IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

CARGILL, INCORPORATED AND INTERNATIONAL FLORA TECHNOLOGIES LTD.,	)	
Plaintiffs,	)	C.A. No. 22-979 (RGA) (SRF)
v.	)	**CONFIDENTIAL**[1]
VANTAGE SPECIALTY CHEMICALS INC.,	)	
Defendant.	)	

VANTAGE SPECIALTY CHEMICALS, INC.'S
INITIAL INVALIDITY CONTENTIONS

Pursuant to the Scheduling Order (D.I. 15), Defendant Vantage Specialty Chemicals, Inc. ("Vantage" or "Defendant") hereby provides the following Initial Invalidity Contentions for each asserted claim, as well as the related invalidating references (*e.g.*, publications, manuals, and patents).

I. PRELIMINARY STATEMENT AND RESERVATION OF RIGHTS

Vantage's Initial Invalidity Contentions address the following claims of the patent-in-suit—U.S. Patent No. 11,248,245 ("the '245 Patent")—which are the claims currently asserted by Plaintiffs Cargill, Inc. and International Flora Technologies Ltd. (collectively, "Plaintiffs"), according to their December 15, 2022 Initial Infringement Contentions against Vantage:

Patent-In-Suit	**Asserted Claims**
The '245 Patent	1, 2

[1] The confidential designation applies only to sentences below that cite to Plaintiffs' December 15, 2022 Initial Infringement Contentions. *See, e.g.*, Section V.A.

CARGILL 2005
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IPR2023-00589

For the reasons set forth in the following sections, each of claims 1 and 2 of the ’245 Patent is invalid pursuant to 35 U.S.C. §§ 101, 102, 103, and/or 112.

These Initial Invalidity Contentions are based on Vantage’s current knowledge of the ’245 Patent, the prior art, Plaintiffs’ December 15, 2022 Initial Infringement Contentions, and information presently and reasonably available to Vantage. This litigation is in its early stages, and Vantage’s investigation of the prior art is ongoing. Vantage reserves the right to supplement, amend, modify, revise, or correct any aspect of these invalidity contentions, and to provide additional information as such information becomes available through discovery or otherwise. In particular, Vantage reserves the right to supplement, modify, or amend its invalidity contentions in light of further investigation, fact and expert discovery, any Order of the Court, including rulings on claim construction, and any subsequent allegations made by Plaintiffs, including with respect to the level of skill in the art and the qualifications of a person of skill in the art (a “POSA”). Vantage further reserves the right to supplement, modify, or amend its invalidity contentions as permitted by the Federal Rules of Civil Procedure, the Default Standard for Discovery, or by Order of the Court. Vantage also reserves the right to supplement its invalidity contentions should Plaintiffs subsequently amend their disclosures in any way, or to otherwise modify their infringement allegations against Vantage (while reserving all rights to challenge any attempt by Plaintiffs to make such an amendment or modification).

Among other things, Vantage identifies obviousness combinations below; and, to the extent Plaintiffs allege that a reference does not disclose or teach a specific element, Vantage specifically identifies which references teach that element, and render the claim as a whole obvious, as well as reasons to combine such references and the reasonable expectation of success of such combinations.

To the extent that Vantage's invalidity contentions rely on or otherwise embody particular constructions of terms or phrases in the asserted claims, Vantage is not proposing any such constructions as proper constructions of those terms or phrases at this time. The Court established separate deadlines for the parties' proposed claim constructions in the Scheduling Order, and Vantage will disclose its proposed constructions according to those deadlines. *See* D.I. 15 at 6-8. For purposes of these Initial Invalidity Contentions, Vantage may apply alternative claim construction positions, without conceding such constructions are proper, and will generally apply the broadest conceivable constructions of each term or phrase. In particular, certain of Vantage's invalidity contentions may be based on claim constructions that appear to underlie Plaintiffs' December 15, 2022 Initial Infringement Contentions. Vantage, however, (i) does not concede that Plaintiffs' apparent constructions are proper, (ii) reserves the right to contest any such constructions, and (iii) reserves the right to respond to alternative constructions proposed by (or indicated by) Plaintiffs. Moreover, Vantage does not admit that any accused process, or any of Vantage's other processes, infringe any of the asserted claims. Nothing stated herein shall be treated as an admission or suggestion regarding either the scope of any of the asserted claims or that any of the accused technology meets any limitations of the asserted claims.

Nothing stated herein shall be construed as an admission or a waiver of any particular construction of any claim term. Moreover, the use of terms herein from the '245 Patent should not be understood to mean that such terms as used in the '245 Patent or claims thereof are definite or otherwise comply with 35 U.S.C. § 112. Likewise, the use of terms herein from the '245 Patent should not be understood to suggest or imply a common, usual, ordinary, customary, plain, or accepted meaning in the art for any such term.

Vantage has, in the attached Exhibits A to S and AA to AF, identified where the prior art references disclose subject matter recited in preambles of the asserted claims, without regard to whether the preambles are properly considered to be limitations of the asserted claims. Vantage reserves the right to argue that the preambles are or are not limitations during the claim construction proceedings in this litigation. *See* D.I. 15 at 6-8.

Vantage reserves the right to supplement, modify, or amend its invalidity contentions in response to any claim construction positions that Plaintiffs may take in this litigation or after the claims have been construed by the Court. For example, Vantage reserves the right to assert that a claim is directed to patent-ineligible subject matter, indefinite, not enabled, and/or fails to meet the written description requirement in light of any claim construction positions Plaintiffs assert or based on any claim construction from the Court. Likewise, prior art not included in this disclosure, whether or not known to Vantage, may be relevant depending upon the claim constructions that Plaintiffs assert or that the Court may adopt. Thus, Vantage reserves the right to supplement its invalidity contentions in light of newly discovered art or changes in claim constructions.

References disclosed as rendering a claim anticipated and/or obvious are representative and are not intended to be exhaustive. Other references disclosing the same or similar elements may be substituted for the cited references. Additional obviousness combinations of the references identified below are possible, and Vantage reserves the right to use any such combination(s) in this litigation. Motivation to combine can be inferred generally for all references within the field of art of the ’245 Patent. Furthermore, where references refer to or cite one another, motivation to combine may be specifically inferred, whether or not called out in a claim chart. Finally, Vantage’s identification of motivation to combine in the cited references should not be

taken as an admission or a representation that Vantage will not rely upon other tests for obviousness. *See KSR Int'l. Co. v. Teleflex Inc.*, 550 U.S. 398, 401 (2007). This includes showing any of the following: (1) that the combination of elements was obvious to try; (2) that the combination of elements according to known methods yielded predictable results; (3) that the substitution of one known element for another obtained predictable results; (4) that the application of a known technique to a known device, method, or product ready for improvement yielded predictable results; or (5) that known work in one field of endeavor prompted variations of such work for use in either the same field or a different one based on design incentives or other market forces because the variations are predictable to a POSA.

The identification of prior art that discloses a particular claim element in these contentions is not an admission that the claim element satisfies the requirements of 35 U.S.C. § 112. Where Vantage asserts that a claim is invalid under 35 U.S.C. § 112 (such as because of a failure to particularly point out and distinctly claim the alleged invention, failure to provide written description support, and/or failure to enable a POSA to make and use the claimed invention), Vantage has nonetheless provided prior art that renders the claim obvious on the assumption that Plaintiffs will contend that those claims are definite, supported by an adequate written description, and adequately enabled.

In addition to the prior art identified in these invalidity contentions, and any future supplement to these invalidity contentions, Vantage may rely on relevant portions of the '245 Patent; the prosecution history of the '245 Patent and all related patents and applications; all references listed in the References Cited portion of the '245 Patent and all related patents and applications; and fact and expert testimony.

II. PRIORITY DATES FOR THE ASSERTED CLAIMS

Plaintiffs' December 15, 2022 Initial Infringement Contentions do not identify a claimed priority date for each asserted claim of the '245 Patent. The '245 Patent was filed on December 19, 2014 and does not claim priority to any earlier-filed patent application. Therefore, the effective date of the '245 Patent is December 19, 2014, and the Leahy-Smith America Invents Act ("AIA") applies to the '245 Patent (because its effective filing date falls after March 16, 2013).

III. INVALIDITY UNDER 35 U.S.C. § 101

Vantage contends that claims 1 and 2 of the '245 Patent are directed to patent-ineligible natural phenomena and/or laws of nature.

At step one of *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 573 U.S. 208, 217-18 (2014), the asserted claims are directed to a natural phenomenon or law of nature, specifically, that enzymatically catalyzed transesterification of a feedstock comprising jojoba wax esters and hydrogenated wax esters results in an increase in OSI compared to the OSI of the feedstock. The '245 Patent describes this as a "surprising[]" and "unexpected" discovery. '245 Patent at 9:56-62, 12:18-20; *see, e.g.*, *Athena Diagnostics, Inc. v. Mayo Collaborative Servs., LLC*, 915 F.3d 743, 751 (Fed. Cir. 2019) (finding claims directed to a natural law unpatentable, noting that the patent specification "highlights the discovery of the natural law" which the inventors "surprisingly found"). The asserted claims explicitly recite this discovery, requiring that "an oxidative stability index (OSI) of the transesterified product is greater than an OSI of the feedstock." '245 Patent at 19:19-21.

At step two of *Alice*, the asserted claims do not contain additional elements that transform the nature of the claim into patent-eligible subject matter. *See Alice* , 573 U.S. at 217-18. Beyond the recited natural phenomenon or law of nature, the additional steps are merely well-understood, routine, and conventional activities of applying a catalyst to reagents (*i.e.*, "providing"

reagents and "contacting" the reagents with a catalyst (lipase), thus causing the "transesterifying" reaction to occur). *See, e.g.*, '245 Patent at 19:9-21; *Athena*, 915 F.3d at 752. As shown above and in the claim charts attached as Exhibits A to S and AA to AF, the elements of the asserted claims were well known in the art. The result of these conventional steps is the natural phenomenon itself: the claimed increase in OSI. Thus, whether considered separately or as an ordered combination, the claim elements do not supply an inventive concept.

In addition, the asserted claims improperly seek to monopolize the natural phenomenon that the inventors purportedly discovered. *See, e.g.*, *Athena*, 915 F.3d at 759-60; *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 130-31 (1948).

IV. INVALIDITY UNDER AIA 35 U.S.C. §§ 102 AND 103

Vantage contends that each of claims 1 and 2 of the '245 Patent is invalid at least under AIA 35 U.S.C. §§ 102(a)(1),102(a)(2), and/or 103.

The charts attached as Exhibits A to S and AA to AF to these Initial Invalidity Contentions set forth how certain prior art identified by Vantage renders obvious each asserted claim of the '245 Patent. Vantage cites the most relevant portions of the identified prior art references. However, other portions of the identified prior art may additionally render obvious one or more of the asserted claims. Where Vantage cites a particular drawing or figure in the accompanying charts, the citation encompasses the description of the drawing or figure, as well as any text associated with the drawing or figure (even if the associated text is not itself expressly cited). Similarly, where Vantage cites particular text concerning a drawing or figure in the accompanying charts, the citation encompasses that drawing or figure as well (even if the associated drawing or figure is not expressly cited). Vantage further incorporates by reference the prior art references cited in the '245 Patent, any patents or patent applications related to the '245 Patent, and any patent or patent application sharing a common inventor with the '245 Patent. This

includes, without limitation, those identified in any other proceeding involving the ’245 Patent or related U.S. or foreign patents. Vantage additionally incorporates by reference all prior art produced or otherwise known to Plaintiffs and all prior art known to the named inventor, any past or current owner, or any individual substantively involved in the prosecution of the ’245 Patent.

Vantage contends that at least some of the systems, methods, and products disclosed in one or more of the prior art references identified herein or in the attached exhibits are prior art under AIA 35 U.S.C. §§ 102(a)(1), 102(a)(2), and/or 103. It is understood that a POSA reads a prior art reference as a whole and in the context of other publications, literature, and general knowledge in the field. To understand and interpret any specific statement or disclosure in a prior art reference, a POSA also relies upon other information, including other publications and general scientific, engineering or other relevant knowledge. Vantage reserves the right to rely upon the general scientific, engineering or other relevant knowledge in the field in interpreting the disclosure of the prior art references. In addition, Vantage reserves the right to rely upon other publications and on expert testimony to provide context and to aid in the understanding of the prior art references. Vantage also reserves the right to rely upon other portions of the prior art references, other publications, and the testimony of experts to establish that the alleged inventions would have been obvious to a POSA, including the basis for modifying or combining the prior art references. Furthermore, Vantage reserves the right to rely upon any admissions relating to prior art found in the intrinsic evidence for the ’245 Patent, including its prosecution history.

Certain pieces of identified prior art inherently disclose features of the asserted claims. Vantage may rely on inherency to demonstrate the invalidity of the asserted claims. Vantage may rely on other portions of the prior art, other documents, and expert testimony to establish the inherency of certain features of the prior art to invalidate the asserted claims. Vantage

also may rely on any reference identified in these invalidity contentions or any other reference to prove that the references are enabled or to explain the meaning of a term used in a reference.

A. Identification of Prior Art

1. Prior Art Patents, Patent Application Publications, and Printed Publications to the Asserted Claims of the '245 Patent

Table 1 below lists prior art patents, patent application publications, and printed publications that describe the state of the art and/or render claims 1 and 2 of the '245 Patent invalid under AIA 35 U.S.C. §§ 102 and/or 103. Vantage reserves the right to identify additional prior art as discovery progresses. Each listed reference became prior art at least as early as the dates provided on the face of the document. Vantage reserves the right to rely upon earlier dates of publication or public availability to the extent such information is uncovered during discovery.

