

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

VANTAGE SPECIALTY CHEMICALS, INC.

Petitioner,

v.

CARGILL, INCORPORATED,

Patent Owner

Case IPR2023-00589
U.S. Patent 11,248,245

PATENT OWNER'S SUR-REPLY



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I. INTRODUCTION

Vantage's Reply fails to fill in the holes in its Petition or rebut Cargill's Response.

Vantage cannot show a teaching or suggestion of the claimed oxidative stability index ("OSI") increase. In fact, the record reflects that a POSITA at the time of the invention would have expected the claimed ester-ester exchange to result in the *same or lower* OSI. Attempting to find the necessary proofs, Vantage relies on incorrect comparisons, including to *commercial* products in Cummings and Trans Isomers 2 "TI2." But a POSITA reading Cummings or TI2 would have understood that any increase in OSI observed was not tied to the required *ester-ester exchange* of transesterification, as the claims require, but instead resulted from the addition of *antioxidants (tocopherols)* during post-processing. Tocopherols were specifically added to the products to increase OSI. Vantage's own exhibits show that tocopherols, *not* transesterification, caused the increase in OSI from 35 to 100 in Cummings upon which Vantage hinges its arguments. Vantage simply cannot meet its burden by relying on the Cummings and TI2 commercial products.

To fill the hole in its proofs for the claimed OSI increase, Vantage then tries to pivot to an inherency argument, but that fails on both the law and the facts.

Transesterification in the prior art did not *always* result in increased OSI, as required

for inherency. Moreover, Vantage fails to substantively rebut Cargill's extensive evidence of unexpected results and unpredictability as to OSI.

Fundamentally, Vantage fails to address Dr. Schultz's evidence about what was understood about lipase chemistry at the time of the invention, namely, that a POSITA would have believed that, to catalyze an *ester-ester exchange*, a lipase would have required a glycerol backbone structure and shorter chains that jojoba wax esters undisputedly lack. Vantage tries to give Dr. Schultz's arguments the back of the hand by dismissing the science as "misleading technical arguments." But tellingly, Vantage fails to provide *any* substantive rebuttal grounded in science and relevant to an ester-ester exchange.

Instead of meeting Cargill head on with the science, Vantage employs a scattershot approach, arguing that lipase-catalyzed ester-ester exchange of jojoba oil was "well-known" six years before the invention, but then failing to cite to any prior art that even suggested such a reaction. Vantage instead points to a group of references that either use a different reaction, a different substrate, or are not prior art. By and large, the new art, like Vantage's previous references, focuses on triglycerides. And Vantage does all this without the support of any expert testimony, leaving the Board with attorney argument rather than evidence.

Vantage has failed to come forward with the evidence to carry its burden. The Board should reject Vantage's unpatentability arguments.

II. ALL GROUNDS FAIL BECAUSE NO PRIOR ART TEACHES OR SUGGESTS THAT TRANSESTERIFICATION INCREASES OSI

All challenged claims of the '245 Patent require that the OSI of the transesterified product is *greater* than the OSI of the feedstock. As Cargill explained in its POR, none of the prior art that Vantage relies on teaches or suggests that ester-ester exchange would increase the OSI of jojoba ester products as compared to its feedstock. *See* POR, 32-50. Vantage's Reply does not overcome this failure of proof.

A. Vantage's Argument That Cummings Shows an Increase in OSI From 35 to 100 From Transesterification Is Wrong

Vantage wrongly contends that a POSITA would have known that lipase-catalyzed ester-ester exchange would increase OSI in jojoba wax esters based on Cummings. Reply, 9-14.¹ But the evidence in the record—Cargill's documents, Dr. Schultz's unrebutted testimony, and *even Vantage's* submitted evidence—shows that a POSITA would have understood that the OSI increase in Cummings results from *additives* in Cummings' commercial products, *not* transesterification as claimed. Vantage's attorney arguments fail to overcome this fact and other deficiencies in its proofs.

¹ Cummings uses a chemical catalyst, not a lipase as claimed. *See* EX2046, 31:19-32:9; EX1028, 7.

1. A POSITA Would Have Understood That Cummings’
Products Have Added Tocopherols That Account for the
Increase in OSI

The products discussed in Cummings—Jojoba Esters 15, 20, 30, 60, and 70—are commercial products. EX1004, 1; EX1028, 5. Vantage does not dispute this. Reply, 10-11. The evidence shows that a POSITA would have known that those commercial products contained additives, such as tocopherols, that are specifically added to increase OSI. Indeed, Vantage’s *own cited evidence* shows that Cummings’ commercial products contain tocopherols for the purpose of increasing OSI.

For example, Vantage’s EX1028 shows Jojoba Esters 15 and 60—the same products that Cummings discloses and Vantage relies upon—before and after tocopherols are added:

Table 2. OSI of Jojoba Esters 15 and 60 when exposed to cosmetic actives (Brown et al. 1997).

