formed into an emulsion, which is excluded by the claims. Appeal Br. 23-24. Specifically, Khan '786 teaches:

> CoQ_{10} and lemon oil at a ratio of 1:1 were accurately weighed into screw-capped glass vials and melted in a water bath at 37°C. Cremophor EL and Capmul MCM-C8 were added to the oily mix, each at a final concentration of 26.9% w/w. The resultant emulsion was mixed with a stirring bar until a transparent solution of SNEDDS was obtained. The SNEDDS then was allowed to cool at ambient temperature for 24 hours until a viscous paste was obtained. Nanoemulsion-absorbed granular material was obtained from a mixture of SNEDDS paste, Kollidon VA 64, Glucidex IT 12, and Avicel at a ratio of 0.11:0.13:0.56:0.2, respectively.

Khan '786, col. 11, l. 62 to col. 12, l. 6 (emphasis added.)

Thus, while melting is used to form an oily mix of Q10 and lemon oil, a step which the Examiner found to meet the limitation (a) of claim 1, subsequently when the oily mix is combined with a carrier as required by step (b) of the claim, an emulsion is formed. An emulsion is expressly excluded by the claim: "(b) mixing said solution with an acceptable carrier to form a composition, with the proviso that said composition is not an emulsion." Consequently, the evidence of record does not support the Examiner's determination that step (b) is described in Kahn '786.

Although there is considerable debate in this record about whether Kahn '786's step of melting Q10 in lemon oil results in its dissolution in the oil as recited in claim 1 of the '826 patent, and about the amount of d-limonene in lemon

oil, it is unnecessary for us to reach these issues. Even if the lemon oil contains sufficient d-limonene to "dissolve" the Q10 upon melting in Khan '786, the limitations of claim 1 are still not met because the subsequent steps of Khan '786 involve emulsification which is excluded by the claim.

The Examiner identified claim 1 of Khan '786 as teaching "the amount of lemon oil required to reduce the melting point of coenzyme Q10 from 51°C to ambient temperature or below is the amount of lemon oil sufficient to solubilize (dissolve) coenzyme Q10 at that reduced melting temperature (Khan '786, claim 1). RAN 18. Claim 1 of Khan '786 is reproduced below:

> 1. An orally administered dietary supplement including a eutectic-based delivery system, comprising:
>
> a) ubiquinone; and
>
> b) a sufficient amount of a volatile essential oil to solubilize the ubiquinone, and wherein said volatile essential oil is present in a sufficient amount to reduce the melting point of ubiquinone to 37°C. or below, and thereby solubilize the ubiquinone comprised in the orally administered dietary supplement at or below body temperature.

Khan '786's claim 1,[11] however, does not describe steps b) and c) of the claims at issue in this appeal. As discussed above, the further steps of the instantly claimed "method of preparing a soft gel capsule" are not described in Khan '786 because Khan teaches making an emulsification which is excluded by the claim. Consequently, even if claim 1 of Khan '786 were considered to describe dissolving Q10 in lemon oil,[12] the further steps b) and c) of instant claim 1 are not met by

[11] We note that the "melting point" and "solubilize" language were added to claim 1 of Khan '786 on October 19, 2004 and January 15, 2008, respectively.

[12] In the related litigation between Patent Owner and Requester (CV 10-8301 PSG(JCx), United States District Court, Central District of California), the district court stated in their Order construing claim 1 of Khan '786: "The fact that the

Khan '786.

Summary

For the foregoing reasons, we conclude that a preponderance of the evidence does not support the Examiner's determination that claim 1 and dependent claims 2, and 6–15 are obvious in view of Khan '786, Nazzal, Fenaroli with Exhibits B-F, Folkers, Chopra, and Davidson. The rejection is reversed.

