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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte TIMOTHY M. MARTIN

Appeal 2020-001043
Application 15/294,225
Technology Center 1600

Before RICHARD M. LEBOVITZ, TAWEN CHANG, and MICHAEL A. VALEK, *Administrative Patent Judges.*

CHANG, *Administrative Patent Judge.*

DECISION ON APPEAL

Pursuant to 35 U.S.C. § 134(a), Appellant[1] appeals from the Examiner's decision to reject claims 1–4, 9–13, 15, 16, and 18–24. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

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[1] We use the word "Appellant" to refer to "applicant" as defined in 37 C.F.R. § 1.42. Appellant identifies the real party in interest as FMC Corporation. Appeal Br. 2. (The Appeal Brief lacks page numbers. We refer to the first page as page 1, with the rest of the pages numbered consecutively.)

STATEMENT OF THE CASE

"Formulations of insecticides combined with fertilizers are desirable in agricultural and related endeavors due to the multiple benefits conveyed by just one application in a single piece of equipment. One application of such a combination or formulation provides nutrients for the plant growth, while eliminating or controlling unwanted insects . . . ." Spec. ¶ 3. However, according to the Specification, "problems with the physical stability of such mixtures have caused application and efficacy issues." *Id.* ¶ 4. Further according to the Specification, "it has now been found that a new insecticidal composition significantly improves physical stability when used to prepare an insecticidal liquid fertilizer." *Id.* ¶ 8.

CLAIMED SUBJECT MATTER

The claims are directed to an insecticidal composition. Claim 1 is illustrative:

> 1. An insecticidal composition consisting essentially of:
> a) bifenthrin present in an amount of from about 5 wt% to about 40 wt% of the composition;
> b) a polymeric dispersant selected from the group consisting of polyacrylic acids, polymethacrylic acids, copolymers thereof, salts thereof, and combinations thereof present in an amount of from about 0.1 to about 30 wt% of the composition;
> c) optionally a suspension agent selected from the group consisting of attapulgite clay, fumed silica, and combinations thereof,
> d) optionally a freeze-thaw stabilizer, and
> e) optionally, a preservative.

Appeal Br. 13 (Claims App.).

REJECTION(S)

A. Claims 1–4, 9–13, 15, 16, and 18–24 are rejected under 35 U.S.C. § 103 as being unpatentable over Jadhav.[2] Non-Final Act.[3] 6.

B. Claims 1–4, 9–13, 15, 16, and 18–24 are rejected under 35 U.S.C. § 103 as being unpatentable over Kabanov.[4] Non-Final Act. 3.

C. Claims 1–4, 9–13, 15, 16, and 18–21 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1–10 of U.S. Patent No. 8,937,054. Non-Final Act. 10.

D. Claims 1–4, 9–13, 15, 16, and 18–24 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1–12 of U.S. Patent No. 9,481,613. Non-Final Act. 10.

OPINION

A. Obviousness rejection over Jadhav (claims 1–4, 9–13, 15, 16, and 18–24)

1. Issue

The Examiner finds that Jadhav teaches "stable insecticidal compositions comprising bifenthrin" and further "suggest[s] that surfactants including polyacrylic acid can be added to the composition." Non-Final Act. 6. The Examiner finds that Jadhav's exemplified combinations discloses weight percentages of pesticide and surfactant / dispersant within the ranges recited in instant claim 1 and that "the only thing being optimized is the

[2] Jadhav et al., US 2009/0203746 A1, published Aug. 13, 2009 ("Jadhav").
[3] July 13, 2018 Office Action ("Non-Final Act.").
[4] Kabanov et al., US 2010/0016392 A1, published Jan. 21, 2010 ("Kabanov").

choice of pesticide and choice of surfactant." *Id.* at 7. Accordingly, the Examiner concludes that Jadhav renders the claimed invention obvious. *Id.*

Appellant contends that Jadhav "discloses synergistic combinations of a chloronicotynyle and a pyrethroid (e.g., bifenthrin)" and thus does not render obvious, and in fact teaches away from, the claimed composition "consisting essentially of" certain recited ingredients including bifenthrin, but not chloronicotynyle. Appeal Br. 10–11.