Cosmetic active (%)	15 h	60 h
None	~35	~175
Tocopherols*	~80	~230
Iron oxides (10%) and tocopherols	~80	~225
Zinc oxides (10%) and tocopherols	~15	~90
Titanium dioxide (10%) and tocopherols	~135	~300
Malic acid (5%) and tocopherols	~110	~20
Salicylic acid (2%) and tocopherols	~25	~50
Salicylic acid (2%), titanium dioxide (10%), and tocopherols	~60	~180
Malic acid (5%), titanium dioxide (10%), and tocopherols	~120	~20
Arbutin (7%) and tocopherols	~50	~90
Kojic acid (1%) and tocopherols	~100	~250
Magnesium ascorbyl phosphate (3%) and tocopherols	~85	~170

* concentration of tocopherols not provided.

EX1028, 5. Without tocopherols (“None”), Jojoba Ester 15—the transesterified product—has an OSI of ~35 hours. *Id.* (“Jojoba Esters 15 had a stability of ~35 OSI hours and Jojoba Esters 60 175 OSI hours.”). But *with tocopherols*, the OSI *goes up to ~80 hours*. *Id.* This increase in OSI is consistent with Cummings’ disclosure of an increase from 35 hours to 100 hours. EX1004, 2; *see also* EX1014, 7; EX2009, ¶140.

Thus, Vantage’s assertion in its Reply that “Cummings explicitly teaches that transesterification of a jojoba-oil-only feedstock increases its OSI from 35 to at least 100,” (Reply, 11), is wrong. *In other words, transesterification did not increase the OSI*—the addition of tocopherols did. As Dr. Schultz explained, a POSITA would have expected the addition of tocopherols to increase OSI. EX2009, ¶¶138-147, 180-185; POR, 39-47, 57-59.

EX1028 also confirms that *all of* Cummings’ commercial products (Jojoba Esters 15, 20, 30, 60 and 70) contain added tocopherol:

Jojoba Esters are proper waxes, with no triglyceride components. Jojoba Esters are a complex mixture of long chain (C35 to C46) fatty acids and fatty alcohols joined by an ester bond and do not contain any trans-unsaturation (International Jojoba Export Council 2004).

Floritech (2005a,b) reported the ester chain length and saturation of 4 Jojoba Ester products as shown in Table 6. Each was reported as being 99.95% Jojoba Esters and 0.05% tocopherol.

...

Methods of Manufacture

...

Simmondsia Chinensis (Jojoba) Seed Oil is combined with Hydrogenated Jojoba Oil and sodium methylate (catalyst) to get mixed Jojoba Esters (Floritech 2005a). Refined Simmondsia Chinensis (Jojoba) Seed Oil is combined with sodium methoxide to get randomized Jojoba Esters. Tocopherol is then added to make the commercial Jojoba Ester 15 (Floritech 2005b).

EX1028, 7 (annotated). Table 6, in turn, lists the products as Jojoba Esters 20, 30, 60, and 70. *Id.*

Cargill's evidence confirms that a POSITA reading Cummings would have known about added tocopherols in Jojoba Esters 15, 20, 30, 60, and 70 and its impact on OSI, and would *not* have understood from Cummings that *ester-ester exchange*, as opposed to added tocopherols, caused the improved OSI. *See* EX2048, 15 (showing tocopherols added to Jojoba Esters 15 and 60); EX2012, 1 (showing 0.05% by weight tocopherols in Jojoba Esters 15); EX2013, 1 (showing 0.05% by weight tocopherols in Jojoba Esters 20); EX2014, 2, 7 (showing tocopherols in Jojoba Esters 15, 20, 30, and 60); EX2049.

These documents defeat Vantage's arguments that Cummings' products do not have tocopherols because "Cummings' description of its process does not reference tocopherol addition[.]" Reply, 13.

Simply put, Cummings does not disclose the claimed increase in OSI.

Vantage's argument that "Cummings' disclosure is akin to the '245 patent, which provides a numerical-OSI comparison only between a jojoba-oil-only feedstock and its transesterified product" is without merit. Reply, 11 (emphasis in original). The OSI disclosures in Cummings are not akin to the '245 patent. The OSI values resulted from the added tocopherols which is different than the inventors disclosure, and the inventors showed more. During prosecution, the inventors showed that when a 20% hydrogenated wax ester feedstock is transesterified with a lipase, the OSI increased over three-fold, from 33.8 to 117. This increase was not taught or suggested by Cummings. Cummings provides nothing that suggests any increase would occur based only on transesterification, without the addition of tocopherols. EX1002, 1075-76.

2. Cummings Must Be Interpreted in View of All of the Pertinent Art

Cummings' lack of discussion of the added tocopherols does not disprove the affirmative evidence that tocopherols were present in the commercial products. Nevertheless, Vantage asserts in its Reply that "[s]urely, had the 'remarkable' OSI results been the result of tocopherols and not transesterification, Cummings would have reported that fact." Reply, 13 (emphasis in original). It is clear from the face of Cummings, however, that the "remarkable" OSI it refers to is *not* in comparison with the *non-transesterified* feedstock, but rather in comparison with *other oils or*

cosmetic ingredients. See EX1004, 1-2 (“Jojoba esters are more oxidatively stable than most similar cosmetic ingredients.”).