2. REJECTION BASED ON MOTOYAMA

Motoyama is cited by the Examiner in the second rejection for its teaching of Q10 dissolved in carvone, which is monoterpene. RAN 10. Relying on declarations of record, the Examiner found that Motoyama discloses that "coenzyme Q10 is solubilized in l-carvone and d-carvone, preferably at 50:50 weight ratio at room temperature . . . . Motoyama further exemplify the preparation of a soft gelatin capsule containing coenzyme Q10 solubilized in l-carvone and soybean oil (Examples 1- 5)." *Id.* The Examiner further found that it would be obvious for one of ordinary skill in the art to use d-limonene instead of Motoyama's carvone to solubilize coenzyme Q10 because Khan '786 describes

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melting point reduction is used as a means to solubilize or dissolve and as a basis for distinguishing traditional methods indicates that melting is distinct from dissolving or solubilizing. Moreover, the specification as a whole is concerned with addressing the problem that ubiquinone is difficult to dissolve, and proposes the melting point reduction method as a solution to this problem. *See id.* 1:59-60; 6:57-60. Thus, the inventors knew what it meant to dissolve ubiquinone, and could have described and claimed the invention as 'dissolving' ubiquinone if that is what they thought they invented. Instead, the written description and claims define the invention not as dissolving ubiquinone, but as reducing its melting point." Exhibit III of Requester's Resp't Br.

lemon oil as highly effective and it contains d-limonene. *Id.* at 10–11. *See also* RAN 31. The Examiner concluded:

> Accordingly, it would have been obvious for one of ordinary skill in the art to use d-limonene to solubilize coenzyme Q10 to form a solution and then mix it with a carrier such as Motoyama's soybean oil to form a composition that is not an emulsion, suspension or elixir, thereby arriving at the method of **claim 1**. There would have been a reasonable expectation of success, especially in view of the teachings of Khan ['786] and Motoyama.

RAN 11.

In this case, we find there is adequate evidence that one of skill in the art would have had reason to try d-limonene to dissolve Q10 with a reasonable expectation of success.[13] The following facts are pertinent to this determination:

FF1. Motoyama teaches that carvone, a monoterpene ('826 patent, col. 3, ll. 53–57; Request 25), dissolves Q10. Motoyama 5 (col. 2) ("[C]arvone is a particularly preferred oil due to good solubility for ubiquinone and the property of dissolving an equal weight of ubiquinone at room temperature.") (*See also* Request 21.)

FF2. Motoyama discloses that other oils may be used:

> Moreover, refined oils that contain carvone (such as peppermint oil, spearmint oil, or the like) are preferred for the present invention due to the ability to dissolve ubiquinone well. Dissolution is good for jojoba oil and eucalyptus oil, and thus these oils are also suitable oils.

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[13] To decide whether a composition would have been obvious in light of the prior art, it must be determined whether, at the time of invention, "a person of ordinary skill in the art would have had reason to attempt to make the . . . [composition], . . . and would have had a reasonable expectation of success in doing so." *PharmaStem Therapeutics, Inc. v. ViaCell, Inc.*, 491 F.3d 1342, 1360 (Fed. Cir. 2007).

Motoyama 5 (col. 2). (*See also* RAN 10.)

FF3. Khan '786 discloses that essential oils, such as menthol, peppermint oil, spearmint oil, and lemon oil lower the melting temperature of Q10, making them useful in a delivery system for Q10. Khan '786, col. 6, ll. 24–27, col. 6, l. 65 to col. 7, l. 35.

FF4. D-limonene is a monoterpene ('826 patent, col. 3, ll. 53–57) and the main constituent of lemon peel oil (IARC 135; Lota[14] 799).

FF5. Nazzal recommended for future studies that "[c]hemical components of essential oils such as limonene, menthone, and carvone can be evaluated for their potency in exerting a eutectic effect." Nazzal 246; RAN 7, 32.

Discussion

A preponderance of the evidence supports the Examiner's determination that one of ordinary skill in the art would have had reason to utilize d-limonene to dissolve Q10.