The issue with respect to this rejection is whether a composition comprising chloronicotynyle in addition to components recited in the claims renders obvious a composition "consisting essentially of" the recited components.

2. *Findings of Fact*

1. The Specification teaches that "[m]ixtures containing insecticide compositions and liquid fertilizers have been practiced in the art, but problems with the physical stability of such mixtures have caused application and efficacy issues." Spec. ¶ 4.

2. The Specification teaches that, "[i]n accordance with the present disclosure, it has now been found that a new insecticidal composition significantly improves physical stability when used to prepare an insecticidal liquid fertilizer." *Id.* ¶ 8.

3. The Specification provides exemplary compositions 1-1 to 1-4, each of which includes bifenthrin, an acrylic homopolymer, and a surfactant. *Id.* ¶¶ 29–32.

4. Claims 13 and 15 on appeal depend directly or indirectly from claim 1 and further recites that the composition comprises at least one

additive selected from the group consisting of, among others, surfactants. Appeal Br. 14 (Claims App.).

5. The Specification describes tests of the physical stability of exemplary compositions 1-1 and 1-2 conducted by mixing the composition with a liquid fertilizer and comparing their stability with a known formulation (TALSTAR® 2EC) of bifenthrin also mixed with the same liquid fertilizer. Table 1 from the Specification is reproduced below:

Table 1. Physical stability; ppm of bifenthrin in sample over time

Composition	0 Minutes	10 Minutes	20 Minutes	30 Minutes	40 Minutes	50 Minutes
1-1	2526	3173	2492	3001	4095	3007
1-2	3552	3664	4277	4580	4418	4841
TALSTAR® 2EC	9427	7557	7052	5630	4270	2984

Id. ¶ 34. Table 1 shows the "ppm of bifenthrin in sample over time" from 0 minutes to 50 minutes. *Id.* The Specification states that "[t]he test data [in Table 1] indicate that the compositions of Example 1 are homogenous throughout the test, indicating good physical stability, whereas the comparison formulation is not homogenous and has poor physical stability when mixed with high phosphorus aqueous-based liquid fertilizer." *Id.* ¶ 35.

6. Jadhav teaches "[a] synergistic insecticidal composition . . . containing a Chloronicotynyle compound and a Pyrethroids compound," wherein "[t]he Chloronicotynyle compound is provided in an amount preferably ranging from 0.1% to 5.0% by weight of the . . . composition," "[t]he Pyrethroids compound is provided in an amount preferably ranging from 1 to 60% by weight of the . . . composition," and the "composition also preferably includes 35 to 98.90% by weight of conventional agriculturally

acceptable carrier(s) and/or excipients." Jadhav Abstract; *see also id.* ¶¶ 12, 19, claim 1.

7. Jadhav teaches that the amounts of the chloronicotynyle and pyrethroids compounds in the composition "may vary accordingly to prevailing conditions such as the particular compounds present, insect pest attack strength, type of pests, application timing, weather conditions, soil conditions, mode of application, topographical character, target crop and the like." *Id.* ¶ 12.

8. Jadhav teaches that the pyrethroids compound is preferably selected from a group consisting of, among other things, bifenthrin. *Id.* ¶¶ 12, 19; *see also id.* at claim 1.

9. Jadhav teaches that its composition "optionally includes surfactant(s) which are preferably non-ionic, cationic and/or anionic in nature and surfactant mixtures which have good emulsifying, dispersing and wetting properties, depending on the nature of the active ingredient to be formulated." *Id.* ¶ 14.

10. Jadhav teaches that examples of surfactants that may be used include, among other things, salts of polyacrylic acids. *Id.* ¶ 14.

11. Jadhav claims "a synergistic insecticidal composition" comprising "a) imidacloprid in an amount ranging from 0.1 to 5% by weight of the composition, b) bifenthrin in an amount ranging from 1.0 to 60% by weight of the composition, and c) a conventional agriculturally acceptable carrier or excipient in an amount ranging from 35% to 98.90% by weight of the composition," wherein the composition further comprise(s) a surfactant, and wherein the surfactant may be, among other things, a salt of polyacrylic acids. *Id.* at claim 9.