Moreover, prior art must be considered from the perspective of a POSITA. A POSITA is “a hypothetical person who is presumed to be aware of all the pertinent prior art.” *Takeda Chem. Indus., Ltd. v. Alphapharm Pty., Ltd.*, 492 F.3d 1350, 1363 (Fed. Cir. 2007) (citation omitted). As shown above, the prior art—including EX1028—discloses that the Jojoba Ester products in Cummings have added tocopherols. A POSITA would be aware of all of this art and would read Cummings with that understanding.

Vantage’s cases are distinguishable. In *In re Clark*, Patent Owner argued the Board improperly relied on a reference that “incorrectly stated” how a transmitter worked. 420 Fed. App’x 994, 998 (Fed. Cir. 2011). Here, there is no error in Cummings. Rather, a POSITA would have understood that tocopherols were added to Cummings’ commercial products. *Takeda*, 492 F.3d at 1363. In *In re Publicover*, the court found the “attorney argument as to the capabilities of a skilled artisan unpersuasive.” 813 Fed. App’x 527, 532 (Fed. Cir. 2020). Here, Cargill has provided both documentary evidence and expert testimony, to show how a POSITA would have understood Cummings’ disclosures in view of all the pertinent art.

In an attempt to fill the gap in Cummings, Vantage concocts a new argument that “because OSI testing is biased toward the first component to oxidize in a blend,”

a POSITA would have known that a feedstock containing hydrogenated jojoba wax esters would also have had an OSI of 35 hours. Reply, 12. Dr. Schultz provided an extensive rebuttal to this argument. EX2009, ¶¶125-128; POR, 34-35. And Vantage’s EX1028’s discussion of Jojoba Ester 60 explicitly disproves it. As shown in Table 6, 9-27% of the esters in Jojoba Ester 60 are fully unsaturated.² EX1028, 7. According to Vantage’s argument, this should “bias” the OSI to the unsaturated component resulting in an OSI of ~35. Reply, 12. But Table 2 and accompanying description shows that the OSI of Jojoba Ester 60 is ~175—**5 times greater** than the OSI of the unsaturated Jojoba Ester 15 product. EX1028, 5. The Board should reject Dr. Rockstraw’s unfounded and unsupported theory. *See TQ Delta, LLC v. CISCO Sys., Inc.*, 942 F.3d 1352, 1358 (Fed. Cir. 2019) (“Conclusory expert testimony does not qualify as substantial evidence.”).

Even then, this new contention still depends on Vantage’s argument that the commercial products in Cummings did not undergo post-processing including the addition of tocopherols to increase OSI. Reply, 13. But the prior art shows conclusively that the commercial products contained tocopherols. EX1028, 5, 7. And a POSITA would have known this. EX2009, ¶¶140-141. No matter what the

² In the left column of Table 6, unsaturated chains (i.e., two double bonds) are indicated by a 2 (i.e., 38:2).

OSI of the feedstock, nothing in the prior art teaches or suggests transesterification alone would increase OSI. To the contrary, EX1028 shows that transesterification alone ***did not increase OSI*** for Jojoba Wax Esters 15. *Compare* EX1004, 2 with EX1028, 5.

In summary, a POSITA would have understood that refined jojoba oil does not contain 20-50% hydrogenated wax esters as required by the claims. EX1004, 2 (Fig. 2). Cummings is therefore ***silent*** regarding the OSI of any feedstock containing 20-50% hydrogenated wax esters. Cummings is also silent about the OSI of the reaction product following transesterification of the claimed feedstock prior to the addition of tocopherols. And the evidence shows that a POSITA would ***not*** have expected transesterification alone to increase OSI. POR, 40-42; EX2009, ¶¶140-141; EX1028, 5, 7.

B. Trans Isomers 2 (“TI2”) Does Not Teach Increased OSI

The Board correctly found that TI2’s “comparison of OSI values appears to be inapposite relative to the claimed OSI comparison.” I.D., 33. Vantage doubled down in Reply, reiterating its argument that TI2 “teaches that transesterifying a jojoba feedstock increases OSI.” *See* Reply, 14-16. As an initial matter, Vantage’s reliance on TI2 suffers from the same flaws identified in Cummings in §II(A). Reply, 14-16. TI2 relies on the ***same commercial products*** as Cummings. Even more confusingly, TI2 purports to further compare those commercial products to products of unknown

composition and origin. *See* EX1014, 7 (Table 4).³ The two unknown products are described in rows 2 and 4 of Table 4, simply labeled “Jojoba oil Partial Hydrogenate,” and notably have entirely different properties. *Id.* It is completely unknown what these two compounds are, how they were made, or where they are from.