First, Motoyama teaches that another monoterpene dissolves Q10 and teaches that some of the same oils (spearmint, peppermint) described as effective by Khan '786 are preferred for their ability to dissolve Q10.[15] FF1–FF3. Because of the overlap in disclosure of essential oils between Motoyama and Khan '786,

[14] Marie-Laure Lota et al., "Volatile Components of Peel and Leaf Oils of Lemon and Lime Species," 50(4) J. of Agric. and Food Chem. 796-805 (2002).
[15] The '826 patent described its invention as "the surprising discovery that ubiquinone (CoQ-10) can be readily dissolved in varying concentrations in monoterpenes." '826 patent, col. 2, ll. 49–51. However, it appears that Motoyama had at least already discovered the Q10 could dissolve in the monoterpene carvone, providing the same solution to the problem identified in the '826 patent of delivering increased amounts of bioavailable Q10. *Id*. at col. 1, ll. 60–62.

one of ordinary skill in the art would have had reason to have used Khan '786's oils in Motoyama's method in amounts sufficient to dissolve Q10, with a reasonable expectation that they would work. That is, since Motoyama teaches that spearmint and peppermint oil dissolve Q10, and Khan '786 teaches using these same oils in conjunction with Q10, the skilled worker would have basis to believe that Khan '786's lemon oil, when used in a sufficient amount, would work in Motoyama's method to *dissolve* Q10.

Second, while Khan '786 does not identify d-limonene as a component of lemon oil, d-limonene is a main constituent of lemon peel oil (FF4). The skilled worker would have had reason to use d-limonene in Motoyama's method because it is a monoterpene like Motoyama's carvone (FF1, FF4), and Nazzal explicitly suggested d-limonene for future studies (FF5).

Unlike the deficiency in Khan '786 where the soft gels comprised an emulsion which is excluded by the claim, evidence has not been provided that Motoyama's capsules comprising Q10 and carvone (Motoyama 5–6, Examples 1–5) are in the form of an emulsion, suspension, or elixir.

Patent Owner argues Khan '786 does not teach that lemon oil or d-limonene can be used to dissolve Q10. Appeal Br. 25. Patent argues that, "[o]n the contrary, Khan teach[es] melting point reduction as an alternative . . . approach to liquefying CoQ-10, precisely because it is difficult to dissolve." *Id.* Furthermore, Patent Owner contends there would be no reasonable expectation of success since Motoyama is directed to carvone and Khan '86 teaches melting, not dissolving. *Id.* at 26. Patent Owner states that Khan '786 "teaches away" from utilizing d-limonene to dissolve Q10 because "Khan uses melting point reduction because coenzyme Q-10 is difficult to dissolve." *Id.* Patent Owner argues that Khan '786's

subsequent publication (Khan 2004[16]) investigating d-limonene is evidence of nonobviousness:

> If it was obvious at the time of the '826 patent application, that d-limonene could be used to reduce the melting point of CoQ-10, then Khan himself [in Khan 2004], would not have been investigating subsequently whether d-limonene could be so-used. Similarly, if it was obvious that d-limonene could be substituted for Motoyama's carvone, then Khan would not have been teaching melting point reduction as an alternative to address the fact that CoQ-10 is difficult to dissolve.

Id. at 27.

Patent Owner's arguments are not supported by adequate evidence of record. Even if the disclosed mechanisms are different – where Khan '786 describes "melting" Q10 and Motoyama describes "dissolving" Q10 – Motoyama specifically teaches that spearmint and peppermint oils dissolve Q10 and these same oils are described by Khan '786 as depressing the melting temperature of Q10. Consequently, in view of Motoyama, the skilled worker would have recognized that certain oils that depress the melting temperature of Q10 also dissolve it when an adequate amount of such oil is used for a given amount of Q10. Based on this, the skilled worker would have had reason to try lemon oil and its main constituent d-limonene in Motoyama's method with a reasonable expectation that it would work because other oils shown to depress the melting temperature of Q10 were shown in Motoyama's experiments to dissolve it.

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[16] Anitha Palamakula, Mahmoud Soliman, Indra K. Reddy, and Mansoor A. Khan, "Preparation and *In Vitro* characterization of Self-Nanoemulsified Drug Delivery Systems of Coenzyme Q10 Using Chiral Essential Oil Components," Pharmaceutical Technology 74–88 (October 2004).