12. Jadhav teaches that "[f]ollowing the right use of the synergistic insecticidal composition with a formulation having a multi-pesticide components, such as pesticide mixture, formulations prepared with extra care of physical compatibility by purposefully specially selecting solvents, carriers and the surfactants, thickeners, stabilizers, etc. exhibits better pest management." *Id.* ¶ 53.

13. The Examiner finds, and Appellant has not disputed, that Jadhav teaches example formulations comprising surfactants – i.e., wetting/dispersing agent Lisapol-D and emulsifier Rhodocal 65 BR & Igepol – in an amount of 13% w/w and 10% w/w, respectively. *Id.* ¶¶ 67, 69, 71, 73, 75, and 77.

3. *Analysis*

Jadhav discloses a composition comprising bifenthrin in an amount ranging from 1.0 to 60% and salts of polyacrylic acids as a surfactant. FF6, FF8–FF11. Jadhav also teaches that its composition may include 35 to 98.90% by weight of conventional agriculturally acceptable carrier(s) and/or excipients, and further teaches example formulations comprising surfactants in amounts of 10 and 13% w/w. FF6, FF13. Thus, we agree with the Examiner that Jadhav would have reasonably suggested to a skilled artisan an insecticidal composition containing the two non-optional ingredients (i.e., bifenthrin and a polymeric dispersant selected from the group consisting of polyacrylic acids, polymethacrylic acids, copolymers thereof, salts thereof, and combinations thereof) recited in claim 1, in amounts encompassing or encompassed by the recited weight percentage ranges. We also find that Appellant has failed to show that the additional component required by Jadhav's prior art composition (i.e., a chloronicotynyle compound), "would

materially change the characteristics of [Appellant's] invention." MPEP § 2111.03(III). We therefore agree with the Examiner that Jadhav renders claim 1 obvious.

Appellant contends that "[t]he appellants' claims are being . . . redrafted to include a chloronicotynyle compound," which Appellant contends to be "clear error by the examiner, particularly in view of the limiting claim language of the preamble." Appeal Br. 10. In particular, Appellant contends that, since the Examiner "has already alleged that *if* a chloronicotynyle compound is included the *novelty of the claim is negated*," the Examiner "should [be] prevent[ed] . . . from re-interpreting and mischaracterizing the claim as it was written." *Id.* at 11. Appellant similarly contends that "[t]here is no suggestion or teaching of the combination of a chloronicotynyle compound with bifenthrin within the . . . [S]pecification, and therefore it is not a reasonable interpretation of the claims to require a combination of bifenthrin and a chloronicotynyle compound." *Id.* Appellant contends that, in fact, "[i]n view of the requirement of Jadhav for combinations of a chloronicotynyle compound and a pyrethroid that are synergistic, Jadhav teaches away from the claimed invention with its restrictive claim language." *Id.* at 12.

We are not persuaded. Appellant's arguments appear to be based on an understanding that Jadhav could render claim 1 obvious only if claim 1 is interpreted to *require* a chloronicotynyle compound. However, claim 1 recites the transitional phrase "consisting essentially of." "The phrase 'consisting essentially of' in a patent claim represents a middle ground between the open-ended term 'comprising' and the close-ended phrase 'consisting of,'" and "consisting essentially of" "has long been understood to

permit inclusion of components . . . that . . . do not 'materially affect the basic and novel properties of the invention,'" even if the claim does not recite, and therefore does not require, the inclusion of such components. *AK Steel Corp. v. Sollac and Ugine*, 344 F.3d 1234, 1239 (Fed. Cir. 2003). Moreover, "[i]f an applicant contends that additional steps or materials in the prior art are excluded by the recitation of 'consisting essentially of,' applicant has the burden of showing that the introduction of additional steps or components would materially change the characteristics of applicant's invention." MPEP § 2111.03(III). Simply citing the inclusion of an additional component in the prior art composition, as Appellant does in this case, does not satisfy this burden.