It is impossible to tell from the face of TI2 the identity of these products. If they are commercial products, TI2 provides no disclosure regarding to what extent they had undergone post-processing with additives that could increase OSI, such as tocopherols. In fact, TI2 admits that partially hydrogenated products are often mislabeled. *See id.*, 6 (section “Labeling Inconsistencies”). No conclusions can be drawn from any comparison involving these materials.

Surprisingly, Vantage’s argument regarding TI2 is at odds with its Petition. In the Petition, Vantage argued that the correct comparison in Table 4 was between the first two lines of the table (Jojoba Esters 30 and corresponding Jojoba oil Partial Hydrogenate) and between the last two lines of the table (Jojoba Esters 60 and its corresponding Jojoba oil Partial Hydrogenate). Pet., 51; EX1003, ¶¶158-161. The Board rejected that argument, correctly finding that “these hydrogenates appear to be comparative *products* made by a different method—not interesterification” and

³ Citations to TI2 (EX1006) herein are to the more legible EX1014.

voicing “concerns with Petitioner’s reasoning[.]” I.D., 33 (emphasis in original).

Therefore, at deposition Dr. Rockstraw and Vantage changed strategies and espoused a new theory found nowhere in the Petition that the relevant comparison is actually between the first two lines of the table. *See* EX2046, 43:22-45:11. This comparison, however, is not found in Dr. Rockstraw’s declaration, and is woefully deficient as Vantage has failed to substantiate this point with any additional evidence in its Reply. *Id.*, 45:12-48:5.

III. ALL GROUNDS FAIL BECAUSE THE INCREASE IN OSI BY TRANSESTERIFICATION WAS UNEXPECTED AND NOT INHERENT

A. An Increase in OSI Using Lipases Was Unexpected

Vantage’s argument that Cargill “provides no evidence that a decrease [in OSI] would have been expected,” (Reply, 22-23), is wrong. The ’245 Patent shows that a chemically-catalyzed ester-ester exchange ***decreases OSI***. EX1001, 9:26-56. Similarly, Vantage’s submitted evidence, EX1015 (Kodali), demonstrates a similar type of reaction also yields a lower OSI. *See* POR, 37 (citing EX1015 at [0081]). Moreover, Rozenaal—cited by Vantage’s TII art—states that in an ester-ester exchange, “[t]he stability of the oil remains essentially unchanged[.]” POR, 43-44 (citing EX2030, 3). Yet Vantage leaves Rozenaal ***entirely un rebutted***. Therefore, Cargill’s evidence shows that an increase of OSI by virtue of the ester-ester exchange reaction itself would ***not*** have been expected by a POSITA.

Vantage’s argument that Xu’s reasons for using a lipase are “unrebutted” is also wrong. Reply, 23. Dr. Schultz explained why Xu’s reasons would have been unconvincing to a POSITA in light of the lack of motivation to use a lipase as a catalyst for ester-ester exchange in jojoba wax esters. *See* EX2009, ¶¶69-87, 114-122. Even if a lipase was used, Vantage provides no evidence showing why a POSITA would have expected lipase use to lead to an *increase* in OSI, as opposed to the same or lower OSI.

Vantage’s reliance (Reply, 23) on *Bristol-Myers Squibb Co. v. Ben Venue Lab’ys., Inc.*, 246 F.3d 1368 (Fed. Cir. 2001), is unfounded. That case is about “[n]ewly discovered results of known processes[.]” *Id.* at 1376. But lipase-catalyzed ester-ester exchange of jojoba wax esters was *unknown* at the time of the invention.

B. Vantage Has Not Met the High Burden to Prove Inherency

The use of inherency for obviousness demands an exacting standard. *See* POR, 60-61. Vantage does not acknowledge, let alone address, that standard in its Reply. Reply, 16-19. Vantage also fails to rebut the significant evidence in the POR showing that ester-ester exchange in the prior art does not always increase OSI. *See* POR, 21-24, 60-61.

The Federal Circuit has stated “the use of inherency in the context of obviousness must be carefully circumscribed because that which may be inherent is not necessarily known and that which is unknown cannot be obvious.” *Honeywell*

Int'l Inc. v. Mexichem Amanco Holding S.A. DE C.V., 865 F.3d 1348, 1354 (Fed. Cir. 2017) (quotation omitted). Where a challenger has not shown that a specific combination or modification in the art would have been made with a reasonable expectation of success, inherency based on unrecognized results cannot follow. For example, in *Honeywell*, about the parties disputed whether a reasonable expectation of success could be achieved with the combination of a particular prior art compound and prior art lubricant. *Id.* at 1355. The Federal Circuit held that the Board erred as a matter of law by ignoring unpredictability in the art and instead relying on the unknown (though perhaps inherent) features of the claimed invention. *Id.* at 1356.