Table 1

No.	Author/Inventor	Title	Date	Short Name
1	Junzo Otera	*Transesterification*, 93 Chem. Rev. 1449 (1993).	1993	Otera
2	Barbara Fitch Haumann	*Tools: hydrogenation, interesterification*, 5 INFORM 668 (Jun. 1994)	Jun. 1994	Haumann
3	David J. Sessa	*Derivation of a Cocoa Butter Equivalent from Jojoba Transesterified Ester via a Differential Scanning Calorimetry Index*, 72 J. SCI. FOOD AGRIC. 295 (1996).	1996	Sessa I
4	David J. Sessa et al.	*Differential Scanning Calorimetry Index for Estimating Level of Saturation in Transesterified Wax Esters*, 73 J. AM. OIL CHEMISTS' SOC. 271 (1996).	1996	Sessa II
5	Eleonora Ledóchowska & Ewa Wilczyńska	*Comparison of the oxidative stability of chemically and enzymatically interesterified fats*, 100 FETT/LIPID 343 (1998).	1998	Ledóchowska
6	Ulf Schuchardt et al.	*Transesterification of Vegetable Oils: a Review*, 9 J. BRAZ. CHEM. SOC. 199 (1998).	1998	Schuchardt
7	Melanie Cummings et al.	*A natural alternative*, reprinted from SOAP, PERFUMERY, AND COSMETICS (SPC) ASIA, (May 1, 1999) *available at* https://www.floratech.com/PDFs/Articles_MKT/ART15.pdf.	May 1, 1999	Cummings

Table 1				
No.	**Author/Inventor**	**Title**	**Date**	**Short Name**
8	Demetrios James G. Arquette	U.S. Patent No. 5,968,530, Emollient Compositions	Oct. 19, 1999	Arquette
9	Georg Steinke et al.	*Lipase-Catalyzed Alcoholysis of Crambe Oil and Camelina Oil for the Preparation of Long-Chain Esters*, 77 J. AM. OIL CHEMISTS' SOC. 361 (Apr. 2000).	Apr. 2000	Steinke
10	James Brown & Robert Kleiman	Trans *Isomers in Cosmetics*, SOAP & COSMETICS at 33 (May 2001) *available at* https://www.floratech.com/PDFs/Articles_MKT/ART17.pdf.	May 2001	*Trans* Isomers 1
10	James Brown & Robert Kleiman	Trans *Isomers in Cosmetics Part 2*, SOAP & COSMETICS at 44 (Jun. 2001) *available at* https://www.floratech.com/PDFs/Articles_MKT/ART17.pdf.	Jun. 2001	*Trans* Isomers 2
11	S. Hari Krishna & N. G. Karanth	*Lipases and Lipase-Catalyzed Esterification Reactions In Nonaqueous Media*, 44 CATALYSIS REVS. 499 (2002).	2002	Krishna
12	James H. Brown	U.S. Patent No. RE38,141E, Dry Emollient Compositions	Jun. 10, 2003	Brown
13	Hal Purcell	U.S. Patent No. 6,559,182, Method for Treatment of Enveloped Viruses Using Jojoba Oil Esters	May 6, 2003	Purcell
14	Xuebing Xu	*Engineering of enzymatic reactions and reactors for lipid modification and synthesis*, 105 EUR. J. LIPID SCI. TECH. 289 (2003).	2003	Xu I
15	Tiankui Yang et al.	*Applications of Immobilized* Thermomyces lanuginosa *Lipase in Interesterification*, 80 J. AM. OIL CHEMISTS' SOC. 881 (2003).	2003	Yang
16	Elka Touitou & Lev Bergelson	U.S. Patent App. Pub. No. 2004/0208904, Products for Preventing Penetration Into The Skin	Oct. 21, 2004	Touitou
17	Wim De Greyt	*Chemical vs. Enzymatic Interesterification*, IUPAC-AOCS Workshop on Fats, Oils & Oilseeds Analyses & Production, 6-8 Dec. 2004 *available at* http://old.iupac.org/symposia/proceedings/Tunis04/degreyt-interesterification-modifieddgw.pdf.	Dec. 6-8, 2004	De Greyt
18	Arnoldo López-Hernández et al.	*Lipase-catalyzed Transesterification of Medium-chain Triacylglycerols and a Fully Hydrogenated Soybean Oil*, 70 J. FOOD SCI. C365 (Jul. 13, 2005).	Jul. 13, 2005	López-Hernández
19	Inmok Lee	U.S. Patent App. Pub. No. 2005/0014237, Method for Producing Fats or Oils	Jan. 20, 2005	Lee

Table 1				
No.	**Author/Inventor**	**Title**	**Date**	**Short Name**
20	Dharma R. Kodali & Scott C. Nivens	U.S. Patent App. Pub. No. 2005/0176597, Oils With Heterogenous Chain Lengths	Aug. 11, 2005	Kodali
21	Cristina Otero et al.	*Continuous Enzymatic Transesterification of Sesame Oil and a Fully Hydrogenated Fat: Effects of Reaction Conditions on Product Characteristics*, 94 BIOTECH. & BIOENG'G 877 (2006).	May 22, 2006	Otero
22	X. Xu et al.	*Chemical and enzymatic interesterification of lipids for use in food*, in *Modifying lipids for use in food* 234 (Frank D. Gunstone, ed., 2006).	2006	Xu II
23	Jamshid Farmani et al.	*Trans-free Iranian vanaspati through enzymatic and chemical transesterification of triple blends of fully hydrogenated soybean, rapeseed and sunflower oils*, 102 FOOD CHEM. 827 (2007).	2007	Farmani
24	Willie H-T Loh et al.	U.S. Patent App. Pub. No. 2007/0190186, Fat Compositions	Aug. 16, 2007	Loh
25	Ibrahim Abou-Nemeh	U.S. Patent App. Pub. No. 2007/0113467, Biodiesel Fuel Compositions Having Increased Oxidative Stability	May 24, 2007	Abou-Nemeh
26	Manuel Criado et al.	*Enzymatic interesterification of olive oil with fully hydrogenated palm oil: Characterization of fats*, 110 EUR. J. LIPID SCI. TECH. 714 (2008).	2008	Criado
27	Personal Care Products Council	*International Cosmetic Ingredient Dictionary and Handbook* (14th ed. 2009).	2009	Personal Care
28	Raquel Costales-Rodríguez et al.	*Chemical and Enzymatic Interesterification of a Blend of Palm Stearin: Soybean Oil for Low* trans-*Margarine Formulation*, 86 J. AM. OIL CHEMISTS' SOC. 681 (2009).	May 30, 2009	Costales-Rodríguez
29	David Schlossman & Yun Shao	U.S. Patent App. Pub. No. 2010/0136065, Nature Ester, Wax or Oil Treated Pigment, Process for Production Thereof, and Cosmetic Made Therewith	Jun. 3, 2010	Schlossman
30	Sobhi Basheer et al.	U.S. Patent App. Pub. No. 2010/0330629, Robust Multi-Enzyme Preparation for the Synthesis of Fatty Acid Alkyl Esters	Dec. 30, 2010	Basheer
31	Greg Austic et al.	WIPO Int'l Pub. No. WO 2012/106701, Fatty Acid Esterification Process	Aug. 9, 2012	Austic
32	Robert Kleiman et al.	U.S. Patent App. Pub. No. 2013/0183259, Human Sebum Mimetics Derived from	Jul. 18, 2013	Kleiman

Table 1				
No.	**Author/Inventor**	**Title**	**Date**	**Short Name**
		Botanical Sources and Methods for Making the Same		
33	Gaurav Shah & Sunil Suri	U.S. Patent No. 8,545,702, Production of Biodiesel from Feedstock	Oct. 1, 2013	Shah
34	Per Munk Nielsen & Hans C. Holm	U.S. Patent App. Pub. No. 2014/0017741, Esterification Process	Jan. 16, 2014	Nielsen
35	José Aracil Mira et al.	WIPO Int'l Pub. No. WO 2014/140392, Integrated Method of Obtaining Monosaturated Alcohols, Biodiesel and Biodegradable Products from Jojoba Oil	Sept. 18, 2014	Aracil Mira

Subject matter within the scope of the broad genus recited in each of the asserted claims of the '245 Patent was well known in the prior art. The patents, patent application publications, and other publications in Table 1, and the combinations of the references in Table 1, disclose, teach, or suggest every element of the asserted claims. Examples of these prior art disclosures, teachings, and suggestions are identified in the following sections and in the attached claim charts. *See* Exhibits A-S, AA-AF.

2. Prior Art Products Produced by Prior Art Processes to the Asserted Claims of the '245 Patent

Table 2 below lists prior art products that, upon information and belief (based on information currently available to Vantage), were produced using prior art processes that render claims 1 and 2 of the '245 Patent invalid under AIA 35 U.S.C. §§ 102 and/or 103. *See* Cummings at 1 (listing in Figure 3 the chemical and physical properties Jojoba esters (15), (20), (30), (60) and (70)); *Trans* Isomers 2 at 46 (listing in Table 2 the chemical and physical properties of Jojoba Esters 15, 20, 30, 60, and 70); Brown at 5:39-43 ("As used in this description of the present invention, Floraesters 70 is III, Floraesters 15 is IIr, Floraesters 20, 30 and 60 are combinations of IIr, IV, V, and IIIr, Floraesters IPJ is a mixture of IIr, VI, and VIII, and Floraesters HIPJ is a combination of IIIr, VII and IX."); Schlossman at [0022] ("In a preferred embodiment, Floraester

70 provided by Floratec [*sic*] is used."); Personal Care at 1506 (listing jojoba ester trade names and trade name mixtures, including 15 offered by Floratech); *see also D.L. Auld Co. v. Chroma Graphics Corp.*, 714 F.2d 1144, 1147-48 (Fed. Cir. 1983). Vantage intends to seek discovery (including from Plaintiffs) in order to prove the products anticipate and/or render obvious claims 1 and 2 of the '245 Patent.[2] Vantage reserves the right to identify additional prior art products as discovery progresses. Each listed prior art product became prior art at least as early as the dates provided on the face of the document that disclosed its public sale, use, or availability otherwise to the public. Vantage reserves the right to rely upon earlier dates of public availability to the extent such information is uncovered during discovery.

Table 2

No.	Product	Relevant Date	Persons/Entities Involved in Prior Use, Sale, or Offers for Sale
1	Jojoba Esters 15	At least as early as May 1999	Int'l Flora Techs. Ltd. d/b/a FloraTech
2	Jojoba Esters 20	At least as early as May 1999	FloraTech
3	Jojoba Esters 30	At least as early as May 1999	FloraTech
4	Jojoba Esters 60	At least as early as May 1999	FloraTech
5	Jojoba Esters 70	At least as early as May 1999	FloraTech
6	Floraesters 15	At least as early as Jun. 10, 2003	FloraTech
7	Floraesters 20	At least as early as Jun. 10, 2003	FloraTech
8	Floraesters 30	At least as early as Jun. 10, 2003	FloraTech
9	Floraesters 60	At least as early as Jun. 10, 2003	FloraTech
10	Floraesters 70	At least as early as Jun. 10, 2003	FloraTech
11	Floraesters IPJ	At least as early as Jun. 10, 2003	FloraTech
12	Floraesters HIPJ	At least as early as Jun. 10, 2003	FloraTech
13	Florabeads (Soft and Hard) Jojoba	At least as early as 2009	FloraTech
14	Florapearls Jojoba	At least as early as 2009	FloraTech

[2] Plaintiff's Complaint appears to admit its products are anticipatory prior art: "Since 1971, FloraTech has marketed quality botanically-derived ingredients to formulators of cosmetic and personal care products. It is, and has been, an industry leader in the jojoba field with its line of Floraesters® products, due to the superior quality of these products. The superior quality of one such product, Floraesters® 20, is a result of the enzymatic process embodied in the '245 patent." D.I. 1, ¶ 3. Any limitations not taught by a prior art Floraesters® product would have been obvious, as taught by one or more of the prior art references identified in Section IV and Table 1 therein.

Table 2			
No.	**Product**	**Relevant Date**	**Persons/Entities Involved in Prior Use, Sale, or Offers for Sale**
15	Florasomes Jojoba	At least as early as 2009	FloraTech
16	Floraspheres Jojoba	At least as early as 2009	FloraTech
17	Floraesters K-100 Jojoba	At least as early as 2009	FloraTech

B. Knowledge and Teachings Available to Persons of Skill in the Art at the Time of the Inventions

A POSA at the time of the alleged invention of the ’245 Patent understood the need for a process for transesterifying wax esters as claimed, including providing a feedstock comprising jojoba wax esters and hydrogenated jojoba wax esters, wherein the amount of hydrogenated jojoba wax esters is 20% to 50% by weight of the feedstock; contacting the feedstock with a lipase; transesterifying the jojoba wax esters and the hydrogenated jojoba wax esters in the feedstock with the lipase to form a transesterified product; and wherein an oxidative stability index (“OSI”) of the transesterified product is greater than an oug and at the time of the inventions—created pressure and motivation to combine known processes for the transesterification of a feedstock comprising jojoba wax esters and hydrogenated jojoba wax esters with known lipase catalysts, with the reasonable expectation that such combination will result in a transesterified product having an OSI greater than the OSI of the feedstock. In addition to the references noted above, POSAs would have had additional resources available to them with respect to disclosures regarding these known methods and processes. These available references include those cited in the ’245 Patent and its related patents and those identified during prosecution of the ’245 Patent and its related patents.

In addition to the prior art identified above and in the accompanying invalidity claim charts, Vantage also may rely on the “Background of the Invention” and other relevant portions of the ’245 Patent, other related patents, and their respective file histories (including

references incorporated into and cited in the ’245 Patent and related patents); and other evidence, including fact and expert testimony about that evidence, to prove that the asserted claims are anticipated and/or rendered obvious under AIA 35 U.S.C. §§ 102 and 103.

In addition to the references disclosed in these Initial Invalidity Contentions, the exhibits hereto, the ’245 Patent and related patents, and their prosecution histories, Patent Office proceedings related to the ’245 Patent and related patents, and the common-sense knowledge of POSAs before and at the time of the alleged inventions, invalidity may be demonstrated by the live testimony of witnesses, which will be identified in accordance with the Scheduling Order. *See* D.I. 15. Such witnesses may be used, among other purposes, to discuss issues relating to prior art systems, prior art references, and the knowledge of a POSA at the time of the alleged inventions.

C. Obviousness Combinations

To the extent that any one of the cited references is found not to disclose a limitation recited in the asserted claims from the ’245 Patent, it would have been obvious to at POSA at the time of the alleged invention of the ’245 Patent either (i) to modify the reference to include the limitation and any remaining limitations of that claim (and any claim(s) from which that claim depends) and/or (ii) to combine said reference with any other of the references in Table 1 above, in Exhibits A to S and AA to AF, and/or with a POSA’s general knowledge, rendering obvious each asserted claim as a whole. Generally, motivation to combine any of these references with others exists within the references themselves, as well as within the knowledge of POSAs at the relevant time. A POSA would have been motivated to combine any of the references listed above in Table 1 and Exhibits A to S and AA to AF, including for the reasons described below and therein. A POSA at the time of filing of the asserted ’245 Patent would have understood the references listed above in Table 1, alone or in combination, to contain explicit and/or implicit teachings, suggestions, and/or rationales to combine them for at least the following exemplary

reasons, and had a reasonable expectation of success in making these simple and known combinations.