Appellant does contend that Jadhav teaches that "the combination of a pyrethroid such as bifenthrin with a chloronicotynyle compound results in a *synergistic* combination, which clearly is a change to the basic character of the claimed combination." Appeal Br. 11.

However, whether a component that is not recited may be included in a claim using the transitional phrase "consisting essentially of" depends on whether they "materially affect the *basic and novel properties* of the invention," not whether they result in a change to any property of the invention. *AK Steel Corp.*, 344 F.3d at 1239 (emphasis added).

Appellant fails to specify in its arguments what it considers to be the basic and novel properties of the invention, and its arguments are unpersuasive on that basis alone.

In any event, to the extent such properties exist, the Specification suggests "physical stability when used to prepare an insecticidal liquid fertilizer" to be the basic and novel property of the invention. Spec. ¶¶ 4

(stating that "problems with the physical stability of . . . mixtures [containing insecticide compositions and liquid fertilizers] have caused application and efficacy issues"), 8 (stating that "it has now been found that a new insecticidal composition significantly improves physical stability when used to prepare an insecticidal liquid fertilizer"); *AK Steel Corp.*, 344 F.3d at 1239–1240 (identifying "good wetting" as the basic and novel property of the invention because "[t]he specification clearly states that good wetting is the goal of the invention as well as what distinguishes it from the prior art").

While synergism may increase the insecticidal effectiveness of Jadhav's compositions, Appellant fails to explain, much less provide persuasive evidence to show, why an increase in insecticidal effectiveness would materially affect the physical stability of the composition when used to prepare an insecticidal liquid fertilizer. Indeed, we note that dependent claims 13 and 15, which depend from claim 1, explicitly recite a composition further comprising at least one additive selected from a group consisting of, among other things, biocides. Appeal Br. 14 (Claims App.). Thus, Appellant does not persuaded us that synergistic insecticidal effectiveness through the inclusion of a chloronicotynyle compound (i.e., a biocide), without more, materially affects the basic and novel properties of the invention of claim 1.

Finally, Appellant contends that "[s]ynergy cannot be predicted, and thus, Jadhav[, which teaches synergistic combinations,] does not have predictive value." Appeal Br. 11. Appellant also contends that "[n]o person of ordinary skill would assume that bifenthrin and a chloronicotynyle are completely interchangeable for patent or other purposes" merely because they are both insecticides. *Id.*

These arguments do not persuade us that the Examiner erred in rejecting claim 1 over Jadhav. Bifenthrin need not be interchangeable with a chloronicotynyle compound in order for Jadhav to render claim 1 obvious, because, based on the record in front of us, the "consisting essentially of" phrase of claim 1 permits the inclusion of a chloronicotynyle compound in the claimed composition *in addition to* the required bifenthrin and polymeric dispersant. Likewise, it is unclear what Appellant contends Jadhav must be able to predict in order to render claim 1 obvious. To the extent Appellant's argument is that a skilled artisan, reading Jadhav, would not have had a reasonable expectation of success at arriving at the claimed invention, we are not persuaded because Jadhav explicitly teaches the combination of bifenthrin, a chloronicotynyle compound, and a salt of polyacrylic acids for use as an insecticidal composition. FF6, FF8–FF11.

Accordingly, we affirm the Examiner's rejection of claim 1 as obvious over Jadhav. Claims 2–4, 9–13, 15, 16, and 18–24, which are not separately argued, fall with claim 1.[5]

B. Obviousness rejection over Kabanov (claims 1–4, 9–13, 15, 16, and 18–24)

1. Issue

The Examiner finds that, with respect to claim 1, Kabanov teaches "stable pesticidal aggregate compositions comprising actives, including

[5] We note that claims 22–24 use the transitional phrase "comprising" rather than "consisting essentially of." Appeal Br. 15 (Claims App.). Thus, Appellant's arguments in the Appeal Brief, which relate to the use of the transitional phrase "consisting essentially of," are not applicable to these claims.

bifenthrin[,] plus polymers including acrylic acid[and] methacrylic acid." Non-Final Act. 3 (citation omitted). The Examiner finds that Kabanov therefore renders obvious the claims on appeal.