Here, Vantage has not shown that a POSITA would have expected OSI to increase when performing lipase-catalyzed ester-ester exchange, particularly in view of Cargill's significant evidence of unpredictability, as described in §III(A) above.

“What is important regarding properties that may be inherent, but unknown, is whether they are *unexpected*,” because while “[a]ll properties of a composition are inherent in that composition...unexpected properties may cause what may appear to be an obvious composition to be nonobvious.”⁴ *Honeywell*, 865 F.3d at 1355.

Vantage provided no evidence or testimony rebutting Cargill's evidence that transesterification was unpredictable and unexpected. *See* POR, 57-61. Thus, neither

⁴ Emphasis added unless otherwise noted.

the statements made during prosecution nor Mr. Addy's testimony, (Reply, 17-18), can be used as proof of inherency, as the property was unknown and, most importantly, unexpected.

But even if the prosecution history or Mr. Addy's testimony are considered, (*id.*), they do not support a finding of inherency. With respect to the prosecution history, Vantage takes statements out of context. Cargill specifically and repeatedly argued that the increase in OSI was **not** inherent. *See* EX1002, 479-484, 608-611, 795-799, 947-949, 1016-1020, 1091, 1167-1170. In fact, Vantage's second quote, (Reply, 18 (citing EX1002, 948-49)), ***directly follows*** one of these lengthy rebuttals to the Examiner's inherency argument. *See* EX1002, 947-948. And Vantage's first quote, from a response to a 112 rejection, (Reply, 17 (citing EX1002, 396)), is ***silent*** as to inherency, and instead simply describes how the claim language should be understood. With respect to Mr. Addy's testimony, a plain reading shows he was merely being asked about the ***claims***, and whether if you performed each step of the ***claims***, you would get the claimed increase in OSI. Reply, 18 (citing EX1043, 60:1-61:24). Mr. Addy was **not** testifying that transesterification in the prior art always results in increased OSI.

Finally, Vantage's argument that Cargill "ignores enzymatic ester-ester exchange-type transesterification—the very type admittedly taught by Petitioner's prior art," (Reply, 18-19), is just wrong. Vantage includes a footnote that cites to

Cummings, but it is undisputed that Cummings uses a sodium methoxide **chemical** catalyst, not a lipase. *See* EX2046, 31:19-32:9; EX1014, 6 (Fig. 4); EX1028, 7.

IV. ALL GROUNDS FAIL BECAUSE VANTAGE’S ARGUMENTS ABOUT LIPASES ARE WRONG

A. A POSITA Would Not Have Been Motivated to Use Lipases for Ester-Ester Exchange

1. Lipase-Catalyzed Ester-Ester Exchange Is a Distinct Reaction Not Found in Vantage’s Prior Art

Vantage asserts that lipases were a “natural choice” for catalyzing ester-ester exchange in jojoba wax esters. Reply, 3. According to Vantage, lipases were not limited to triglycerides, and lipases were specifically known to catalyze jojoba ester reactions. Reply, 3-7. But Vantage does not prove that. Vantage ultimately fails to provide any evidence showing why a POSITA would have found it obvious to use lipases to catalyze an **ester-ester exchange** in jojoba wax esters.

First, Vantage does not substantively rebut Dr. Schultz’s evidence of lipase chemistry and his testimony that “critical structural differences, namely jojoba wax esters’ absence of a glycerol backbone, would have counseled a POSITA against using a lipase with jojoba wax esters.”⁵ EX2009, ¶114; *see also id.*, ¶¶69-87. The

⁵ Vantage argues Dr. Schultz ignored the patent’s “broad definition” of “lipase,” (Reply, 3 n.1), but Dr. Schultz applied the same meaning used in the art generally,

only disclosure of lipases anywhere in Vantage's ground references are in Xu and Rozenaal (vis-à-vis citation in TI1), which are focused on triglycerides. *See* POR, 25-32.

Second, Vantage focuses on different lipase reactions and different substrates rather than the claimed *ester-ester exchange* of a mixture of long-chain jojoba wax esters. As Dr. Schultz explained, at the time of the invention lipase-catalyzed ester-ester exchange specifically was believed to require a glycerol backbone to interact with the lipase's catalytic triad and ester chains of no more than 18 carbons EX2009, ¶¶76-81; EX2063, 3, 10. A POSITA would have had no motivation or expectation of success in using a lipase to catalyze an ester-ester exchange on jojoba wax esters, which lack a glycerol backbone and have two long (20-22) carbon chains attached to a single ester bond. EX2009, ¶¶53, 82-87, 119-121. Reactions that use small molecules, such as alcohols or acids, would not give a POSITA any reasonable expectation that an ester-ester exchange of a molecule with two long carbon chains, like jojoba wax esters, would be successful. Thus, Vantage's prior art, even in

including in all of Vantage's art, and shows no error in his analysis. *See* EX1041, 90:20-91:13. Dr. Schultz saw no enzymes capable of transesterifying wax esters. *Id.*, 165:9-167:3.

combination, does not suggest to a POSITA that an *ester-ester exchange* would actually work. POR, 13-15, 25-32.