Vantage contends that it would have been obvious to modify the above-listed prior art to include any allegedly missing element, in view of (i) the knowledge of a POSA, (ii) the admitted prior art of the ’245 Patent, and/or (iii) in combination with any of the other prior art references identified for the ’245 Patent. By way of example, and without limitation, Vantage provides the following exemplary combinations for particular claim limitations based on teachings of the cited prior art references. Vantage reserves the right to rely upon any combination of prior art references whether listed herein or otherwise.

A POSA having knowledge of the above-listed patents, articles, and systems, among other things, would have been motivated, taught, and suggested to combine the prior art listed above in Table 1 and discussed in Exhibits A to S with one another, in any number of ways, including as detailed below and, for example, in Exhibits AA to AF.

As a threshold matter, the asserted claims of the ’245 Patent simply arrange old elements known in the fields of oil chemistry and cosmetic ingredients, with each performing the same function it had been known to perform, and yield no more than what one would expect from such an arrangement. Such combinations of the prior art are obvious, as further detailed below.

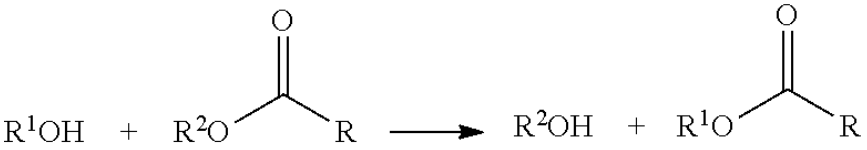
1. Most Claimed Elements of the Asserted Claims of the ’245 Patent are Admittedly Known in the Prior Art

The ’245 Patent uses entirely (and admittedly) conventional oil chemistry methods, reactants, catalysts, and parameters (*e.g.*, transesterification of jojoba wax esters and hydrogenated jojoba wax esters, lipase catalysts, oxidative stability index). As the ’245 Patent explains, the alleged novelty is simply that the OSI of the transesterified product is greater than the OSI of the feedstock. *See* ’245 Patent at 9:56-62 (“Surprisingly, however, the OSI of the enzymatically

catalyzed transesterified product is greater than that of the feedstock. This result indicates that the enzymatic catalysis has an unexpected positive effect on OSI that is not explainable simply by the enzymatic catalyst preserving the natural tocopherols originally present in the feedstock during the reaction."); *id.* at 12:18-20 ("Again, the increase in OSI from the feedstock material was again surprisingly noted."). Indeed the '245 Patent does not purport to have invented any new process or reactant.

Of note, the '245 Patent itself admits that several of the claimed elements were commonly known, and conventional, prior to the date of the alleged invention. *See also, e.g.*, Exhibits A-S, AA-AF (evidencing that the claimed elements were common and conventional). For example, the '245 Patent discloses that:

- "Transesterification involves the process of exchanging acyl groups located on each side of a ester group with an acyl group contained in an alcohol group, as illustrated below:"



'245 Patent at 3:28-37.

- "Transesterification for naturally occurring or structured or synthetic esters permits altering of various physical properties of the transesterified product when compared to the original feedstock. By non-limiting example, physical properties such as viscosity, dropping point, oil (oxidative) stability index (OSI), carbon chain distribution, and other properties of the transesterified product may be greater, equal to, or less than the corresponding values of the original wax ester-containing feedstocks. These changes take place at least in part because the chain lengths of the resulting ester products are randomized compared to the distribution in the original wax ester feedstock, which may alter the functionality of the transesterified material in a mixture and/or the thermal properties of the material." *Id.* at 3:38-51.

- "Conventionally, transesterification of wax esters is accomplished using several different methods. Methods and systems for transesterifying jojoba oil that include the use of an acidic bentonite-type clay at temperatures between 150C-350C are disclosed in U.S. Pat. No. 4,329,298 to Brown, et al., entitled 'Isomerization of Jojoba Oil and Products Thereof,' filed Aug. 15, 1980 and issued May 11, 1982

and in U.S. Pat. No. 4,360,387 to Brown, et al., entitled 'Isomorphous Jojoba Oil Compositions Containing Trans-Isomerized Jojoba Oil,' filed Mar. 9, 1981, issued Nov. 23, 1982, the disclosures of both of which are hereby incorporated entirely herein by reference." *Id.* at 3:52-63.

- "Many different enzymes may be employed in enzymatic catalytic transesterification reactions for wax esters, including those that are derived/obtained from biological organisms, those made synthetically, and those that are entirely artificial, whether made biologically and/or synthetically. For those enzymes that are lipases, these may include, one, some, any, or any combination of lipases derived from the following organisms: *Aspergillus niger*, *Aspergillus oryzae*, *Bacillus subtilis*, *Bacillus thermocatenulatus*, *Burkholderia cepacia*, *Burkholderia glumae*, *Candida rugosa*, *Candida antarctica A*, *Candida antarctica B*, *Candida cylindracea*, *Candida parapsilosis*, *Chromobacterium viscosum*, *Geotrichum candidum*, *Geotrichum* sp., *Mucor miehei*, *Humicola lanuginose*, *Penicillium camembertii*, *Penicillium chrysogenum*, *Penicillium roquefortii*, *Pseudomonas cepacia*, *Pseudomonas aeruginosa*, *Pseudomonas fluorenscens*, *Pseudomonas fragi*, *Pseudomonas alcaligenes*, *Pseudomonas mendocina*, *Rhizopus arrhizus*, *Rhizomucor miehe*, *Staphylococcus hyicus*, *Staphylococcus aereus*, *Staphylococcus epidermidis*, *Staphylococcus warneria*, *Staphylococcus xylosus*, *Thermomyces lanuginosus*, *Aspergillus* sp., *Bacillus* sp., *Burkholderia* sp., *Candida* sp., *Chromobacterium* sp., *Geotrichum* sp, *Mucor* sp, *Humicola* sp, *Penicillium* sp, *Pseudomonas* sp, *Rhizopus* sp., *Staphylococcus* sp, and *Thermomyces* sp." *Id.* at 5:39-63.

- "In particular implementations, the lipase may be the following: a lipase from *Thermomyces lanuginosus* marketed under the tradenames LIPOZYME TL IM™ or LIPEX™ by Novozymes A/S of Bagsvaerd, Denmark and immobilized on a substrate also manufactured by Novozymes. A representative sequence listing of the lipase is included as SEQ ID NO: 1 herein. In other implemenations [*sic*], the lipase may be that marketed under the tradename NOVOZYM™ by Novozymes, A/S derived from *Candida antarctica*, a representative sequence listing for which is included as SEQ ID NO: 2 herein. In various implementations, the lipases may be any of the following: those marketed under the tradenames CALB L™, NOVOZYME 435™, NOVOCOR AD L™, and LIPOLASE 100L™ by Novozymes; those marketed under the tradenames CALB™, CALA™, and CRL™ by c-LEcta, GMBH of Leipzig, Germany; those marketed under the tradenames LIPASE A "AMANO" 12™, LIPASE AY "AMANO" 30SD™, LIPASE G "AMANO" 50™, LIPASE R "AMANO"™, LIPASE DF "AMANO" 15™, LIPASE MER "AMANO"™, and NEWLASE F™ by Amano Enzyme Inc. of Nagoya, Japan; those marketed under the tradenames LIPASE MY™, LIPASE OF™, LIPASE PL™, LIPASE PLC/PLG™, LIPASE QLM™, LIPASE QLC/QLG™LIPASE SL™, and LIPASE TL™, by Meito Sangyo Co., Ltd., of Nagoya, Japan." *Id.* at 5:64-22.

- "In other implementations, the lipase may be a lipase from *Candida antarctica A*, a lipase from *Candida antarctica* B, *Candida rugosa* or any combination thereof.

In various implementations, the lipases may be any disclosed in U.S. Patent Application Publication No. 20140017741 (the '714 publication) to Nielsen, et al., entitled 'Esterification Process,' filed Oct. 1, 2013 and published Jan. 16, 2014, the disclosure of which is hereby entirely incorporated herein by reference. Those lipases disclosed in the sequence listings for the various patent applications listed in para. [0026]-[0029] in the '741 publication, previously incorporated by reference, each of which applications are hereby entirely incorporated by reference herein, may also be those utilized in particular implementations." *Id.* at 6:23-36.

- "Jojoba oil derived from the seeds of the jojoba plant contains wax esters and other components that have been noted to be useful for various functions. These include steryl esters, sterols, and various hydrocarbons that can be useful as skin conditioning agents in cosmetics and personal care products. Antioxidants, like tocopherols, are also included, along with various volatile ingredients naturally present in the oil, which are volatile in comparison with the wax esters. The wax esters in jojoba oil generally vary between 34 and 48 carbons in length. A detailed analysis of the wax ester distribution, structural characteristics, and other components in jojoba oil may be found in the paper by Thomas K. Miwa, entitled 'Structural Determination and Uses of Jojoba Oil,' *J. Amer. Oil Chem. Soc.*, Vol. 61, No. 2 (February 1984), p. 407-410, the disclosure of which is hereby incorporated entirely herein by reference." *Id.* at 6:57-7:5.

- "Table 2 shows observed effect of the chemically catalyzed process and various enzymatically catalyzed processes on the various naturally present components in jojoba oil as well as side reaction byproducts."

TABLE 2

Transesterified Product Component	Skin Care Formula Function	Chemical Catalyst	Enzyme Catalyst
Steryl Esters	Skin Conditioning Agent	Removed/Degraded	Functionally Unaffected
Sterols	Skin Conditioning Agent	Removed/Degraded	Functionally Unaffected
Tocopherols	Antioxidant	Removed/Degraded	Functionally Unaffected
Hydrocarbons	Skin Conditioning Agent	Removed/Degraded	Unchanged
Fatty Acid Methyl Esters	Emollient	Formed, <5%	Not formed
Free Fatty Alcohols	Emollient, Viscosity Controller	Formed, <5%	Not formed
Volatile Ingredients	Sensory Attributes	Removed/Degraded	Functionally Unaffected

Id. at 7:64-8:19.

- "As can be observed from the table, the enzymatic transesterification process takes place at the melting point of the jojoba oil (and any hydrogenated jojoba oil included in the feedstock) under substantially atmospheric pressure. The reaction

> also proceeds without removing/degrading the tocopherols or volatiles naturally contained in the jojoba oil. Also, the enzyme catalyzed process does not create methyl esters or free fatty alcohols which may limit the applications of the transesterified product as they affect the emollient and/or viscosity behavior of the product. Furthermore, the degradation/removal of the tocopherols in the chemically catalyzed process adversely affects the oxidative stability (measured by the OSI) and accordingly, the shelf life, of the transesterified product." *Id.* at 8:20-36.

- "The OSI was measured using an Omnion Scientific Services machine, Model OSI-8-110, according to the procedures set forth in the American Oil Chemist's Society (AOCS) Official Method Cd 12b-92, a copy of which is submitted herewith as Appendix A and incorporated entirely herein by reference." *Id.* at 9:62-67.

- "Various additional background information on the structure, use, and of transesterification reactions using hydrogenated jojoba wax esters may be found in the articles by James Brown and Robert Kleiman 'Trans Isomers in Cosmetics', Parts 1 and 2, *Soap & Cosmetics*, May 2001, p. 33-36 and June 2001, as well as in Sessa et al., 'Differential Scanning calorimetry Index for Estimating Level of Saturation in Transeesterified [*sic*] Wax Esters,' *J. Amer. Oil Chem. Soc.*, v. 73, 271-273 (1996), and David J. Sessa, 'Derivation of a Cocoa Butter Equivalent from Jojoba Transesterified Ester via a Differential Scanning Calorimetry Index,' *J. Sci. Food Agric.*, v. 72, p. 295-298 (1996) the disclosures of all of which are hereby entirely incorporated herein by reference."

A POSA, at the time of the invention, would have had good reason to pursue and/or combine known methods and options, with the goal of producing a shelf-stable product using a simpler, more environmentally-friendly process. As the '245 Patent admits, it was known that the process of chemical transesterification can have undesirable side effects and produce undesirable byproducts, resulting in a product with undesirable properties and/or components:

> Other conventional transesterification reactions use a chemical catalyst, such as sodium methylate (methoxide) or sodium hydroxide. While the reaction is catalytic, side reactions between the catalyst and components of the feedstock and/or reactants occur during transesterification process. These side reactions create byproducts that reduce the yield of the process and alter the properties of the transesterified product. Some of the property changes occur because of damage/changes to the feedstock esters caused by the high temperatures (100C-230C) and low pressures (<7 mmHg) required to carry out chemical catalytic transesterification. Other property changes occur because these conditions and/or the chemical catalysts themselves degrade, destroy, or reduce the effectiveness of other subcomponents of the wax ester feedstock.

> Where the wax ester feedstock is derived from a natural source, such as in a jojoba wax ester feedstock, existing antioxidants, sterols, hydrocarbons, and other volatile compounds (volatile in comparison to the volatility of the wax esters) react with the chemical catalyst in side reactions. The resulting transesterified product may have little or none of any of these components remaining intact following chemical catalytic transesterification and/or may reduce the effectiveness of these components. Furthermore, the transesterified product may include artifacts of these components which are undesirable or have undesirable effects in the product or subsequent mixtures that include the product.
>
> Chemically catalyzed transesterification of wax esters is carried out in a batch reactor, and the catalyst cannot, accordingly, be recovered for reuse from the transesterification product. Referring to FIG. 1, a process flow diagram for a conventional transesterification process is illustrated. As illustrated, the feedstock containing wax esters is processed in a batch catalytic reaction. Following batch processing, the reaction is stopped using an acid and/or water such as citric acid to neutralize the remaining catalyst. At this point, the reactor contents are then checked for the presence of free fatty acids, which, if present requires the use of a neutralization process for the free fatty acids. The batch reactants are then moved into a waste separation step, in which the solution is washed with soft water to remove soaps and salts in the reactor material and separate them from the oil/lipid portion of the reactor material that contains the transesterified product to form a waste stream and a transesterified product stream. The transesterified product in the transesterified product stream is then bleached to remove remaining color bodies, soaps, and other undesirable byproducts formed during the chemically catalyzed transesterification reaction. The transesterified product stream is then deodorized and votated to produce a finished transesterified product. The process of votation is a controlled crystallization process or tempering process in which the transesterified product is agitated under controlled conditions to form a transesterified product with a desired consistency and crystalline structure for later use. Votation includes various heating, chilling, flash chilling, and other pressure adjustments to provide the desired consistency and/or structure.