Appellant concedes that Kabanov discloses "a stable pesticidal aggregate composition that includes . . . (a) a polymer having at least three similarly charge[d] electrostatic moieties; (b) an amphiphilic surfactant having at least one electrostatically charge[d] moiety of opposite charge to the polymer; and (c) a pesticide." Appeal Br. 4. However, Appellant contends that Kabanov only "provides a laundry list of species[,] agents[,] and excipients that fall into . . . (a), (b), or (c)," and argues that "[p]roviding a laundry list of components that could *potentially* be combined into a composition is not enough to render an invention obvious." *Id.*

Appellant argues that Kabanov does not provide a reason to use bifenthrin in its composition. Appeal Br. 8. Appellant argues that, while Kabanov "does provide an example of bifenthrin with a polymeric dispersant . . . [that] is a polymethacrylic acid derivative," this example does not provide a skilled artisan with a reason to use the disclosed dispersant, with a reasonable expectation of success, and in fact teaches away from it. *Id.* at 5.

Appellant also contends that Kabanov does not teach or suggest the "percentages of each of the components in the composition" that are recited in the instant claims. Appeal Br. 6–7. Appellant further contends that "[t]he preamble of the instant claims uses the restrictive language 'consisting essentially of,'" while "Kabanov requires at least one component (the amphiphilic surfactant) that is not explicitly included within the appellants' claim." *Id.* at 7. Appellant contends that "Kabanov teaches away from the

claimed invention by requiring a surfactant/dispersant combination." *Id.* at 8.

The issue with respect to this rejection is whether Kabanov suggests a composition consisting essentially of bifenthrin and a recited polymeric dispersant in an amount within the range recited in claim 1.

2. Findings of Fact

14. Kabanov teaches "a substantially water-insoluble pesticidal aggregate produced from a mixture comprising: (a) a polymer having at least three similarly charged electrostatic moieties; (b) an amphiphilic surfactant having at least one electrostatically charged moiety of opposite charge to the polymer; and (c) a pesticide." Kabanov Abstract, ¶ 2.

15. Kabanov teaches that "[p]articularly preferred pesticides" that "may be employed to produce the aggregates of [its] invention" include bifenthrin. *Id.* ¶ 66.

16. Kabanov teaches that polymers useful its invention "may be or may contain polyion, polyanion, or polycation polymer segments" and that "[e]xamples of polyanions and polyanion blocks and segments include but are not limited to polymers and their salts comprising units deriving from one or several monomers including," among others, acrylic acid and methacrylic acid. *Id.* ¶ 71; *see also id.* ¶ 83 (stating that "[p]referred polymers include . . . polyacrylic acid polymers"), claim 15 (reciting pesticidal aggregate wherein polymer component is selected from a group consisting of, among other things, linear polyacrylic acid polymers).

17. Kabanov teaches that its compositions may be formulated as wettable powders, water-dispersible granules, emulsifiable concentrates and flowable formulations, and suspension concentrates, wherein the pesticide

contents may range, respectively, from 5–80%, 10–70% w/w, 5–95% or 10–50% by weight of the composition, and 8–50% w/w. Spec. ¶¶ 100–104. Kabanov teaches that its compositions may be formulated as concentrates where the aggregate may form upon dilution or after application. *Id.* ¶ 97, 98, 102, 103. Kabanov teaches that the pesticidal composition of its invention "may be applied either as water-diluted sprays, or dusts, or granules to the areas in which suppression of pests is desired," that "[t]hese formulations may contain as little as 0.1% to as much as 35% or more by weight of pesticide," and that "[c]oncentrates may be diluted in water, e.g., 100–1000 times, to form stable aqueous dispersion, e.g., stable for 24 hours." *Id.* ¶ 119.

18. Kabanov teaches that

> the polymers and surfactants used in the aggregates of this invention are selected to be suitable for the properties, such as the pKa or hydrophobicity of the pesticide in order to produce an aggregate and to produce the desired properties for a given application. The rate of release of the pesticide may also be changed through variation of the surfactant to polymer ratio and/or variation of pKa of polymer, and or through variation of the hydrophobicity of the surfactant.

Id. ¶ 95.