We do not agree that that Khan '786's later experiments with d-limonene is evidence of nonobviousness. Nazzal expressly suggested evaluating d-limonene (FF5), providing explicit evidence that one of ordinary skill in the art had reason to try it at the time of the invention. In view of this explicit suggestion in Nazzal, one of ordinary skill in the art would had reason to try d-limonene in Motoyama's method, as well, since d-limonene is a monoterpene like carvone which had been shown to dissolve Q10. Indeed, it was later shown by Khan 2004 that d-limonene dissolves Q10. As noted by Requester, Khan 2004 states "CoQ10 is soluble in R-limonene (i.e. d-limonene), with a solubility of about 571 mg/ml." Resp't Br. 12.

As held in *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421(2007):

> When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense.

There is no persuasive evidence of record that one of ordinary skill in the art would have had "to vary all parameters or try each of numerous possible choices until one possibly arrived at a successful result, where the prior art gave either no indication of which parameters were critical or no direction as to which of many possible choices is likely to be successful." *In re O'Farrell*, 853 F.2d 894, 903 (Fed. Cir. 1988); *Bayer Schering Pharma AG v. Barr Labs., Inc.*, 575 F.3d 1341, 1347 (Fed. Cir. 2009).

For the foregoing reasons, we conclude that a preponderance of the evidence supports the Examiner's determination that claim 1 is obvious in view of Khan '786, Fenaroli with Exhibits B-F, Motoyama in combination with Patent Owner's

alleged admissions regarding Motoyama, and Chopra. Claims 2 and 5–16 were not argued separately and thus fall with claim 1 and for the reasons set forth by the Examiner.

TIME PERIOD FOR RESPONSE

In accordance with 37 C.F.R. § 41.79(a)(1), the "[p]arties to the appeal may file a request for rehearing of the decision within one month of the date of: . . . [t]he original decision of the Board under § 41.77(a)." A request for rehearing must be in compliance with 37 C.F.R. § 41.79(b). Comments in opposition to the request and additional requests for rehearing must be in accordance with 37 C.F.R. § 41.79(c), (d), respectively. Under 37 C.F.R. § 41.79(e), the times for requesting rehearing under paragraph (a) of this section, for requesting further rehearing under paragraph (d) of this section, and for submitting comments under paragraph (c) of this section may not be extended.

An appeal to the United States Court of Appeals for the Federal Circuit under 35 U.S.C. §§ 141-144 and 315 and 37 C.F.R. § 1.983 for an *inter partes* reexamination proceeding "commenced" on or after November 2, 2002 may not be taken "until all parties' rights to request rehearing have been exhausted, at which time the decision of the Board is final and appealable by any party to the appeal to the Board." 37 C.F.R. § 41.81. *See also* MPEP § 2682 (8th ed., Rev. 7, July 2008).

In the event neither party files a request for rehearing within the time provided in 37 C.F.R. § 41.79, and this decision becomes final and appealable under 37 C.F.R. § 41.81, a party seeking judicial review must timely serve notice

on the Director of the United States Patent and Trademark Office. *See* 37 C.F.R. §§ 90.1 and 1.983.

AFFIRMED

peb

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EXAMINER
HUANG, EVELYN MEI

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

EXHIBIT B

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

JARROW FORMULAS, INC.
Respondent and Requester

v.

SOFT GEL TECHNOLOGIES, INC.
Patent Owner and Appellant

Appeal 2015-004072
Reexamination Control 95/002,411
Patent 8,147,826 B2
Technology Center 3900

Before CHUNG K. PAK, RICHARD M. LEBOVITZ, and JEFFREY B. ROBERTSON, *Administrative Patent Judges*.

LEBOVITZ, *Administrative Patent Judge*.