See ’245 Patent at 3:66-4:54. This is further evidenced by the prior art as discussed below and in the accompanying Exhibits A to S and AA to AF.

Further, as the ’245 Patent admits, a POSA at the time of the invention would have easily understood that—in contrast to a chemical transesterification process—an enzymatic

transesterification process has fewer steps and produces few, if any, of the undesirable byproducts generated in a chemical transesterification process:

> [T]here are fewer process steps in an enzymatically catalyzed transesterification process. Furthermore, as will be discussed in detail below, because there are little or no side reactions between the enzyme catalysts and the reactants, while the transesterification results of the enzyme catalyzed process are very similar to chemically catalyzed process, the properties and components of an enzyme catalyzed transesterified product stream differ in important ways while retaining essentially the same functional characteristics.

'245 Patent at 5:9-18. This is further evidenced by the prior art as discussed below and in the accompanying Exhibits A to S and AA to AF.

Of particular relevance to claims 1 and 2, the '245 Patent admits that a POSA would have understood that chemical transesterification of jojoba oil into a transesterified product may degrade the tocopherols (antioxidants) of the feedstock—thus negatively impacting the shelf life of the product—while enzymatic transesterification of jojoba oil may not:

> [T]he enzymatic transesterification process takes place at the melting point of the jojoba oil (and any hydrogenated jojoba oil included in the feedstock) under substantially atmospheric pressure. The reaction also proceeds without removing/degrading the tocopherols or volatiles naturally contained in the jojoba oil. Also, the enzyme catalyzed process does not create methyl esters or free fatty alcohols which may limit the applications of the transesterified product as they affect the emollient and/or viscosity behavior of the product. Furthermore, the degradation/removal of the tocopherols in the chemically catalyzed process adversely affects the oxidative stability (measured by the OSI) and accordingly, the shelf life, of the transesterified product.

'245 Patent at 8:20-33. This is further evidenced by the prior art as discussed below and in the accompanying Exhibits A to S and AA to AF.

2. Relevant Disclosures in the Identified Prior Art and Combinations Thereof

Prior to the ’245 Patent, the preamble and each of the limitations of the asserted claims 1 and 2 were well-known and commonplace to a POSA. Specifically, prior to the ’245 Patent, the following were well-known and commonplace to a POSA:

- **A.1 – Processes for transesterifying a feedstock of waxes and oils using one or more chemical catalysts[3]:** This is discussed in, and evidenced by, a number of the

[3] Prior to the ’245 Patent, the term “transesterification” had a well-known and commonplace meaning to a POSA. Transesterification can refer to “the process of exchanging acyl groups located on each side of a ester group with an acyl group contained in an alcohol group”—in other words, the reactions between an ester and an alcohol, also referred to as “alcoholysis.” *See* ’245 Patent at 3:28-37. This is discussed in, and evidenced by, a number of the prior art references listed above, including (without limitation), Otera at 1449 (“Transesterification is a process where an ester is transformed into another through interchange of the alkoxy moiety (eq 2). . . . RCOOR’ + R”OH ←→ RCOOR” + R’OH ([eq] 2)”); Schuchardt at 199 (“Transesterification is the general term used to describe the important class of organic reactions where an ester is transformed into another through interchange of the alkoxy moiety. When the original ester is reacted with an alcohol, the transesterification process is called alcoholysis (Scheme 1). . . . RCOOR’ + R”OH ←*catalyst*→ RCOOR” + R’OH Scheme 1. General equation for a transesterification reaction.”); Arquette at 8:29-38 (“The basic reactions which may be used in the preparation of the emollient compositions of the invention derived from jojoba oil may include at least the following procedures. . . . Reaction C I [“The alcohol”], and IIn [“Jojoba Wax Esters”] and IIIn [“Fully hydrogenated Jojoba Wax Esters”] (catalyst) → IV, V, VI, VII, VIII, IX, Ir and IIIr”); Steinke at 362 (“*Alcoholysis*. Reactions were carried out in glass tubes provided with Teflon-lined screw-caps using 0.3 mmol oil (crambe oil or camelina oil) with the stoichiometric amount of alcohol (oleyl alcohol, crambe alcohols, camelina alcohols, n-octanol, or isopropanol).”); Krishna at 511, 529 (“Enzymatic production of esters can be achieved either by reaction between free acid and hydroxyl groups of alcohol or by ester exchange or transesterification (includes alcoholysis, acidolysis, and interesterification).”); Brown at Abstract (“The compositions of the present invention may be obtained by a novel process of a base catalyzed alcoholysis reaction between jojoba oil and an alcohol, such as isopropyl alcohol.”); Xu I at 296 (“Alcoholysis is the reaction between an ester and an alcohol.”); Yang at 881 (“Interesterification commonly refers to three reactions: acidolysis, alcoholysis, and ester–ester exchange. Chemical interesterification, mainly ester–ester exchange, has been used in commercial production of shortening and margarine fats”); Touitou at [0001] (“In another embodiment, the invention relates to compositions and compounds for topical application comprising at least one photoprotective compound for topical application comprising . . . of Jojoba esters obtained by transesterification of the said wax/oil with alcohols bearing one or several UV-absorbing groups.”); Lee at [0024] (“A non-limiting example of transesterification includes reaction of a fat or oil with an alcohol (e.g., methanol) or with an ester.”); Xu II at 239 (“Alcoholysis is the reaction between an ester and an alcohol, resulting in an alcohol exchange.”); Abou-Nemeh at [0016], Table B (“In a base catalyzed transesterification process, an oil or fat is reacted with an alcohol, such as methanol or ethanol, in the presence of a

catalyst, such as sodium hydroxide or potassium hydroxide, to produce glycerine and methyl or ethyl esters."); Basheer at [0001] ("The invention relates to the preparation of an immobilized multi-enzyme system for transesterification or esterification of oils and fats triglycerides or of fatty acids, with short-chain alcohols, to obtain fatty acid short-chain alkyl esters, preferably to be used as biodiesel."); Austic at claim 1 ("A process for the production of fatty acid alkyl esters from a fatty acid feedstock containing free fatty acids, comprising the steps of: (a) providing a reaction mixture (R) that comprises the fatty acid feed stock, a lower alcohol, and a lipolytic enzyme[.]"); Shah at 17:8-36 ("As used herein, 'transesterifying' refers to the process of exchanging the organic group R_1 of an ester with the organic group R_2 of an alcohol . . . . As such, the transesterification is typically represented by: alcohol+ester→different alcohol+different ester."); Nielsen at [0038] ("In the present process for enzymatic production of biodiesel a reaction mixture 1 comprising a triglyceride feed stock, a lower alcohol (e.g., methanol or ethanol) and water in a first lipase catalysed transesterification process step forms fatty acid alkyl esters, free fatty acids and free glycerol."); Aracil Mira at Abstract (Machine translation: "The invention concerns the transesterification of jojoba oil in the presence of low- and medium-molecular weight alcohols . . . .").

Plaintiffs in their Complaint (*see, e.g.*, D.I. 1, ¶39), and in their December 15, 2022 Initial Infringement Contentions, appear to use transesterification interchangeably with the term "interesterification" to refer to the class of reactions between an ester and another ester, also referred to as "ester-ester exchange." Prior to the '245 Patent, such usage of the term transesterification was also well-known and commonplace to a POSA. This is discussed in, and evidenced by, a number of the prior art references listed above, including (without limitation), Sessa II at 271, Scheme 1 ("Materials. The calibration (provided by JDA) sets consisted of native jojoba wax esters chemically transesterified with proportionate blends of completely hydrogenated jojoba wax esters to give a series consisting of 5, 10, 15, 20, 30,40, and 50% saturation."); Ledóchowska at 343 (stating that "a mixture of tallow and low erucic acid rapeseed (LEAR) oil (4:6, w/w) was used in the investigations" and that the chemical and enzymatic interesterification reactions were carried out without any additives other than the relevant catalyst); Schuchardt at 199 ("Transesterification is the general term used to describe the important class of organic reactions where an ester is transformed into another through interchange of the alkoxy moiety."); Cummings at 45, Fig. 1 ("Jojoba oil is converted to jojoba esters through a process known as interesterification. In this process, different ratios of unsaturated jojoba oil are combined with fully saturated jojoba oil and then interesterified."); *Trans* Isomers 1 at 35 ("Interesterification: The catalyzed chemical reaction between two or more esters in which the acids and alcohols present are recombined in a random manner, also known as transesterification."); *Trans* Isomers 2 at 44-45 ("The CTFA Ingredient Dictionary defines Jojoba Esters as: A complex mixture of esters produced by the transesterification/ interesterification of Simmondsia Chinensis (Jojoba) Oil, Hydrogenated Jojoba Oil, or a transesterified mixture of the two. Figure 4 represents the interesterification reaction between jojoba oil (only *cis* isomers) and fully hydrogenated jojoba oil (no *cis* or *trans*isomers)."); Xu I at 290 ("The major enzymatic reactions for the modification of lipids are often referring to hydrolysis, esterification, acidolysis, alcoholysis, and ester-ester exchange from the reaction mechanisms. Interesterification or transesterification is also commonly used in literature to describe some of the above reactions. . . . Transesterification [is] a term often used for ester-ester exchange. It is also used in literature for the acidolysis reaction or as a general term for all the three reactions including alcoholysis."); Yang at 881 ("Interesterification

prior art references listed above, including (without limitation), Otera at 1449 ("Transesterification is a process where an ester is transformed into another through interchange of the alkoxy moiety (eq 2). Since the reaction is an equilibrium process, the transformation occurs essentially by simply mixing the two components. However, it has long been known that the reaction is accelerated by acid or base catalysts. Because of their versatility, the acid- or base-catalyzed reactions were the subjects of extensive investigation, and the fundamental features were almost brought to light during 1950s and 1960s."); Haumann at 675 ("Interesterification can be carried out at significantly lower temperatures than hydrogenation, depending on the type of catalyst used. . . . The most commonly used catalyst is sodium methylate."); Sessa II at 271 ("*Materials*. The calibration (provided by JDA) sets consisted of native jojoba wax esters chemically transesterified with proportionate blends of completely hydrogenated jojoba wax esters to give a series consisting of 5, 10, 15, 20, 30,40, and 50% saturation."); Ledóchowska at 343 ("Interesterification can be catalyzed both by chemical and biological catalysts. . . . As chemical catalyst sodium methoxide purchased from

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commonly refers to three reactions: acidolysis, alcoholysis, and ester–ester exchange. Chemical interesterification, mainly ester–ester exchange, has been used in commercial production of shortening and margarine fats"); López-Hernández at C365 ("Although lipases are named for their ability to catalyze lipolysis (hydrolysis) reactions, the use of these enzymes in systems with very low water contents leads to catalysis of a variety of reactions, including ester synthesis, alcoholysis, acidolysis, and interesterification. Enzyme-catalyzed transesterification reactions have been studied by several research groups[.]"); Lee at [0025] ("The term 'interesterification' includes the processes acidolysis, alcoholysis, glycerolysis, and transesterification. . . . Acidolysis includes the reaction of a fatty acid with a triacylglycerol, alcoholoysis includes the reaction of an alcohol with a triacylglycerol, and glycerolyis includes alcoholysis reactions in which the alcohol is glycerol. A non-limiting example of interesterification or transesterification includes reactions of different triglycerides resulting in randomization of the fatty acid group."); Kodali at [0032] ("According to the invention, transesterification (i.e., the exchange of an acyl group of one ester with that of another ester) of a vegetable oil with an ester of a short chain fatty acid results in random esterification of the short chain fatty acids to the glycerol backbone of the vegetable oil[.]"); Otero at 878 ("Transesterification between a fat and oil typically involves exchange of fatty acid residues between the precursor acylglycerols and is accompanied by a concomitant change in the properties of the original material."); Xu II at 235 ("Interesterification in a chemical sense, as defined by Sonntag (1982), often refers to the reaction of triacylglycerols within or between the molecules or with other acyl donors or alcohol moieties, yielding new esters by an interchange of fatty acid groups. It can be classified into ester-ester interchange, acidolysis and alcoholysis, depending on the nature of the substrates."); Personal Care at 1506 ("Jojoba Esters is a complex mixture of esters produced by the transesterification/ interesterification of Simmondsia Chinensis (Jojoba) Oil (q.v.), Hydrogenated Jojoba Oil (q.v.), or a mixture of the two."); Schlossman at [0022] ("The coating may be jojoba esters, which is a complex mixture of esters produced by the transesterification/interesterification of *Simmondsia Chinensis* (Jojoba) oil (q.v.), hydrogenated Jojoba oil (q.v.), or a mixture of the two."). Consistent with the '245 Patent and Plaintiffs' Complaint and December 15, 2022 Initial Infringement Contentions, the prior art references listed above disclose both uses of the term "transesterification."