19. Kabanov teaches that "[t]he pesticidal aggregates of [its] invention may be formulated and/or applied with one or more second compounds" and that "[s]econd compounds include . . . fertilizers." *Id.* ¶¶ 107–108.

20. Kabanov provides an example, Example 29, that teaches the preparation of aggregates of Ethacryl M, bifenthrin, and Arquad surfactant. *Id.* ¶ 199.

21. Ethacryl M is "a sodium salt of polyacrylic copolymer of comb-branched structure with polyol pendant groups." *Id.* ¶ 199. Appellant has not disputed that Ethacryl M meets the limitations in claim 1 relating to a polymeric dispersant.

22. Example 29 of Kabanov teaches mixing 0.224 mL of 4% solution of Arquad 18-50 solution in ethanol with 0.14 mL of Ethacryl M solution in ethanol (4%) and 0.005 mL of aqueous solution of NaOH (4%), adding to the mixture various amounts of 0.5% solution of bifenthrin in ethanol, evaporating the ethanol until white powder-like residues were left in the vials, and rehydrating the solid compositions in 2.5 mL of water. *Id.* ¶ 199. Example 29 of Kabanov evaluates the dispersion stability of the compositions having the following components:

TABLE 21

	Concentration of components in the dispersions, mg/mL				
	Ethacryl M	NaOH	Arquad 18-50	Bifenthrin	Dispersion stability (hours)
33A	2.24	0.08	4.48	0.12	72
33B	2.24	0.08	4.48	0.2	48
33C	2.24	0.08	4.48	0.4	24

Id. ¶ 199. Kabanov teaches that the dispersion containing 0.4, 0.2, and 0.12 mg/mL of bifenthrin was stable for at least 24 hours, 2 days, and 3 days, respectively. *Id.* ¶ 199.

3. Analysis

We agree with the Examiner that claim 1 is rendered obvious by Kabanov.

In particular, Kabanov teaches a pesticidal composition comprising (1) a polymer having similarly charged electrostatic moieties, including polymers of acrylic acid and methacrylic acid, (2) an amphiphilic surfactant

having at least one oppositely charged moiety to the polymer, and (3) a pesticide such as bifenthrin. FF14–16. In Example 29, Kabanov specifically provides example compositions rehydrated in water and consisting of bifenthrin, Ethacryl M (a salt of polyacrylic copolymer), Arquad surfactant, and NaOH. FF20–FF22. Thus, Kabanov teaches a pesticidal composition containing the two non-optional ingredients (i.e., bifenthrin and a polymeric dispersant selected from the group consisting of polyacrylic acids, polymethacrylic acids, copolymers thereof, salts thereof, and combinations thereof) recited in claim 1. Furthermore, although Kabanov's compositions contain at least one additional ingredient (i.e., an amphiphilic surfactant having at least one oppositely charged moiety to the polymer), Appellant fails to show that this additional component "would materially change the characteristics of [Appellant's] invention." MPEP § 2111.03(III). Thus, Kabanov teaches a composition "consisting essentially of" bifenthrin and a polymeric dispersant selected from the group consisting of polyacrylic acids, polymethacrylic acids, copolymers thereof, salts thereof, and combinations thereof, as recited in claim 1.

As to the recited range of ingredient amounts (i.e., "about 5 wt% to about 40 wt%" bifenthrin and "about 0.1 to about 30 wt%" of the polymeric dispersant), we note that Kabanov teaches that the pesticide content of its compositions may range from, e.g., 10–50% by weight, which overlaps the percentage weight range of bifenthrin recited in claim 1. FF17. As explained by our reviewing court, "[a] prima facie case of obviousness typically exists when the ranges of a claimed composition overlap the ranges disclosed in the prior art." *In re Peterson*, 315 F.3d 1325, 1329–30 (Fed. Cir. 2003). Moreover, to the extent Kabanov does not explicitly teach the

recited range of ingredient amounts,[6] it teaches that the amounts of pesticide and polymer to be used in the composition depend on, e.g., the type of formulation and the desired properties for a given application, such as stability and rate of release of the pesticide. FF18, FF22 (showing that concentration of bifenthrin affects physical stability of composition). Thus, we further determine that the amounts of bifenthrin and polymeric dispersant are result-effective variables. "[D]iscovery of an optimum value of a result