DECISION ON REHEARING

This is a decision on a Request for Rehearing filed September 30, 2015 by Patent Owner ("Req. Reh'g") in which Patent Owner requests reconsideration of the Patent Trial and Appeal Board Decision of August 31, 2015 ("Decision" or "Dec.") affirming the rejections of (1) claims 1, 2, and 6–15 under 35 U.S.C. § 103(a) as obvious in view of Khan '786, Fenaroli with Exhibits B–F, Motoyama, and Chopra; and (2) of claims 5 and 7 under

35 U.S.C. § 103(a) as obvious in view of Khan '786, Fenaroli with Exhibits B–F, Motoyama, and Steele. Dec. 3. Requester filed on comments in response to the Patent Owner's Request for Rehearing.

Patent Owner contends the Board erred in affirming the rejections based on Motoyama. Req. Reh'g 2.

The obviousness rejection over Motoyama was based on the finding that it would have obvious for one of ordinary skill in the art to use d-limonene instead of Motoyama's carvone to solubilize coenzyme Q10. It was stated in the Decision:

> Motoyama teaches that another monoterpene dissolves Q10 and teaches that some of the same oils (spearmint, peppermint) described as effective by Khan '786 are preferred for their ability to dissolve Q10. FF1–FF3. Because of the overlap in disclosure of essential oils between Motoyama and Khan '786, one of ordinary skill in the art would have had reason to have used Khan '786's oils in Motoyama's method in amounts sufficient to dissolve Q10, with a reasonable expectation that they would work. That is, since Motoyama teaches that spearmint and peppermint oil dissolve Q10, and Khan '786 teaches using these same oils in conjunction with Q10, the skilled worker would have basis to believe that Khan '786's lemon oil, when used in a sufficient amount, would work in Motoyama's method to *dissolve* Q10.

Dec. 13–14 (footnote omitted).

Findings 2 and 3 from the Decision are reproduced below:

FF2. Motoyama discloses that other oils may be used:

> Moreover, refined oils that contain carvone (such as peppermint oil, spearmint oil, or the like) are preferred for the present invention due to the ability to dissolve ubiquinone well.

> Dissolution is good for jojoba oil and eucalyptus oil, and thus these oils are also suitable oils.

Motoyama 5 (col. 2); *see also* RAN 10.

FF3. Khan '786 discloses that essential oils, such as menthol, peppermint oil, spearmint oil, and lemon oil lower the melting temperature of Q10, making them useful in a delivery system for Q10. Khan '786, col. 6, ll. 24–27, col. 6, l. 65–col. 7, l. 35.

The Decision reasoned, based on the above findings, and the additional suggestion by Nazzal that "[c]hemical components of essential oils such as limonene, menthone, and carvone can be evaluated for their potency in exerting a eutectic effect" (FF5) as in Khan '786, that "the skilled worker would have had reason to try lemon oil and its main constituent d-limonene in Motoyama's method with a reasonable expectation that it would work." Dec. 13, 15. We note that, while we characterized "d-limonene" as a "main constituent," we did not mean that d-limonene is necessarily present in amounts higher than any other constituent, but rather it is a characteristic component of lemon oil. Accordingly, since the characterization of "d-limonene" as a "main constituent" may be misleading, we **modify** the Decision on page 15 to state that d-limonene is "one of the main constituents" of lemon oil.

Patent Owner contends that the Board decision erred in finding that it would have been obvious to substitute d-limonene for carvone. Req. Reh'g 2. Specifically, Patent Owner contends that Khan '786 teaches that "lemon oil does not function in the same way or achieve the same result with Q10 as spearmint oil or peppermint oil." *Id.* at 3, 6–7. To support this position,

Patent Owner reproduced the following passage from Khan '786 (col. 7, ll. 44–49):

> [p]recipitation of CoQ_{10} . . . for the formulas made with anise oil, peppermint oil, and spearmint oils was however irreversible rendering them less effective for the preparation of emulsified systems. The use of lemon oil appears reasonable and attractive.