Vantage conflates the claimed invention by pointing to lipases catalyzing *other reactions*, as though that is new information. Reply, 3-4. These different, unclaimed, chemical reactions, such as *esterification*, *intraesterification*, hydrolysis, ammonolysis, alcoholysis, and acidolysis are *not* the claimed *ester-ester exchange*. See POR, 42-43 (citing EX2009, ¶143; EX2046, 23:2-12). This is a distinction that matters, because unlike the other reactions, the ester-ester exchange in jojoba wax esters has considerable steric hindrance concerns that Vantage never addresses. EX2009, ¶¶76-87, 119-121. Vantage's other reactions are all distinguishable from *ester-ester exchange*:

- *Esterification* facilitates *creation* of triglycerides from fatty acids and fatty alcohols, (see EX1008, 4); it does not require the breaking and forming of bonds between two long carbon chains like those in jojoba wax esters.
- *Hydrolysis* uses water to break down triglycerides into diacylglycerides or monoacylglycerides, (*id.*, 2; EX2009, ¶70), not to break and reform bonds between two long carbon chains.
- *Acidolysis* and *alcoholysis* are different types of reactions that do *not* involve two long-chain esters—but instead acids and alcohols of comparably low molecular weight that lack the steric hindrance issues associated with jojoba wax esters. POR, 9-11; EX2009, ¶¶59-61, 81, 84; EX2063, 3 (Fig. 1); see also §§IV(A)-(B), *supra*.

- ***Intr***esterification and ***Isomerization*** are not ester-ester exchanges; rather, these reactions refer to an exchange within a single molecule. *See, e.g.*, I.D., 33 (“‘transisomerization’ reaction” is “not interesterification”).

Vantage’s faulty science is exemplified by its incorrect allegation that “enzyme-catalyzed transesterification of jojoba oil was a well-known technique[.]” This allegation is premised on a single sentence reciting that “***Isomerized*** Jojoba Oil...is produced by the enzymatic ***intra***esterification” of jojoba oil. Reply, 6. But this single sentence is not linked to ***any*** underlying reference and, further, does not identify what kind of enzyme was used or anything else about the purported reaction. It therefore teaches a POSITA nothing about lipase-catalyzed ester-ester exchange. It certainly is insufficient to enable a POSITA to perform an enzymatic ester-ester exchange in jojoba oil. *Raytheon Techs. Corp. v. Gen. Elec. Co.*, 993 F.3d 1374, 1382 (Fed. Cir. 2021) (reversing Board’s obviousness finding where prior art did not enable the claimed invention).

2. Vantage Attempts to Improperly Shift Its Burden to Cargill

Vantage next argues that that “PO’s cited evidence does not establish that lipases were known to be incompatible with non-triglycerides.” Reply, 7. But it is ***Vantage***, not Cargill, who must show that a POSITA would have reasonably expected that lipases could successfully catalyze ester-ester exchange in jojoba wax esters. *See Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir.

2015). Cargill presented thorough scientific evidence regarding a POSITA's knowledge of lipase chemistry, in the form of both documentary evidence and expert testimony. Again, Cargill's evidence stands unrebutted by any POSITA. Vantage cannot shift the burden to Cargill or meet its burden through unsubstantiated attorney argument alone. *Wasica Fin. GmbH v. Cont'l Auto. Sys., Inc.*, 853 F.3d 1272, 1284-85 (Fed. Cir. 2017) ("a party's unsworn attorney argument...is not evidence and thus cannot rebut record evidence") (quotation omitted).

Vantage's statement also improperly over-broadens and mischaracterizes Cargill's arguments. What Cargill actually argued was that lipases were known to facilitate ester-ester exchange in triglycerides, but not in non-triglycerides. Vantage's selection of two sentence fragments from EX2028 fails to demonstrate that lipases were known to facilitate ester-ester exchange in non-triglycerides. *See* Reply, 7-8 (citing EX2028, 2 for proposition that "[l]ipases...are also active on a broad range of substrates" and "catalyze a large variety of synthesis reactions"). Again, Cargill does not dispute that lipases were known to catalyze other reactions in triglycerides. Notably, however, Vantage fails to cite to a single *example* of a non-triglyceride-based reaction in EX2028. EX2028 only otherwise discloses the triglyceride-forming reactions distinguished in §IV(A)(1) above which still involve a glycerol backbone.

Third, Vantage is wrong that applicants never rebutted the Examiner stating "[i]t was also known in the art that jojoba oil can be esterified using a lipase to

produce wax esters.” Reply, 8 (citing EX1002, 554, 765, 813). Applicant provided extensive rebuttal to Examiner’s rejections to show that transesterifying jojoba wax esters with a lipase was new and nonobvious. *See, e.g.*, EX1002, 608-611, 794-800, 947-949. The Examiner agreed and allowed the claims. *Id.*, 1167.