Merck (Darmstadt, Germany) was used."); Schuchardt at Abstract, 200-202 ("The general aspects of this process and the applicability of different types of catalysts (acids, alkaline metal hydroxides, alkoxides and carbonates, enzymes and non-ionic bases, such as amines, amidines, guanidines and triamino(imino)phosphoranes) are described."); Cummings at 2, Figure 1 (stating "[j]ojoba oil is converted to jojoba esters through a process known as interesterification" and identifying in Figure 1 use of a catalyst); Arquette at 2:15-39, 7:65-8:44 ("The compositions comprising fatty alcohols, isopropyl esters and jojoba wax esters jojoba oil[] may be obtained by the base catalyzed alcoholysis reaction between jojoba oil and isopropyl alcohol."); *Trans* Isomers 1 at 34-35 (defining interesterification as "[t]he catalyzed chemical reaction between two or more esters in which the acids and alcohols present are recombined in a random manner, also known as transesterification" and stating that the reaction can "us[e] various catalysts including enzymes"); *Trans* Isomers 2 at 44-45, Figure 4 (stating "Figure 4 represents the interesterification reaction between (I) jojoba oil (only *cis* isomers) and (II) fully hydrogenated jojoba oil (no *cis* or *trans*isomers)" and showing use of a "Sodium Methylate Catalyst"); Brown at 3:59-62 ("The compositions comprising fatty alcohols, isopropyl esters and jojoba wax esters (jojoba oil) may be obtained by the base catalyzed alcoholysis reaction between jojoba oil and an alkyl alcohol."); Purcell at 9:34-39 ("Interesterification reactions, for example between jojoba oil and fully hydrogenated jojoba using a sodium methylate catalyst, break the ester linkage between the aliphatic acids and aliphatic alcohols. With completion of the reaction there is a random regrouping of the acids and alcohols with formation of new bonds."); Yang at 881 ("Chemical interesterification, mainly ester–ester exchange, has been used in commercial production of shortening and margarine fats[.] This process has strict requirements for material oils and is usually carried out above 100°C using an inorganic catalyst with no positional specificity."); Touitou at [0024], [0031] ("The present invention relates to the conversion of natural jojoba wax/oil . . . into light absorbing substances and their use as skin photo-protectors, . . . by transesterification of the said wax/oil or its hydrogenated derivatives with alcohols bearing UV-absorbing groups. . . . 'Jojoba Esters' is a complex mixture of esters produced by the transesterification of jojoba oil, hydrogenated jojoba oil, or a mixture of the tw [*sic*] with organic alcohols."); De Greyt at 7-9 (listing catalysts used in chemical interesterification, including sodium methoxide); Kodali at [0041] ("Non-limiting examples of catalysts [for transesterification] include base catalysts, sodium methoxide, acid catalysts including inorganic acids such as sulfuric acid and acidified clays, organic acids Such as methane sulfonic acid, benzenesulfonic acid, and toluenesulfonic acid, and acidic resins such as Amberlyst 15. Metals such as sodium and magnesium, and metal hydrides also are useful catalysts."); Xu II at 234 ("Interesterification, as defined in a lipid glossary (Gunstone and Herslof, 1992), is a general term for alkali-catalyzed reaction of, for example, triacylglycerols producing a random distribution of ester groups within the molecules."); Farmani at Abstract, 828 ("Production of trans-free Iranian vanaspati through enzymatic and chemical transesterification of triple blends of fully hydrogenated soybean (FHSBO), rapeseed (RSO) and sunflower (SFO) oils was investigated," for which "[s]odium methoxide (dry powder) was purchased from

Merck (Darmstadt, Germany)."); Loh at [0025] ("A fat composition of the invention can be interesterified (i.e., an acyl group of one ester is exchanged with that of another ester) chemically or enzymatically. Thus, acyl groups of the triacylglycerols (TAGS) in the vegetable oil are exchanged with acyl groups from the waxes. . . . Non-limiting examples of catalysts include base catalysts such as sodium methoxide, sodium ethoxide, sodium hydroxide, and glycerol. Metals such as sodium and magnesium, and metal hydrides also are useful catalysts."); Abou-Nemeh at [0016], Table B ("In general, biodiesel is produced through the transesterification of vegetable oils . . . . In a base catalyzed transesterification process, an oil or fat is reacted with an alcohol, such as methanol or ethanol, in the presence of a catalyst, such as sodium hydroxide or potassium hydroxide, to produce glycerine and methyl or ethyl esters."); Costales-Rodríguez at 682 ("Interesterification can be conducted chemically or enzymatically. Chemical interesterification (CIE) is usually random and produces complete positional randomization of the acyl groups on the glycerol backbone. Depending from enzyme regioselectivity, enzymatic interesterification (EIE) can be random or specific. Intermediate specificity can also be obtained simply by adjusting the residence time of the enzymatic process."); Schlossman at [0022] ("The coating may be jojoba esters, which is a complex mixture of esters produced by the transesterification/interesterification of *Simmondsia Chinensis* (Jojoba) oil (q.v.), hydrogenated Jojoba oil (q.v.), or a mixture of the two."); Austic at 1:26-28 ("Accordingly, U.S. Patent No. 4,164,506 discloses a process comprising the esterification of free fatty acids of unrefined fats with a lower alcohol in an amount larger than its solubility in the fats in the presence of an acid catalyst."); Kleiman at Abstract ("In one exemplary embodiment, a human sebum mimetic comprises a wax ester derived from interesterification of refined botanical oil comprising palmitoleic acid and refined jojoba oil, a phytosterol, and phytosqualene."); Shah at 17:8-36 ("As used herein, 'transesterifying' refers to the process of exchanging the organic group R1 of an ester with the organic group R_2 of an alcohol . . . . The reaction typically requires heat and a strong base catalyst, such as sodium hydroxide or potassium hydroxide.").

- **A.2 – Processes for transesterifying a feedstock of jojoba wax esters and hydrogenated jojoba wax esters using one or more chemical catalysts:** This is discussed in, and evidenced by, a number of the prior art references listed above, including (without limitation), Sessa I at Abstract ("A series of wax ester blends was constructed by transesterifying native jojoba oil with 50-500 g kg^{-1} completely hydrogenated jojoba wax esters"); Sessa II at 271 ("*Materials*. The calibration (provided by JDA) sets consisted of native jojoba wax esters chemically transesterified with proportionate blends of completely hydrogenated jojoba wax esters to give a series consisting of 5, 10, 15, 20, 30,40, and 50% saturation."); Cummings at 2, Figure 1 (stating "[j]ojoba oil is converted to jojoba esters through a process known as interesterification" and identifying in Figure 1 use of a catalyst); Arquette at 8:57-9:5 ("In preparing the emollient composition, refine jojoba oil (or hydrogenated jojoba oil or a mixture of the oil and hydrogenated oil) is introduced into an appropriate vessel . . . . The anhydrous isopropyl alcohol (or other alcohol) is then added . . . . When the temperature has reached 70-75°C., a first addition of

catalyst (e.g., a catalyst for alcoholysis and interesterification such as sodium methoxide) is made."); *Trans* Isomers 2 at 44-45, Figure 4 (stating "Figure 4 represents the interesterification reaction between (I) jojoba oil (only *cis* isomers) and (II) fully hydrogenated jojoba oil (no *cis* or *trans*isomers)" and showing use of a "Sodium Methylate Catalyst"); Brown at 5:1-16 ("In preparing the emollient composition, refine jojoba oil (or hydrogenated jojoba oil or a mixture of the oil and hydrogenated oil) is introduced into an appropriate vessel . . . . The anhydrous isopropyl alcohol is then added . . . . When the temperature has reached 70-75°C., a first addition of catalyst (e.g., a catalyst for alcoholysis and interesterification such as sodium methoxide) is made."); Purcell at 9:34-39 ("Interesterification reactions, for example between jojoba oil and fully hydrogenated jojoba using a sodium methylate catalyst, break the ester linkage between the aliphatic acids and aliphatic alcohols. With completion of the reaction there is a random regrouping of the acids and alcohols with formation of new bonds."); Touitou at [0024], [0031] ("The present invention relates to the conversion of natural jojoba wax/oil . . . into light absorbing substances and their use as skin photo-protectors, . . . by transesterification of the said wax/oil or its hydrogenated derivatives with alcohols bearing UV-absorbing groups. . . . 'Jojoba Esters' is a complex mixture of esters produced by the transesterification of jojoba oil, hydrogenated jojoba oil, or a mixture of the tw [*sic*] with organic alcohols."); Loh at [0005], [0007], [0018], [0025] (disclosing "a composition that includes an interesterified vegetable oil and plant-derived wax component" that can be chemically or enzymatically interesterified, and disclosing jojoba oils and that "[h]ydrogenated jojoba oils also is a suitable plant-derived wax"); Schlossman at [0022] ("The coating may be jojoba esters, which is a complex mixture of esters produced by the transesterification/interesterification of *Simmondsia Chinensis* (Jojoba) oil (q.v.), hydrogenated Jojoba oil (q.v.), or a mixture of the two."); Austic at 1:26-28 4:26-5:3, claim 1 ("Accordingly, U.S. Patent No. 4,164,506 discloses a process comprising the esterification of free fatty acids of unrefined fats with a lower alcohol in an amount larger than its solubility in the fats in the presence of an acid catalyst."; "fatty acid feedstock may be oil selected from the group consisting of . . . jojoba oil" and is further defined as "a substrate comprising fatty acid derivatives"); Shah at 17:8-36, 20:55-21:18 ("As used herein, 'transesterifying' refers to the process of exchanging the organic group R_1 of an ester with the organic group R_2 of an alcohol . . . . The reaction typically requires heat and a strong base catalyst, such as sodium hydroxide or potassium hydroxide. . . . [T]he biodiesel feedstocks (103) can include at least one of . . . jojoba oil . . . and their derivatives (including genetically modified and otherwise).").

- **B – The reasons for using processes for transesterifying a feedstock of waxes and oils using one or more chemical catalysts were to improve the physical properties of the waxes and oils:** These reasons include (but are not limited to), oxidative stability, temperature stability, lubricity, ability to form stable emulsions etc., including at lower temperatures. This is discussed in, and evidenced by, a number of the prior art references listed above, including (without limitation), Haumann at 674-75 ("Unlike hydrogenation, interesterification neither affects the degree of saturation nor causes isomerization of the fatty acid double bond. Thus,

it does not change the fatty acid profile of the starting material. Instead, it rearranges the fatty acids on the glycerol molecule. Interesterification can be carried out at significantly lower temperatures than hydrogenation, depending on the type of catalyst used. . . . Random interesterification. the predominant form used, changes the crystal form of an oil or blend to produce desired solid fat content curves or to produce blends with high levels of polyunsaturated fatty acids."); Cummings at 1-2 ("Following the archetype of jojoba created by nature, jojoba esters are a new creation of oxidatively stable, plant-derived, oil-free emollients shown to be non-toxic, non-comedogenic, hypoallergenic and biodegradable. Broad ranges of physical and chemical characteristics of this new family of esters render them effective in an equally broad range of cosmetic applications. "); Arquette at 2:22-34 ("The new emollient composition preserves the excellent skin feel attributed to jojoba oil, which has long been used as an emollient, and also increase [*sic*] the range of applications for cosmetic compositions by providing an emollient that can provide a more polar and hydrophilic quality than is found in jojoba oils, (which may also be referred to in the art as jojoba wax esters). The composition forms stable emulsions much more readily than does jojoba oil. The composition may also further provide excellent emolliency to normally dry cosmetic systems involving high levels of pigments, with the emolient acting as a pigment wetting agent. It also functions as an excipient in press powder."); *Trans* Isomers 1 at 34 ("The challenge of cosmetic ingredient suppliers is therefore to provide manufacturers with oxidatively stable and affordable lipid based emollients that exhibit a broad range of melting points yet which contain no trans fatty isomers. Oil phase emollients with these desirable characteristics can be obtained without the formation of trans isomers through a process known as 'interesterification.'"); *Trans* Isomers 2 at 45-47 (explaining that jojoba esters have better properties compared to hydrogenated jojoba oils, including lack of *trans* isomers, "feel," "slip," oxidative stability); Brown at 3:46-58 ("These new compositions also increase the range of applications for cosmetic compositions through an emollient that is more polar and hydrophilic than is found in jojoba oils, (which may also be referred to in the art as jojoba wax esters). The composition forms stable emulsions much more readily than does jojoba oil. The composition may also further provide excellent emolliency to normally dry cosmetic systems involving high levels of pigments, with the emollient acting as a pigment wetting agent and as an aid to a smooth and even application of the dry system. It also functions as an excipient in pressed powder."); Kodali at [0005] ("Transesterifying various short saturated fatty acid esters with a vegetable oil improves oxidative stability and low temperature properties due to the increased saturation and the heterogeneity of the fatty acids esterified to the polyols.").

- **C.1 – Processes for transesterifying a feedstock of waxes and oils using one or more enzymatic catalysts[4]:** This is discussed in, and evidenced by, a number of

[4] Lipases are a type of enzyme; however, the '245 Patent states that, "[a]s used herein, 'lipase' means any enzyme or protein capable of being used in a transesterification reaction of a wax ester." '245 Patent at 4:59-65.

the prior art references listed above, including (without limitation), Otera at 1462 ("Transesterification catalyzed by enzymes has met with explosive expansion recently. This subject was boosted by successful employment of dry enzymes in organic solvents which was initiated by Klibanov and his co-workers. . . . The catalytic power of each lipase [derived from pig pancreas, yeast, and mold] in the transesterification reaction compared to that in the hydrolysis reaction in water was of the same order. That is, the enzymes seem to display their full inherent catalytic power in organic solvents."); Haumann at 676 ("Also gaining scrutiny is enzymatic interesterification. now used commercially to produce high value-added products, such as structured triglycerides for confectionery use. . . . Interesterification using random lipases produces fat compositions similar to those obtainable from standard chemical methods."); Ledóchowska at 343 ("Interesterification can be catalyzed both by chemical and biological catalysts. . . . As biocatalyst a commercial immobilized *sn*-1,3-specific *Rhizomucor miehei* lipase preparation (*Lipozyme IM, Novo* Industry, Bagsvaerd, Denmark) was used."); Schuchardt at 202 ("Lipase-Catalyzed Processes: Due to their ready availability and the ease with which they can be handled, hydrolytic enzymes have been widely applied in organic synthesis."); Steinke at Abstract ("Crambe oil and camelina oil were transesterified with oleyl alcohol, the alcohols derived from crambe and camelina oils, n-octanol or isopropanol using Novozym 435 (immobilized lipase B from *Candida antarctica*), Lipozyme IM (immobilized lipase from *Rhizomucor miehei*), and papaya (*Carica papaya*) latex lipase as biocatalysts."); *Trans* Isomers 1 at 34 ("Oil phase emollients with these desirable characteristics can be obtained without the formation of trans isomers through a process known as 'interesterification.' Rozenaal [*sic*] discussed use of this interesterification process to modify the melting characteristics of triglycerides using various catalysts including enzymes.") (citing Rozenaal [*sic*], A., *Interesterification of Oils and Fats, Inform*, vol. 3, no. 11, (Nov. 1992) pp. l232—1237.); Krishna at 502 ("At present, there is considerable interest in the use of enzymes as catalysts in organic synthesis. Among the reactions that are studied are hydrolysis, esterification, and transesterification catalyzed by hydrolytic enzymes such as lipases, esterases, and proteinases. . . . The use of lipases in esterification reactions to produce industrially important products such as . . . wax esters, . . . modified fats and oils, structured lipids, and flavor esters is very attractive. . . . On an average, at least one paper dealing with biocatalysis in organic solvents is published every day."); Xu I at 289 ("In 1984, *Zaks* and *Klibanov* published a paper in *Science*, indicating that enzymes could work in a solvent microaqueous medium at 100 °C. This is an important milestone in enzyme history. It means that enzymes can also be used for the catalysis of reverse reaction, *i.e.* esterification. This opens up a variety of potential applications. In the lipid area, a reaction such as interesterification (acidolysis, alcoholysis, and ester-ester exchange) is also possible with the catalysis of lipases in a probable hydrolysis-esterification two-step mechanism. Thus chemical interesterification, which has been implemented in the current industry can be fully replaced."); Yang at 881 ("Although lipases are designed in nature for the hydrolysis and synthesis of lipids and related molecules, it was discovered in the early 1980s that lipases could catalyze the interesterification of acyl groups in microaqueous systems[.] Many