We have considered this argument but do not find it persuasive. The complete passage from Khan '786 reads as follows:

> Due to limited solubility of CoQ_{10} in surfactant, the use of cremophor EL as a model emulsifier not only induces crystallization of CoQ_{10} in the cooled supersaturated mixture but also may delay or retard re-melting the system at higher temperatures. The time necessary to melt different combinations of CoQ_{10}, essential oil and cremophor EL at 37° C. was recorded. When 60% w/w of cremophor EL was added, preparations made with 50 and 60% w/w lemon oil to CoQ_{10} melted within 5.3 and 1.8 min, respectively. Precipitation of CoQ_{10} at higher cremophor EL concentration for the formulas made with anise oil, peppermint oil and spearmint oils was however irreversible rendering them less effective for the preparation of emulsified systems. The use of lemon oil appears reasonable and attractive. At 50% w/w of lemon oil to CoQ_{10}, formulas would melt within 5 min from initial exposure to body temperatures.

Khan '786, col. 7, ll. 36–52.

Table 2 of Khan '786 shows the data described in paragraph reproduced above ("N/A" indicates "formulations where no melting time was observed within 24 hours." *Id.* at col. 7, ll. 14–16.)

TABLE 2

CrEL (%)	20%	40%	60%
Spearmint Oil			
60%	0.69 ± 0.13	1.56 ± 0.59	N/A
50%	4.38 ± 2.13	N/A	N/A
Peppermint Oil			
60%	1.11 ± 0.42	N/A	N/A
50%	8.17 ± 2.08	N/A	N/A
Anise Oil			
60%	0.83 ± 0.73	0.97 ± 0.27	N/A
50%	1.28 ± 0.63	2.33 ± 0.88	N/A
Lemon Oil			
60%	1 ± 0.17	1.29 ± 0.44	1.76 ± 0.23
50%	2 ± 0.29	3.56 ± 1.69	5.33 ± 1.48

Khan '786 did not state that lemon oil "does not function in the same way" as spearmint, peppermint, and anise oils as asserted by Patent Owner. Req. Reh'g 3. Rather, as indicated by Table 2 and the accompanying explanation, Cremophor EL ("CrEL") was an effective emulsifier for lemon oil at all concentrations tested. Cremophor EL was an effective emulsifier for spearmint, peppermint, and anise oils at lower concentrations, but at higher concentrations it was not. These results led Khan '786 to conclude that these oils were "less effective for the preparation of emulsified system," while lemon oil is "reasonable and attractive" for such purpose. Khan '786, col. 7, ll. 36–52. Patent Owner has not presented evidence that spearmint, peppermint, and anise oils function differently than lemon oil. From the table, it is evident that spearmint, peppermint, and anise oils do not melt over the complete range of Cremophor EL, but Patent Owner has not explained or provided evidence that these results mean they "function" in a different way from lemon oil in Khan '786's experiments. Req. Reh'g 6–7.

No evidence of carvone in lemon oil

Patent Owner contends that "one of skill in the art, recognizing that spearmint oil and peppermint oil were identified in Motoyama because they each contain carvone, would not expect success with lemon oil because there is no evidence that it contains carvone." Req. Reh'g 6.

It was explained in the Decision why it would have been expected that lemon oil, and its constituent d-limonene, would dissolve Q10 as described for carvone in Motoyama. First, the Decision recognized there was overlap in the oils found by Motoyama to dissolve Q10 and the oils found by Khan '786 to depress the melting temperature of Q10. Dec. 15. The Decision also found that the oils in each publication contain monoterpenes, namely, lemon oil contains d-limonene and the oils in Motoyama contain carvone – the active component identified by Motoyama. *Id.* at 5; FF1; FF4. Based on this overlap, the Decision concluded that one of ordinary skill in the art would have reasonably expected that the oils of Khan '786 would have worked in Motoyama's method. *Id.* In other words, because monoterpene-containing oils work in both methods, the skilled worker would have reasonable expected that lemon oil – also containing a monoterpene – would dissolve Q10 in Motoyama's method and so would d-limonene. When it was known from Motoyama that a monoterpene could dissolve Q10, the Examiner reasonable found that another monoterpene, d-limonene, would work to dissolve Q10, especially because of the overlap in oils described as effective in both methods. Patent Owner has not identified a flaw in this reasoning. Rather, Patent Owner simply argues that lemon oil does not

contain carvone (Req. Reh'g 6), but did not address the reasoning in the decision about the oils in each publication comprising monoterpenes (Dec. 14) as a basis for finding a reasonable expectation of success in using d-limonene in place of carvone.