3. Obvious to Try is Not Enough

Throughout its Reply, Vantage hints at an “obvious to try” argument but fails to support it. *See* Reply, 8 (“a POSA would have had...*reasons to try* a lipase to catalyze the reactions taught in Cummings and TI2, including those in Xu”); *id.*, 16, 23. Even if considered, the Federal Circuit has made clear that obvious to try does not, on its own, render claims obvious. *See In re Rosuvastatin Calcium Pat. Litig.*, 703 F.3d 511, 518 (Fed. Cir. 2012) (“obviousness is not shown when what was ‘obvious to try’ was to explore a new technology or general approach that seemed to be a promising field of experimentation” (quotation omitted)). That is particularly true here, as Cargill showed the results of transesterification were not “predictable.” *Grunenthal GMBH v. Alkem Lab’ys Ltd.*, 919 F.3d 1333, 1345 (Fed. Cir. 2019). A POSITA would not have had a reasonable expectation of success in using lipases to perform ester-ester exchange in jojoba wax esters nor expected the associated OSI increase. POR, 57-61; EX2009, ¶¶102-110, 180-185.

B. Vantage’s New Prior Art Is a Red Herring

Vantage introduces new art in an effort to distract the Board from the technical flaws in its obviousness analysis. Notably, Vantage offers no expert testimony to support its new references. Cargill discredited Dr. Rockstraw’s opinions at his deposition. Dr. Rockstraw knew nothing about lipase chemistry, (EX2046, 35:11-19, 57:20-58:6, 69:9-17), and said repeatedly that triglycerides—the subject of all of Vantage’s ground references—were “not something I’ve studied with regard to this matter,” (*id.*, 98:14-17; 99:10-12). It is therefore unsurprising that Vantage did not use him to explain how a POSITA would understand its new references.

Regardless, these references describe different reactions, use different substrates, or do not qualify as prior art. If anything, these references reaffirm that, at the time of the invention, lipases were understood to primarily interact with triglycerides.

’741 Publication (EX1034) (Reply, 5)

- Discloses an alcoholysis reaction, not ester-ester exchange. EX1034, cl. 1 (“providing a reaction mixture 1 comprising a fatty acid feedstock, a lower alcohol and water...”).⁶
- Uses triglycerides as a substrate. *Id.*, [0013] (“[t]he term fatty acid feedstock is ***defined herein*** as a fatty acid feedstock substrate

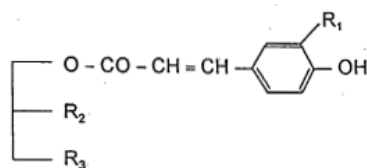
⁶ Notably, Vantage’s Reply (at 5) truncates this claim and omits the underlined words.

comprising triglyceride.”); [0038] (process uses “a triglyceride feedstock”).

- Despite defining the feedstock as triglycerides, erroneously includes jojoba oil in laundry list of predominantly triglyceride-based oils, both in the specification and claim 5. *Id.*, [0014], cl. 5.

'683 Publication (EX1036) (Reply, 6)

- Discloses replacing a triglyceride fatty acid with a small molecule ester to create a modified triglyceride, stating “compounds of this invention are generally characterized by Formula I,” *which is a triglyceride*:



EX1036, 3-4.

- Describes importance of the glycerol backbone. *Id.*, 5 (“The substituted acylglycerols of the invention consist of a **glycerol backbone**”).
- Erroneously identifies jojoba oil as a triglyceride. *Id.*, cl. 19 (“wherein **said triglyceride** is a vegetable oil selected from the group consisting of...jojoba oil...”).

'207 Publication (EX1037) (Reply, 7)

- Discloses an alcoholysis reaction, not ester-ester exchange. EX1037, 4:34-5:2.
- Uses glycerides as a substrate. *Id.*, 8:5-11 (“[g]lyceride containing plant oils...are particularly suitable as the feedstock,” that “[a]s used herein the term ‘glyceride containing plant oil or animal fat’ means any oil or fat product of plant or animal origin that contains esters formed from glycerol and fatty acids (i.e. glycerides)”).

- Identifies jojoba oil only once in the specification, in another laundry list of predominantly triglyceride-based oils. *Id.*, 8:23-33.

Zoete (EX1038) (Reply, 7)

- Discloses ammonolysis, not ester-ester exchange. EX1038, 346.
- Reaction uses ammonia, another small molecule a POSITA would not have expected to have steric hindrance issues. *See id.*, 347; EX2009, ¶¶62, 81-87; EX2063, 3 (Fig. 1).
- Method appears to effectively be an alcoholysis reaction, as the starting material contains 50% alcohol and the reaction creates an alcohol byproduct that was isolated afterward, just as in a traditional alcoholysis reaction. EX1038, 347-348; *see also* EX2028, 3 (Fig. 1); EX2009, ¶¶58-61, 143; POR, 9-12.
- End product is an amide, cis-11-eicosenamide, ***not*** an ester. EX1038, 348.