varieties of lipases have been investigated for the enzymatic modification of oils and fats. Commercial lipases are available from microbial, plant, and animal sources. Among them, microbial lipases are the most attractive ones, and these have been described extensively[.]"); De Greyt at 21-23 (discussing properties of Lipozyme TL IM, a lipase from *Thermomyces lanuginosus* used in enzymatic interesterification); López-Hernández at C365 ("The enzymatic synthesis of SL [(structured lipids)] is a relatively new concept in lipid modification, and lipases are the biocatalysts of choice for this application. Although lipases are named for their ability to catalyze lipolysis (hydrolysis) reactions, the use of these enzymes in systems with very low water contents leads to catalysis of a variety of reactions, including ester synthesis, alcoholysis, acidolysis, and interesterification . . . . Enzyme-catalyzed transesterification reactions have been studied by several research groups because they provide a viable technology for producing SL, including acylglycerols containing medium-chain-length fatty acid residues."); Lee at [0006] ("One family of enzymes capable of affecting this transesterification or esterification in glycerides are known as lipases. Lipases are obtained from prokaryotic or eukaryotic microorganisms[.]"); Otero at 878 ("In the present work, a laboratory scale packed-bed reactor containing an immobilized lipase from *Thermomyces lanuginosus* (TL IM) was used to carry out the continuous transesterification reaction."); Xu II at 236 ("Figure 11.1 illustrates the difference between chemical and specific lipase-catalyzed interesterification in two triacylglycerols. . . . [W]ith 1,3-specific lipase-catalyzed reaction governed mainly by enzyme specificity and dynamics, only four new isomers (six if stereoisomers are included) are expected, apart from the original ACA and BBB."); Farmani at Abstract, 828 ("Production of trans-free Iranian vanaspati through enzymatic and chemical transesterification of triple blends of fully hydrogenated soybean (FHSBO), rapeseed (RSO) and sunflower (SFO) oils was investigated," for which "[c]ommercial immobilized 1,3-specific lipase from *Thermomyces lanuginosa*, Lipozyme TL IM, was kindly donated by Novo Nordisk (A. S., Denmark)."); Loh at [0025] ("A fat composition of the invention can be interesterified (i.e., an acyl group of one ester is exchanged with that of another ester) chemically or enzymatically."); Criado at Abstract, 715 ("Seven different reaction products were prepared *via* enzymatic interesterification of extra-virgin olive oil (EVOO) and fully hydrogenated palm oil (FHPO), by varying the initial weight ratio of EVOO to FHPO from 80:20 to 20:80. . . . The immobilized lipase preparation from *Candida antarctica* B (Novozym 435), was kindly provided by Novozymes Ltd. (Bagsvaerd, Denmark)."); Costales-Rodríguez at 682-83 ("Interesterification can be conducted chemically or enzymatically. Chemical interesterification (CIE) is usually random and produces complete positional randomization of the acyl groups on the glycerol backbone. Depending from enzyme regioselectivity, enzymatic interesterification (EIE) can be random or specific. Intermediate specificity can also be obtained simply by adjusting the residence time of the enzymatic process. . . . Lipozyme® TL IM, a commercial, silica-granulated lipase from *Thermomyces lanuginosa*, which rearranges the fatty acids with a certain *sn*-1,3 specificity, was obtained from Novozymes A/S (Bagsvaerd, Denmark)."); Basheer at [0001] ("The invention relates to the preparation of an immobilized multi-enzyme system for

transesterification or esterification of oils and fats triglycerides or of fatty acids, with short-chain alcohols, to obtain fatty acid short-chain alkyl esters, preferably to be used as biodiesel."); Austic at 4:26-5:3, claim 1 (claiming "[a] process for the production of fatty acid alkyl esters from a fatty acid feedstock containing free fatty acids, comprising the steps of: (a) providing a reaction mixture (R) that comprises the fatty acid feed stock, a lower alcohol, and a lipolytic enzyme" where "fatty acid feedstock may be oil selected from the group consisting of . . . jojoba oil" and is further defined as "a substrate comprising fatty acid derivatives"); Shah at 17:37-56, 20:55-21:18, 36:21-34 ("As used herein, 'Biocatalyst A solid catalyst' refers to a methanol-resistant enzyme biocatalyst . . . . As used herein, 'enzyme biocatalyst' refers to an immobilized enzyme . . . . [T]he biodiesel feedstocks (103) can include at least one of fats, oils, and grease. . . . The transesterifying (306 or 308) employs a solid heterogeneous catalyst, present in the mixture (305). In specific embodiments, the solid heterogeneous catalyst includes Biocatalyst A solid catalyst, Biocatalyst B solid catalyst, or a combination thereof (TransBiodiesel, Israel)."); Nielsen at [0038] ("In the present process for enzymatic production of biodiesel a reaction mixture 1 comprising a triglyceride feedstock, a lower alcohol (e.g., methanol or ethanol) and water in a first lipase catalysed transesterification process step forms fatty acid alkyl esters, free fatty acids and free glycerol."); Aracil Mira at 6-7 (Machine translation: "This [transesterification] procedure is extended to liquid and solid fractions of Jojoba oil . . . . The catalytic systems referred to in the invention are enzymatic preparations consisting of lipases, triacylglycerol hydrolases (EC 3.1.1.3), produced by the fungal species *Mucor miehi* or the fungal species *Candida antárctica*[.]").

- **C.2 – Processes for transesterifying a feedstock of jojoba wax esters and hydrogenated jojoba wax esters using one or more enzymatic catalysts:**[5] This is discussed in, and evidenced by, a number of the prior art references listed above, including (without limitation), Loh at [0005], [0007], [0018], [0025] (disclosing "a composition that includes an interesterified vegetable oil and plant-derived wax component" that can be chemically or enzymatically interesterified, and disclosing jojoba oils and that "[h]ydrogenated jojoba oils also is a suitable plant-derived wax"); Austic at 4:26-5:3, 8:25-11:25, claim 1 (claiming "[a] process for the production of fatty acid alkyl esters from a fatty acid feedstock containing free fatty acids, comprising the steps of: (a) providing a reaction mixture (R) that comprises the fatty acid feed stock, a lower alcohol, and a lipolytic enzyme" where "fatty acid feedstock may be oil selected from the group consisting of . . . jojoba oil" and is further defined as "a substrate comprising fatty acid derivatives" and "[t]he lipolytic enzyme may be selected from lipases"); Shah at 17:37-56, 20:55-21:18, 36:21-34 ("As used herein, 'Biocatalyst A solid catalyst' refers to a methanol-resistant enzyme biocatalyst . . . . As used herein, 'enzyme biocatalyst' refers to an immobilized enzyme . . . . The enzymes are lipase derived. . . . [T]he biodiesel feedstocks (103) can include at least one of . . . jojoba oil . . . and their derivatives (including genetically modified and otherwise). . . . The transesterifying (306 or

[5] *See supra* 29 n.4.

308) employs a solid heterogeneous catalyst, present in the mixture (305). In specific embodiments, the solid heterogeneous catalyst includes Biocatalyst A solid catalyst, Biocatalyst B solid catalyst, or a combination thereof (TransBiodiesel, Israel).").

- **D – The reasons for using processes for transesterifying a feedstock of waxes and oils using one or more enzymatic catalysts were similar to the reasons for using chemical catalysts:** These reasons include to improve the physical properties of the waxes and oils, such as oxidative stability, temperature stability, lubricity, emulsification, skin absorption without additives, absence of *trans* isomers, etc. This is discussed in, and evidenced by, a number of the prior art references listed above, including (without limitation), Haumann at 676 ("Interesterification using random lipases produces fat compositions similar to those obtainable from standard chemical methods. An advantage is that these lipases generally are perceived as 'natural' alternatives to chemical techniques."); Xu I at 289 ("The driving forces for the involvement of industrial sectors can be also listed as follows: – very interesting products and potential market demands[;] – improvement of product quality refereeing to mild conditions[;] – reduction of enzyme price and balanced economy in general[;] – simple processes and low investment[;] – environmental considerations[;] – customer perception and marketing strategy [;] – know-how preparation and technology takeover/control. This list can be prolonged: 'image' strategy by using enzyme technology is important for many industrial companies; energy-efficiency of the technology is also often mentioned."); Yang at 881 ("The advantages of the enzym[e-catalyzed interesterification] reaction lie in its selectivity, mild reaction conditions, few side reactions or by-products, ease of product recovery, easy process control, and minimal waste disposal[.] . . . [I]nexpensive and nearly commercially developed immobilized *Thermomyces lanuginosa* lipase, named Lipozyme TL IM, has gradually gained attention in lipid research and in industry as well."); López-Hernández at C371 ("Structured lipids [(SL)] containing different levels of MCT [(medium-chain TAG (triacylglycerides))] were produced by lipase-catalyzed interesterification reactions. . . . The SL generated in these experiments contain only saturated fatty acid residues . . . . The absence of unsaturated fatty acids residues implies that the products of the synthesis reaction have enhanced stability with regard to oxidation processes."); Xu II at 264 ("From the point of view of oxidation during storage, the enzymatically-produced fats have advantages over the chemically randomized product; the latter develops high peroxide values during storage. With regard to physical properties, the former can form the required crystal type and textures along with suitable solid fat profiles which are comparable to those of the chemically randomized fats.").

- **E – The reasons for replacing chemical catalysts with enzymatic catalysts in processes for transesterifying a feedstock of waxes and oils:** These reasons include (but are not limited to): (1) improved oxidative stability of the enzymatically transesterified product compared to the oxidative stability of the

feedstock and of chemically transesterified products; (2) fewer process steps in an enzyme-catalyzed process; (3) reduced energy consumption in an enzyme-catalyzed process; (4) increased control over the reaction product in an enzyme-catalyzed process (5) more complete conversion of the oil reactants into transesterified product in an enzyme-catalyzed process; (6) reduced or eliminated *trans* isomers content in the product of an enzyme-catalyzed process, a desirable characteristic to consumers; and (7) consumer perception of an enzyme-catalyzed process as a "natural" process, a desirable characteristic to consumers. This is discussed in, and evidenced by, a number of the prior art references listed above, including (without limitation), Otera at 1462 ("Transesterification catalyzed by enzymes has met with explosive expansion recently. This subject was boosted by successful employment of dry enzymes in organic solvents which was initiated by Klibanov and his co-workers. Although the enzymatic procedures are not always familiar with synthetic organic chemists yet and sometimes not suitable for the large scale preparation, they no doubt have some advantages over the chemical ones. In particular, enzymatic transesterification is attractive in terms of specificity. Since the transesterification is an equilibrium process, no stereo- and enatioselectivities are usually expected. However, the highly specific character of enzymes enables one to satisfy such needs."); Haumann at 675-76 ("Interesterification using random lipases produces fat compositions similar to those obtainable from standard chemical methods. An advantage is that these lipases generally are perceived as 'natural' alternatives to chemical techniques."); Ledóchowska at 347 ("The presented investigations demonstrate that interesterification products and pure TAGs [(triacylglycerols)], isolated from these products, undergo faster oxidation than the starting mixture. At the same time, TAGs obtained from enzymatic interesterification product have a better oxidative stability in comparison with TAGs from chemical interesterification."); Steinke at 361 ("Interest in lipase-catalyzed preparation of wax and bio-esters has grown in the last few years because of the possibility to obtain a wide variety of high-quality products under mild reaction conditions utilizing the substrate selectivity of such biocatalysts. The alcoholysis of triacylglycerols from vegetable oils with fatty alcohols, catalyzed by lipases, leads to a mixture of long-chain and very long chain wax esters with properties potentially suitable for applications in cosmetics and lubricants."); Xu I at 289 ("The driving forces for the involvement of industrial sectors can be also listed as follows: – very interesting products and potential market demands[;] – improvement of product quality refereeing to mild conditions[;] – reduction of enzyme price and balanced economy in general[;] – simple processes and low investment[;] – environmental considerations[;] – customer perception and marketing strategy [;] – know-how preparation and technology takeover/control. This list can be prolonged: 'image' strategy by using enzyme technology is important for many industrial companies; energy-efficiency of the technology is also often mentioned."); Yang at 881 ("The advantages of the enzym[e-catalyzed interesterification] reaction lie in its selectivity, mild reaction conditions, few side reactions or by-products, ease of product recovery, easy process control, and minimal waste disposal[.] . . . [I]nexpensive and nearly commercially developed immobilized *Thermomyces lanuginosa* lipase, named

Lipozyme TL IM, has gradually gained attention in lipid research and in industry as well."); De Greyt at 29-36 (comparing chemical and enzymatic interesterification processes); Lee at [0005] ("In contrast [to chemical transesterification or esterification processes], enzymatic methods of transesterification or esterification are simpler, cleaner, environmentally friendly and are highly specific with respect to modifying glyceride fatty acid groups."); Otero at 877 ("To address [the food industry's need to replace semi-solid fats from partially hydrogenated oils by others with similar functional properties] enzymatic transesterification reactions between a solid fat and a liquid oil can be employed for production of semi-solid fats that contain no *trans* fatty acid residues[.] Enzymatic processes based on the use of either *sn*-1,3 specific or nonspecific lipases are advantageous because of their selectivity (generation of fewer undesired byproducts), mild reaction conditions, and ease of product recovery. They also facilitate process control and minimize problems of waste disposal[.]"); Farmani at 832 ("Transesterification resulted in reduction of IP_{120} [induction period of oxidation at 120 °C] of initial blends. However, enzymatically transesterified fats had higher IP_{120} than chemically transesterified ones. Enzymatic transesterification led to less SFA [(saturated fatty acid)] and more oxidatively stable fats than chemical transesterification."); Criado at 715 ("Like chemical interesterification (CI), enzymatic interesterification (EI) permits one to produce semi-solid fats. Enzymatic processes based on the use of either *sn*-1,3-specific or nonspecific lipases are advantageous compared to CI because of: (a) higher selectivity so that fewer undesired side products are generated; (b) milder operating conditions, which permit one to reduce energy costs and prevent degradation of both the reaction products and the process equipment; (c) fewer hazards because contact with biocatalysts is less dangerous than that with the corresponding chemical catalysts; (d) ease of product recovery and purification, requiring fewer process steps; (e) higher yields; and (f) the possibility of operating in a continuous mode, thereby facilitating use of fixed-bed reactors and process control. By contrast, CI processes are based on the use of batch or semi-batch reactors."); Costales-Rodríguez at 696 ("Degradation of free tocopherols after post-deodorization was more pronounced with CIE [chemical interesterification] compared to the deodorized EIE [enzymatic interesterification]. Risk of oxidative damage after EIE is less than after CIE, which is in accordance with Chu et al. observations."); Austic at 2:13-15 ("[T]here is a strong preference for an esterification reaction at lower temperatures and for a catalyst that does not cause side-products to be formed. Operating at a lower temperature can also lead to energy savings."); Shah at 17:42-56 ("As used herein, 'enzyme biocatalyst' refers to an immobilized enzyme, typically used for the production of biodiesel. . . . The enzymes are typically biodegradable and safe to human use.").