Khan (2004)

After the filing date of Khan '786, a scientific article was published by Mansoor A. Khan and two other authors ("Khan (2004)"). "Khan" is the same person listed as the inventor of Khan '786 and author of Khan (2004). The publication evaluated R-limonene and S-limonene (the d- and l-enantiomers) in the eutectic-based self-nanoemulsified drug delivery system (SNEDDS) described in Khan '786. Patent Owner contends that the Decision dismissed the impact of Khan (2004) on obviousness. Req. Reh'g 8. Patent Owner contends:

> Khan's own 2004 Article makes clear that it was not obvious, at the time of the invention of the '826 patent, to make the type of substitution the Board proposes (i.e., substitute d-limonene for carvone). Dr. Khan himself was studying years later, whether d-limonene would reduce the melting point of Q10. See Khan's 2004 Publication (Ex. II).

Id. at 7.

> But well after that date, it was not obvious to Khan that d-limonene could be substituted for his own lemon oil. Khan investigated this precise substitution with a team of eminent scientists. A peer-reviewed article was published, and the investigation was the focus of a Ph.D. dissertation. Eminent scientists don't publish peer-reviewed journal articles and award Ph.D.'s for the investigation of obvious chemical substitutions.

Id. at 8.

We fully considered Khan (2004), but did not find that it persuasively demonstrated the non-obviousness of the claimed subject matter. Dec. 16. Patent Owner makes the statement that "Eminent scientists don't publish peer-reviewed journal articles and award Ph.D.'s for the investigation of obvious chemical substitutions," but did not provide evidence to substantiate this assertion. Req. Reh'g 8. An argument made by counsel in a brief does not substitute for evidence lacking in the record. *Estee Lauder, Inc. v. L'Oréal, S.A.*, 129 F.3d 588, 595 (Fed. Cir. 1997).

Khan (2004) states that "it was of interest to study natural substances such as chiral components of essential oils for solubilizing drug compounds with poor aqueous solubility." Khan (2004) 74. Khan (2004) describes reason to use limonenes, but states that the "available literature is scarce, however, about using these components to prepare SNEDDS." *Id.* Khan (2004) states that the "study described in this article evaluated chiral molecules, limonenes in SNEDDS." *Id.* The publication characterizes SNEDDS prepared with limonenes. Khan (2004) 86 ("Conclusion"). Patent Owner has not pointed to evidence in the publication that it was not obvious to have utilized limonenes to prepare SNEDDS. Simply because Khan (2004) undertook a study to evaluate limonenes in SNEDDS, does not mean that it would not have been obvious they would have worked to some extent as found in the Decision. Moreover, the obviousness determination in the Decision was based on teachings in Motoyama (Dec. 15), and Nazzal's explicit suggestions (*id.* at 15–16). Motoyama is not mentioned in Khan (2004) nor have we been told whether the authors were aware of it. Thus,

the Decision is based on publications that were not cited nor addressed by Khan (2004).

Does Khan '786 teach away from the claimed subject matter?

Patent Owner contends that Khan '786 teaches away from the claimed subject matter because it "teaches that CoQ10 must be liquefied through melting, precisely because it cannot be dissolved. Rather than teaching that d-limonene dissolves CoQ10, Khan teaches that because CoQ10 is difficult to dissolve: it has 'poor water solubility' and only 'limited solubility in fixed oils and triglycerides.' Khan at 1:46, 1:59-60." Req. Reh'g 9–10.