Lei (EX1035) (Reply, 5-6)

- Is not prior art, as Vantage admits, (Reply, 5), and the Board would commit legal error by relying on it.
- Does not disclose jojoba wax esters in ester-ester exchange with other jojoba wax esters. *See* EX1035, Fig. 1.
- Instead discloses a reaction with a short chain ethyl acetate (red box), another small molecule without the same steric hindrance concerns as jojoba wax esters:

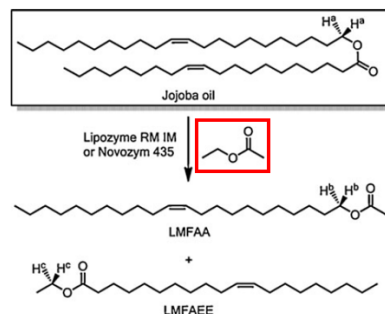


Figure 1. Typical structure of jojoba oil ester and its interesterification with EA catalyzed by Lipozyme RM IM and Novozym 435, respectively.

Id. (annotated).

Ultimately, Vantage’s approach to this new art seems to be raising any reference that contains the words “jojoba oil” and “lipase” without providing any explanation as to why the references are relevant to the claimed invention. This scattershot approach is mere attorney argument, and fails to carry Vantage’s burden. *Wasica*, 853 F.3d at 1284-85. At minimum, none of this art would enable a POSITA to perform a lipase-catalyzed ester-ester exchange in jojoba wax esters. *Raytheon*, 993 F.3d at 1382.

Thus, Vantage’s contention that enzyme-catalyzed ester-ester exchange of jojoba was “well-known” is wrong. If true, Vantage would have provided clear evidence rather than this disparate group of prior art references that fail to teach or suggest that a lipase could perform an ester-ester exchange in jojoba wax esters.

V. PRIOR ART DOES NOT TEACH COMPOSITION OF THE FEEDSTOCK

Vantage argues that the composition of the claimed feedstock could be derived from Cummings commercial products. Reply, 20. As noted above, however, post-

processing of Cummings' products was known to significantly impact their properties. Vantage's rebuttal that "Dr. Rockstraw's calculations are not dependent on the trace presence of any reaction side-products or the precise reaction yield," (*id.*), sidesteps the question of whether or how iodine value would be affected by post-processing. *See* POR, 47-48. Regardless, Dr. Rockstraw's calculations and Sessa's disclosures provide no knowledge to a POSITA about the effects of ester-ester exchange on OSI, let alone when using a lipase.

VI. THE DEPENDENT CLAIMS ARE PATENTABLE

The dependent claims are patentable as explained previously. *See* POR, 49-50. Namely, neither Cummings nor Sessa discloses the full composition of their feedstocks or the resulting post-reaction products to know whether they contain any OSI-affecting materials, free fatty acids or methyl esters. *Id.*

VII. SECONDARY CONSIDERATIONS SUPPORT NON-OBVIOUSNESS

As discussed above in §III(A), Cargill's evidence of unexpected results stands un rebutted. Additionally, evidence of Vantage's copying and the prior art's age further support the non-obviousness of the invention.

A. Vantage's Failure to Replicate Cargill's Product Without the Patent Specification Supports Non-Obviousness

Vantage's argument that Cargill has not demonstrated a nexus to the claimed invention, (Reply, 23-24), is belied by the fact that Cargill has a commercial product. Therefore, nexus is presumed and Vantage has no evidence showing that any

unclaimed features materially impact the functionality of Cargill’s product. *Cf. Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1373-74 (Fed. Cir. 2019).

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

B. Age of the Prior Art Supports Non-Obviousness

The age gap between the prior art and the priority date is telling, particularly given Vantage’s contention that lipase-catalyzed ester-ester exchange of jojoba oil was “well-known” in 2008. Reply, 6. Unlike Vantage’s *In re Wright* case, (Reply, 26), here evidence shows that Vantage, at least, “tried and failed to solve the problem,” which *In re Wright* indicates ***supports*** an argument that the age of prior art can show non-obviousness. 569 F.2d 1124, 1127 (C.C.P.A. 1977).

VIII. CONCLUSION

For all the reasons set forth above and in Cargill's POR, the Board should reject Vantage's grounds of unpatentability.

Respectfully submitted,

Date: April 10, 2024

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CERTIFICATION UNDER 37 CFR § 42.24(d)

Under the provisions of 37 CFR § 42.24(d), the undersigned hereby certifies that the word count for the foregoing Patent Owner's Sur-Reply totals 5,599, which is less than the 5,600 allowed under 37 CFR § 42.24(c)(4).

Respectfully submitted,

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e)(4), the undersigned certifies that on April 10, 2024, a complete and entire copy of this Patent Owner's Sur-Reply were provided via email, to the Petitioner by serving the email correspondence addresses of record as follows:

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