- **F – The reasons for varying the amount of hydrogenated derivatives in a feedstock of a mixture of waxes and oils and hydrogenated derivatives of the same:** These reasons were to obtain particular physical properties of the resulting product. This is discussed in, and evidenced by, a number of the prior art references listed above, including (without limitation), Haumann at ("The effect on melting and solidification properties ultimately depends on the type and mixture of the

starting materials, according to Michael D. Erickson, senior research scientist at Kraft Food ingredients (KFI), in a chapter on interesterification prepared for the *Handbook of Soy Oil Processing and Utilization, 2nd Edition,* to be published later this year."); Sessa I at Abstract ("A series of wax ester blends was constructed by transesterifying native jojoba oil with 50-500 g kg^{-1} completely hydrogenated jojoba wax esters. . . . From these indices and also from regression analyses of each species' individual events we could optimize [*sic*] the level of saturation needed to best mimic the melt and crystallisation [*sic*] properties of cocoa butter. The wax ester blend with 400 g kg^{-1} saturation most closely resembled the thermal properties of cocoa butter where the monounsaturated species of the jojoba blend gave identical thermograms to tempered cocoa butter."); Cummings at 2 ("Jojoba oil is converted to jojoba esters through a process known as interesterification. In this process different ratios of unsaturated jojoba oils are combined with fully saturated jojoba oil and then interesterified. The process results in jojoba esters engineered to deliver specific physical, functional and chemical characteristics."); *Trans* Isomers 1 at 34 ("A fully hydrogenated lipid material has a higher melting point and is more resistant to free radical formation (See Figure 3). Fully hydrogenated forms are also the most oxidatively stable of all possible chemical structures of lipids. Fully hydrogenated jojoba oil (melting point 68-70°C) contains neither *cis* nor *trans* isomers . . . Partial hydrogenation of lipid materials is routinely employed as a commercial means of incrementally increasing the oxidative stability of a lipid [and] increasing the melting point of the material[.]"); Otero at 878 ("Transesterification between a fat and oil typically involves exchange of fatty acid residues between the precursor acylglycerols and is accompanied by a concomitant change in the properties of the original material. The properties of the product are in large measure governed by a convenient choice of the precursor reagents [and] their respective proportions in the starting mixture[.]"); Farmani at 832 ("Comparison of SFC [(solid fat content)] of transesterified blends with those of the commercial low trans vanaspati showed that the minimum SFA [(saturated fatty acid)] necessary to produce a trans-free fat suitable for use as vanaspati was 27.2% (20% FHSBO [(fully hydrogenated soy bean oil)]) for enzymatic and 28.4% (21.5% FHSBO) for chemical transesterification. On the other hand, to have a SMP [(slip melting point)] lower than 40 °C, content of SFA must be lower than 36.6% (30.9% FHSBO) and 37.8% (32.3% FHSBO) for enzymatic and chemical transesterification, respectively."); Criado at 722-23 ("Preparation of semi-solid fats *via* enzymatic interesterification of EVOO [(extra virgin olive oil)] and FHPO [(fully hydrogenated palm oil)] has been carried out in batch reactors using Novozym 435 as biocatalyst. The properties of the reaction products were compared with those of the corresponding physical blends of the precursor reactants. The properties and potential ultimate uses of the products depend on the relative proportions of the initial mixture and, specifically, on the distribution of the FA residues in the various TAG product species.").

- **G – Processes for transesterifying a feedstock of a mixture of waxes and oils and hydrogenated derivatives of the same, in which the amount of hydrogenated derivatives is 20% to 50% by weight of the feedstock:** This is discussed in, and evidenced by, a number of the prior art references listed above,

including (without limitation), Sessa I at 296 ("Natural cocoa butter and the calibration sets consisting of native jojoba wax esters that were transesterified with proportionate blends of completely hydrogenated wax esters to give a series of 50, 100, 150, 200, 300, 400 and 500 g kg^{-1} saturated ester were provided by International Flora Technologies Ltd (Gilbert, AZ, USA)"); Sessa II at 271 ("*Materials*. The calibration (provided by JDA) sets consisted of native jojoba wax esters chemically transesterified with proportionate blends of completely hydrogenated jojoba wax esters to give a series consisting of 5, 10, 15, 20, 30, 40, and 50% saturation."); Cummings at 1 (listing in Figure 3 Jojoba esters (15), (20), (30), (60) and (70)); *Trans* Isomers 2 at 46 (listing in Table 2 the chemical and physical properties of Jojoba Esters 15, 20, 30, 60, and 70); Brown at 5:39-43 ("As used in this description of the present invention, Floraesters 70 is III, Floraesters 15 is IIr, Floraesters 20, 30 and 60 are combinations of IIr, IV, V, and IIIr, Floraesters IPJ is a mixture of IIr, VI, and VIII, and Floraesters HIPJ is a combination of IIIr, VII and IX."); López-Hernández at Abstract, C371 ("A commercial preparation of medium-chain TAG [(triacylglycerides)] (MCT) was enzymatically transesterified with a fully hydrogenated soybean oil (FHSBO) at different weight ratios (40:60, 50:50, 60:40, and 70:30). . . . The changes in the melting profiles of the final products corresponded directly to the observed depletion of high-melting-point TAG present in the FHSBO."); Otero at Abstract ("An immobilized lipase from *Thermomyces lanuginosus* (TL IM) was employed to mediate the continuous transesterification of sesame oil and fully hydrogenated soybean oil (FHSBO) in a packed-bed reactor operating at 70°C. . . . The dependence of the steady state product TAG profile on space time was determined for four initial weight ratios of sesame oil to hydrogenated fat (90:10, 80:20, 70:30, and 60:40)."); Farmani at 828 ("FHSBO [(fully hydrogenated soy bean oil)] was melted at 80 °C and triple blends of FHSBO:RSO [(deodorized rapeseed oil)]:SFO [(sunflower oil)] in the mass ratio of 15:25:60, 20:25:55, 25:25:50, 30:25:45, 35:25:40 and 40:25:35 were prepared."); Loh at [0007], [0018] ("The invention also features a composition that includes an interesterified vegetable oil and plant-derived wax component. The plant-derived wax component [for which hydrogenated jojoba oil is suitable] is at least about 0.1%, by weight, of such a composition, e.g., 0.5% to 30% or 0.5% to 15%. "); Criado at 715, 718 ("The interesterification reaction between EVOO [(extra virgin olive oil)] and FHPO [(fully hydrogenated palm oil)] was carried out at 75 °C (above the melting point of FHPO, 63 °C) in 50-mL stoppered flasks using an enzyme loading of 10% of the total weight of substrates. The total weight of substrates was 10 g. Neither water nor solvent was added to the reaction medium. The weight ratio of EVOO to FHPO was varied from 80:20 to 20:80," specifically, 80:20, 70:30, 60:40, 50:50, 40:60, 30:70, 20:80); Personal Care at 1506 (listing jojoba ester trade names and trade name mixtures, including 15 offered by Floratech).

- **H – Processes for transesterifying a feedstock of waxes and oils that produce a product of which the OSI is greater than the OSI of the feedstock:** This is discussed in, and evidenced by, a number of the prior art references listed above, including (without limitation), Cummings at 2 ("Jojoba esters demonstrate remarkable stability with OSI [(Oxidative Stability Index)] values of all jojoba

esters greater than 100 hours and as high as 675 hours. The OSI of refined jojoba oil is around 35 hours."); *Trans* Isomers 2 at 46-47 (showing in Table 4 that the OSIs of Jojoba Esters 30 and 60 are greater than the OSI of partially hydrogenated jojoba oils having the same melting point); Kodali at [0005] ("Transesterifying various short saturated fatty acid esters with a vegetable oil improves oxidative stability and low temperature properties due to the increased saturation and the heterogeneity of the fatty acids esterified to the polyols."); López-Hernández at C371 ("Structured lipids [(SL)] containing different levels of MCT [(medium-chain TAG (triacylglycerides))] were produced by lipase-catalyzed interesterification reactions. . . . The SL generated in these experiments contain only saturated fatty acid residues . . . . The absence of unsaturated fatty acids residues implies that the products of the synthesis reaction have enhanced stability with regard to oxidation processes."); and Xu II at 245 ("The margarines produced from enzymatically interesterified fats generally had much lower peroxide values compared to the margarine produced from chemically randomized fats stored at 25 °C (Zhang *et al.*, 2006). A similar observation was also apparent in a pure oil system (Tautorus and McCurdy, 1990). This confirms that enzymatic interesterification has advantages for the oxidative stability of the products.").

Table 3 below categorizes the relevant disclosures of the prior art references listed above.

Table 3

	Subject Matter	**Exemplary References Disclosing The Subject Matter**
A.1	Processes for transesterifying a feedstock of waxes and oils using one or more chemical catalysts	Otera, Haumann, Sessa II, Ledóchowska, Schuchardt, Cummings, Arquette, *Trans* Isomers 1, *Trans* Isomers 2, Brown, Purcell, Yang, Touitou, De Greyt, Kodali, Xu II, Farmani, Loh, Abou-Nemeh, Costales-Rodríguez, Schlossman, Austic, Kleiman, Shah
A.2	Processes for transesterifying a feedstock of jojoba wax esters and hydrogenated jojoba wax esters using one or more chemical catalysts	Sessa I, Sessa II, Cummings, Arquette, *Trans* Isomers 2, Brown, Purcell, Touitou, Loh, Schlossman, Austic, Shah
B	The reasons for using processes for transesterifying a feedstock of waxes and oils using one or more chemical catalysts	Haumann, Cummings, Arquette, *Trans* Isomers 1, *Trans* Isomers 2, Brown, Kodali
C.1	Processes for transesterifying a feedstock of waxes and oils using one or more enzymatic catalysts	Otera, Haumann, Ledóchowska, Schuchardt, Steinke, *Trans* Isomers 1, Krishna, Xu I, Yang, De Greyt, López-Hernández, Lee, Otero, Xu II, Farmani, Loh, Criado, Costales-Rodríguez, Basheer, Austic, Shah, Nielsen, Aracil Mira
C.2	Processes for transesterifying a feedstock of jojoba wax esters and hydrogenated jojoba wax esters using one or more enzymatic catalysts	Loh, Austic, Shah

Table 3		
	Subject Matter	**Exemplary References Disclosing The Subject Matter**
D	The reasons for using processes for transesterifying a feedstock of waxes and oils using one or more enzymatic catalysts were similar to the reasons for using chemical catalysts	Haumann, Xu I, Yang, López-Hernández, Xu II
E	The reasons for replacing chemical catalysts with enzymatic catalysts in processes for transesterifying a feedstock of waxes and oils	Otera, Haumann, Ledóchowska, Steinke, Krishna, Xu I, Yang, De Greyt, Lee, Otero, Farmani, Costales-Rodríguez, Austic, Shah
F	The reasons for varying the amount of hydrogenated derivatives in a feedstock of a mixture of waxes and oils and hydrogenated derivatives of the same	Haumann, Sessa I, Cummings, *Trans* Isomers 1, Otero, Farmani, Criado
G	Processes for transesterifying a feedstock of waxes and oils and hydrogenated derivatives of the same, in which the amount of hydrogenated derivatives are 20% to 50% by weight of the feedstock	Sessa I, Sessa II, Cummings, *Trans* Isomers 1, *Trans* Isomers 2, Brown, López-Hernández, Otero, Farmani, Loh, Criado, Personal Care
H	Processes for transesterifying a feedstock of waxes and oils that produce a product of which the OSI is greater than the OSI of the feedstock	Cummings, *Trans* Isomers 2, Kodali, López-Hernández, Xu II

At least the following exemplary combinations of teachings and motivations to combine set forth above in Table 3 render obvious claims 1 and 2 of the ’245 Patent:

1. C.2 in view of G and H
2. A.1 in view of C.2, G, and H
3. A.2 in view of C.1, G, and H
4. A.2 in view of C.2, G, and H
5. C.1 in view of C.2, G, and H
6. A.1 in view of A.2, C.1, G, and H
7. A.1 in view of A.2, C.2, G, and H
8. A.1 in view of C.1, C2, G, and H

Vantage contends these teachings, and motivations to combine, are established by referring to any one or more references from each corresponding category. The reasons for combining such references in the manner described are set forth in the references in categories B, D, E, F, and H set forth above in Table 3. As examples of the manner in which references from the foregoing categories can be combined, the following specific combinations render obvious claims 1 and 2 of the ’245 Patent:

1. Cummings (A.1, G, H) in view of Xu I (C.1) and Sessa I (A.2, G)
2. *Trans* Isomers 2 (A.1, G, H) in view of Xu I (C.1) and Sessa I (A.2, G)
3. Brown (A.1, G) in view of Xu I (C.1), Sessa I (A.2, G), and Cummings (A.1, G, H)
4. Cummings (A.1, G, H) in view of Shah (A.2, C.1-2) and Loh (A.1-2, C.1-2, G)
5. Loh (A.1-2, C.1-2, G) in view of Xu I (C.1) and Cummings (A.1, G, H)
6. *Trans* Isomers 2 (A.1, G, H) in view of Sessa I (A.2, G) and *Trans* Isomers 1 (A.1, C.1, G)

Claim charts setting forth specific, exemplary obviousness combinations and the corresponding motivations to combine are set forth in the accompanying Exhibits A to S and AA to AF.

Any reference or combination of references that anticipates or makes obvious an asserted independent claim also makes obvious any asserted claim dependent on that independent claim because every element of each dependent claim was known by a POSA at the time of the alleged invention, and it would have been obvious to combine those known elements with the independent claims at least as a matter of common sense and routine innovation. Accordingly, Vantage contends that each asserted claim would have been rendered obvious not only by the combinations explicitly defined in these contentions, but also by any other combination of references that renders obvious an asserted claim.