While the passages cited from Khan '786 refer to the poor solubility of Q10 in water and "fixed oils or triglycerides" (Khan '786 at col. 1, ll. 46–62), the rejection is based on dissolving Q10 in d-limonene, which Patent Owner has not established is a fixed oil or triglyceride. The rejection is also based on the obviousness of utilizing d-limonene, a monoterpene, in Motoyama's method of dissolving Q10 using another monoterpene, carvone. We have not been directed to evidence that Khan '786 teaches away from Q10 dissolving in d-limonene when it was known from Motoyama that a monoterpene could dissolve Q10. Patent Owner has focused on Khan '786, while failing to address the teaching in Motoyama relied upon in the Decision.

Board merges concepts of melt and dissolve

Patent Owner contends that "[m]elting and dissolving are two completely different mechanisms, as Khan teaches, not different degrees of

the same mechanism." Req. Reh'g 12. Patent Owner contends that the Boarded "merged" these concepts.

First, Patent Owner did not provide evidence that the two mechanisms are "completely different." Patent Owner has not provided scientific evidence that the mechanisms are discrete. In fact, in the related appeal (2015-007926) in Reexamination Control 95/002,405 of US Patent 8,105,583 which was mailed after the Request for Rehearing in this appeal, the Board extensively discussed this issue. *See* Decision in Appeal 2015-007926 (mailed February 2, 2016), e.g., pages 9–12.

Second, the obviousness determination was not based on a mechanism. The Decisions was based on the teachings in Motoyama: "in view of Motoyama the skilled worker would have recognized that certain oils [which contain monoterpenes] that depress the melting temperature of CoQ10 also dissolve it when an adequate amount of such oil is used for a given amount of CoQ10." Dec. 15. There is no merging of the concepts of dissolving and melting in the Decision. Patent Owner has made conclusory statements about the mechanism of melting and dissolving being "completely" different and has provided no scientific evidence to support this contention.

Nazzal

We agree with Patent Owner that we erred on pages 14 and 16 of the Decision in stating that "Nazzal expressly suggested evaluating d-limonene (FF5), providing explicit evidence that one of ordinary skill in the art had reason to try it at the time of the invention." Req. Reh'g 16. However,

Finding of Fact 5 correctly stated that "Nazzal recommended for future studies that '[c]hemical components of essential oils such as limonene, menthone, and carvone can be evaluated for their potency in exerting a eutectic effect.' Nazzal 246; RAN 7, 32." Dec. 13.

This error does not change our determination that the claims would have been obvious to one of ordinary skill in the art. Since Nazzal does not mention the specific limonene enantiomer (FF5), it would have been obvious to have evaluated the d- -form (FF4) for its potency in lowering the melting temperature of Q10 and in Motoyama's method.

d-limonene as the main constituent of lemon oil

Patent Owner also argues that d-limonene is not the main constituent of lemon oil as stated in the Decision. Req. Reh'g 13. We agree with Patent Owner that Lota provides evidence that d-limonene is not always the main constituent of lemon oil peel. *See* Lota (Table 1, e.g., species labeled "Bor"). However, the Decision was not based on finding that d-limonene is the main constituent of lemon oil, but rather that it is monoterpene, the suggestion by Nazzal to use limonene in Khan 786's method, and the teaching Motoyama that a monoterpene dissolves Q10.

SUMMARY

The Decision is modified as follows:

(1) to correct all instances (pages 14 and 16) of the Decision in which it was said that Nazzal suggested "d-limonene." The Decision is corrected by replacing "d-limonene" with "limonene."

(2) to delete "the main" from Finding of Fact 4 and replace with "a", and to delete "main" from page 14 which references FF4, and from page 15 (third line up from bottom).

(2) to replace the last sentence on page 15 of the Decision with the following sentence:

> Based on this, the skilled worker would have had reason to try d-limonene, one of the main constituents in lemon oil, in Motoyama's method with a reasonable expectation that it would work because other oils containing monoterpenes shown to depress the melting temperature of Q10 in Khan '786 were shown in Motoyama's experiments to dissolve it.

However, we decline to change the outcome of the Decision with respect to the disposition of the rejections of the claims.

REHEARING DENIED

Appeal 2015-004072
Reexamination Control 95/002,411
Patent 8,147,826 B2

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