3. Motivation to Combine

Vantage contends that there was a reason to make each combination set forth herein. For example, each combination of art would have produced no unexpected results; and each combination at most would simply represent a known alternative to a POSA. *See KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 415-18 (2007) (rejecting the Federal Circuit's "rigid" application of the teaching, suggestion, or motivation to combine test, instead espousing an "expansive and flexible" approach). Indeed, the Supreme Court has held that a POSA is "a person of ordinary creativity, not an automaton" and "in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle." *Id.* at 420-21; *see also* Examination Guidelines for Determining Obviousness Under 35 U.S.C. §103 in view of the Supreme Court Decision in *KSR International Co. v. Teleflex Inc.*, 72 Fed. Reg. 57,526 (Oct. 10, 2007).

It would have been obvious to a POSA to make one or more combinations of the prior art references identified above because these references would have been combined using: known methods to yield predictable results; known techniques in the same way; a simple substitution of one known, equivalent element for another to obtain predictable results; and/or a teaching, suggestion, or motivation in the prior art generally. In addition, it would have been obvious to try combining the prior art references identified above because there were only a finite number of predictable solutions and/or because known work in one field of endeavor prompted variations based on predictable design incentives and/or market forces either in the same field or a different one. In addition, it would have been obvious to a POSA to make each of the combinations of the prior art references identified above because the combinations represent the known potential options with a reasonable expectation of success.

As one example, it would have been obvious to apply known transesterification processes to transesterify jojoba wax esters and hydrogenated jojoba wax esters. As discussed above, at the time of the invention, a POSA was aware of methods for transesterification of waxes and oils and the benefits thereof, including improving the physical properties such as oxidative stability, temperature stability, lubricity, and ability to form stable emulsions. In addition, jojoba oil and jojoba esters were known compounds with known beneficial properties. *See, e.g.*, Cummings at 1 ("Jojoba esters are a new category of naturally derived, oil free emollients that offer good properties for a wide variety of cosmetic products."); Brown at 2:28-30 ("A major portion of the production of jojoba oil is used by the cosmetic industry as an emollient in a variety of products."); Loh at [0016], [0018]. Thus, transesterifying jojoba wax esters and hydrogenated jojoba wax esters would simply have involved, for example, using a known technique of transesterification to improve similar compounds (waxes and oils) in the same way, and applying a known technique to a known compound ready for improvement to yield predictable results.

As another example, it would have been obvious to use an enzymatic catalyst, and specifically lipase (again, as discussed above the patent defines "lipase" broadly[6]), in known transesterification processes, including transesterification of jojoba wax esters. As discussed above, at the time of the invention, a POSA was aware of enzymatic catalysts, including lipase specifically, and the benefits thereof, and reasons for replacing chemical catalysts with enzymatic catalysts. *See, e.g.*, Xu I at 289 ("[A] reaction such as interesterification . . . is also possible with the catalysis of lipases in a probable hydrolysis-esterification two-step mechanism. Thus chemical interesterification, which has been implemented in the current industry can be fully replaced."), 296 ("[M]ilder conditions are applied than in chemical processes."), 300 ("Enzymatic processes

[6] *See supra* 29 n.4.

are simpler in general than chemical interesterification."); Otera at 1462 ("[Enzymatic procedures] no doubt have some advantages over the chemical ones. In particular, enzymatic transesterification is attractive in terms of specificity. Since the transesterification is an equilibrium process, no stereo- and enatio-selectivities are usually expected. However, the highly specific character of enzymes enables one to satisfy such needs."); Haumann at 675-76 ("Interesterification using random lipases produces fat compositions similar to those obtainable from standard chemical methods. An advantage is that these lipases generally are perceived as 'natural' alternatives to chemical techniques."); *see also* Category C.1, C.2, D, and E disclosures above. In addition, processes for transesterifying jojoba wax esters using chemical catalysts, such as sodium methoxide, were well known in the art. Thus, applying a lipase catalyst to known processes for transesterification of jojoba wax esters would simply have involved, for example, a simple substitution of one known element (enzymatic catalysts) for another (chemical catalysts) to obtain predictable results, use of a known technique of enzymatic catalysis to improve similar processes (transesterification of jojoba wax esters) in the same way, and applying a known technique to a known process (chemical catalysis) ready for improvement to yield predictable results.

As another example, it would have been obvious to use 20% to 50% by weight of hydrogenated jojoba wax esters in the feedstock. As discussed above, processes for transesterifying a mixture of jojoba wax esters and hydrogenated jojoba wax esters were known. Further, as discussed above, a POSA was aware that the fraction of hydrogenated derivatives in the feedstock would affect the physical properties of the end product. Further, as discussed above, a POSA was aware of compositions wherein the weight fraction of the hydrogenated component in the feedstock fell within the claimed 20% to 50% range. Thus, using a feedstock wherein the hydrogenated jojoba wax esters is 20% to 50% by weight would simply have involved, for

example, combining prior art elements (a feedstock of jojoba oil, a feedstock of waxes and hydrogenated derivatives, varying feedstock composition to change end product characteristics, etc.) according to known methods to yield predictable results, and weight fractions that were "obvious to try" because they were among a finite number of identified, predictable solutions, with a reasonable expectation of success.

Further, motivation to combine exists because the prior art references are from the same field of art, and a POSA would draw equally from the field of art presented in the '245 Patent. The combinations suggested above reflect at least combinations of prior art elements according to known methods to yield predictable results, simple substitutions of known elements to obtain predictable results, and combinations that are obvious to try. Further elaboration and information shall be provided with Vantage's expert report(s).

Additional evidence that there would have been a motivation to combine the prior art references identified above includes the interrelated teachings of multiple prior art references; the effects of demands known to the design community or present in the marketplace; the existence of a known problem for which there was an obvious solution encompassed by the asserted claims; the existence of a known need or problem in the field of the endeavor at the time of the invention(s); and the background knowledge that would have been possessed by a POSA.

Thus, the motivation to combine the teachings of the prior art references disclosed herein is found in the references themselves and: (1) the nature of the problem being solved; (2) the express, implied and inherent teachings of the prior art; (3) the knowledge of POSAs in the art; (4) the predictable results obtained by combining the different elements of the prior art; (5) the predictable results obtained in simple substitution of one known element for another; (6) the use of a known technique to improve similar methods in the same way; (7) the predictable results

obtained in applying a known technique to a known method ready for improvement; (8) the finite number of identified predictable solutions that had a reasonable expectation of success; and (9) known work in various technological fields that could be applied to the same or different technological fields based on design incentives or other market forces.

4. Reasonable Expectation of Success

A POSA would have had a reasonable expectation of success in light of the disclosures of the prior art references listed above and discussed in the claim charts at Exhibits A to S and AA to AF. In addition to the reasoning discussed in the prior sections, a POSA would have had a reasonable expectation of success given the long history of prior art processes for the enzymatic transesterification of feedstocks comprising jojoba wax esters and hydrogenated wax esters. *See* Table 1; Exhibits A–S, AA–AF. Using the reaction parameters taught in the prior art, a POSA would have had a reasonable expectation of success in implementing known enzymatic transesterification methods disclosed in the above-discussed references to obtain a transesterified product of which the OSI is greater than the OSI of the feedstock.

V. INVALIDITY UNDER AIA 35 U.S.C. § 112

A. Indefiniteness

Vantage contends that claims 1 and 2 of the ’245 Patent are invalid for indefiniteness. *See* AIA 35 U.S.C. § 112(b); *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 901 (2014). Specifically, at least the following terms, read in light of the specification and the prosecution history, fail to inform, with reasonable certainty, POSAs about the scope of the invention—especially in light of how Plaintiffs appear to interpret the terms in their December 15, 2022 Initial Infringement Contentions:

- “feedstock”

- "lipase"
- "contacting the feedstock with a lipase"
- "transesterifying" / "transesterified"
- "an oxidative stability index (OSI) of the transesterified product"
- "an OSI of the feedstock"

This indefiniteness is largely the result of inconsistencies amongst the language of the claims, applicants' statements during prosecution, and Plaintiff's apparent arguments here. *See, e.g.*, *Infinity Comput. Prods., Inc. v. Oki Data Am., Inc.*, 987 F.3d 1053, 1060-62 (Fed. Cir. 2021).

For example, claim 1 merely requires the OSI of the "transesterified product" to be "***greater*** than" the "OSI of the feedstock." '245 Patent at 19:19-21. Yet applicant told the Patent Office that "the observed OSI ***increase for [the prior art]*** is within the level of measurement noise for OSI—an increase of a single hour is ***very little actual increase*** and not one that would be commercially significant or observable as a practical matter." CARGILL 00000506 (emphasis added). The inventor told the Patent Office likewise: "While both the jojoba [*i.e.*, the invention] and crambe derived ester products [*i.e.*, the prior art] saw an increase in oxidative stability over the OSI of the original feedstock, the jojoba derived esters ***increased by*** an average of 384% compared to ***175% for the crambe derivative*** . . . . It is also important to note that while the OSI of the crambe ester products increased an average of 175%, this increase was merely l hour. An increase of 1 hour under the OSI evaluation is not actually significant." CARGILL 00000494 (emphasis added). Worse, now, applicant appears to assert that claims 1 and 2 of the '245 Patent can cover an interesterification[7] process in which the OSI of the product is ***less than*** the OSI of the feedstock. *See* Plaintiffs' Initial Infringement Contentions, Ex. A.

[7] Vantage does not concede that Plaintiff's apparent construction of the term "transesterification" to cover "interesterification" processes is proper in light of the '245 Patent specification, reserves

As an additional example, claim 1 requires that the "transesterifying" process ***itself*** cause the claimed increase in OSI. '245 Patent at 19:19-21. Applicant made consistent comments to the Patent Office:

> **Rejections under 35 U.S.C. 112**
>
> Claims 1-7 stand rejected by the Examiner under 35 U.S.C. 112. Specifically, in the 11/30/18 OA on pg. 6, the Examiner argues that using "wherein" in a method claim is reciting the result of the method step rather than the method itself. The Applicant respectfully traverses this rejection. The steps of the method are recited in the first three clauses of the claim which is apparent with the gerund form of the verbs which is required in method steps. The wherein phase of the claim is merely describing one of the properties of the product formed using the method that is unique to products made using this particular method. Therefore, the Applicant has particularly pointed out the subject matter of the claim and has included a resulting quality of the product. Applicant respectfully requests that the rejection of claims 1-7 under 35 U.S.C. 112 be withdrawn.

CARGILL 00000421; *see also, e.g.*, CARGILL 00000428; CARGILL 00000431; '245 Patent at 9:49-62, 12:16-20. Yet, now, Plaintiffs appear to assert that the claimed increase in OSI can be entirely the result of adding antioxidants (which is an unclaimed step). *See* Plaintiffs' Initial Infringement Contentions, Ex. A.

As yet an additional example, claim 1 uses the open-ended word "comprising," meaning that the feedstock contacted by the lipase may include materials other than "wax esters" and "hydrogenated wax esters." '245 Patent at 19:11-14; *see Mars, Inc. v. H.J. Heinz Co., LP*, 377 F.3d 1369, 1376 (Fed. Cir. 2004). For example, the patent itself repeatedly says that "the feedstock may further include an antioxidant." '245 Patent at 1:32, 1:60, 2:17. In fact, during prosecution, the Patent Office told applicant—and applicant conceded—that there was no written description

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the right to contest such construction, and reserves the right to respond to alternative constructions proposed by (or indicated by) Plaintiffs. *See also supra* 23 n.3.

for a feedstock that contained only "wax esters" and "hydrogenated wax esters." *See* CARGILL 00001038 (applicant adding new prosecuted claim 26 claiming "wherein the feedstock consists of the jojoba wax esters and the hydrogenated jojoba wax esters"); CARGILL 00001054-00001055 (the Examiner rejecting newly prosecuted claim 26 "under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement" because "[t]he specification discloses . . . components other than wax esters and hydrogenated wax esters, such as . . . antioxidants such as tocopherols . . . . The specification does not disclose a feedstock that ***consists of*** jojoba wax esters and hydrogenated wax esters.") (emphasis in original); CARGILL 00001134 (applicant amending prosecuted claim 24 to recite "the amount of hydrogenated jojoba wax esters is 20% to 50% by weight ***of the jojoba wax esters***") (emphasis added); CARGILL 00001143-45 (the Examiner rejecting the amendment to prosecuted claim 24 as new matter and not supported by the original disclosure because "[t]he original disclosure supports the amount of hydrogenated jojoba wax esters is 20% to 50% ***by weight of the feedstock***. The original disclosure does not disclose 'the amount of hydrogenated jojoba wax esters is 20% to 50% by weight of ***the jojoba wax esters*** . . . .'") (emphasis in original). Yet, now, Plaintiffs appear to assert that they can ignore the antioxidants (tocopherols) in the accused feedstock. *See* Plaintiffs' Initial Infringement Contentions, Ex. A.

B. Lack of Written Description

Vantage contends that the asserted claims of the '245 Patent are invalid for lack of written description under AIA 35 U.S.C. § 112(a) because the specification does not demonstrate that the inventors had possession of the full scope of the claimed invention. Specifically, the following claim terms lack written description—especially in light of how Plaintiffs appear to interpret the terms in their December 15, 2022 Initial Infringement Contentions, as well as the inconsistencies detailed directly above:

- "feedstock comprising jojoba wax esters and hydrogenated jojoba wax esters"
- "transesterifying . . . with the lipase"
- "transesterifying the jojoba wax esters and the hydrogenated jojoba wax esters in the feedstock"
- "wherein an oxidative stability index (OSI) of the transesterified product is greater than an OSI of the feedstock"

C. Lack of Enablement

Vantage contends that the asserted claims of the '245 Patent are invalid for lack of enablement under AIA 35 U.S.C. § 112(a) because the specification does not teach POSAs how to make and use the full scope of the claimed invention without undue experimentation. Specifically, the following claim requirements are not enabled to their full scope—especially in light of how Plaintiffs appear to interpret the terms in their December 15, 2022 Initial Infringement Contentions, as well as the inconsistencies detailed directly above:

- "transesterifying the jojoba wax esters and the hydrogenated jojoba wax esters in the feedstock with the lipase to form a transesterified product"
- "wherein an oxidative stability index (OSI) of the transesterified product is greater than an OSI of the feedstock"

VI. DOCUMENT PRODUCTION

Pursuant to the Scheduling Order (D.I. 15), and concurrent with service of these Initial Invalidity Contentions, Vantage is producing documents related to these Initial Invalidity Contentions bearing Bates Numbers VANTAGE_00000038 through VANTAGE_00000624 and reserves the right to supplement by producing additional documents. Copies of these documents will be sent under separate cover.

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