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[6] We note that Composition 33C in Kabanov's Example 29 contains 2.24 mg/mL of Ethacryl M, 0.08 mg/mL NaOH, 4.48 mg/mL Arquad 18-50, and 0.4 mg/mL bifenthrin. FF22. Prior to hydration, therefore, the composition would appear to contain 5.56% by weight of bifenthrin (i.e., 0.4 mg bifenthrin divided by 7.2 mg, the total weight of the components in 1 mL) and 31.1% by weight of Ethacryl M (i.e., 2.24 mg Ethacryl M divided by 7.2 mg). This would fall within the ingredient ranges recited in claim 1 (i.e., "about 5 wt% to about 40 wt%" bifenthrin and "about 0.1 to about 30 wt%" of the polymeric dispersant) or render the ranges obvious. In particular, while the 31.1% Ethacryl M contained in Composition 33C is slightly outside of the recited range of 0.1 to about 30 wt%, the Federal Circuit has explained that "a prima facie case of obviousness exists when the claimed range and the prior art range do not overlap but are close enough such that one skilled in the art would have expected them to have the same properties." *In re Peterson*, 315 F.3d at 1329. Moreover, the Specification states that, "[w]here guidance from the experience of those of ordinary skill is lacking, guidance from the context is lacking, and where a more specific rule is not recited . . . , the 'about' range shall be not more than 10% of the absolute value of an end point or 10% of the range recited, whichever is less." Spec. ¶ 9. The different between the amount disclosed in Kabanov, 31.1%, and the recited 30%, is not more than "10% of the absolute value of an end point or . . . range recited." In any event, as discussed above, the recited ingredient amount ranges are prima facie obvious because such amounts are result-effective variables; thus, we need not rely only on the specific ingredient amounts in Example 29 in Kabanov.

effective variable in a known process is ordinarily within the skill of the art." *In re Boesch*, 617 F.2d 272, 276 (CCPA 1980).

Accordingly, we find that Kabanov suggests all of the limitations of claim 1 and renders it obvious. We address Appellant's arguments below.

Citing to *Pfizer Inc. v. Mylan Pharmaceuticals Inc.*, 71 F. Supp. 3d 458 (D. Del. 2014), Appellant first argues that Kabanov only provides "a laundry list of components that could *potentially* be combined into a composition," which is "not enough to render [the] invention obvious." Appeal Br. 4; *see also id.* at 6.

We are not persuaded. The Federal Circuit has held that "disclos[ing] a multitude of effective combinations does not render any particular formulation less obvious." *Merck & Co. v. Biocraft Labs., Inc.*, 874 F.2d 804, 807 (Fed. Cir. 1989) (finding that prior art disclosing 1200 effective combinations rendered claim obvious); *see also Sinclair & Carroll Co. v. Interchemical Corp.,* 325 U.S. 327, 335 (1945) ("Reading a list and selecting a known compound to meet known requirements is no more ingenious than selecting the last piece to put into the last opening in a jig-saw puzzle. It is not invention."). Thus, the fact that Kabanov lists a number of pesticides and polymers that may be used in its compositions do not render the use of a particular combination of pesticide and polymer (e.g., the bifenthrin and acrylic / methacrylic acid polymer combination) in Kabanov's composition less obvious. Moreover, as discussed above, Kabanov provides example compositions in Example 29 that includes both of the two required ingredients in claim 1 (i.e., bifenthrin and a claimed polymer dispersant). FF20–FF22.

Appellant's citation to *Pfizer* is inapposite. Unlike in the present case and *Merck*, where the claimed compounds and their combination were both taught by the prior art and only routine optimization was necessary to arrive at the claimed invention, in *Pfizer* only an analog to the claimed compounds was disclosed in a prior art reference relating to generic preparation for a large number of potential compounds in a class. 71 F. Supp. 3d at 468. The court in *Pfizer* stated that, "given the sheer volume of possible combinations *and the additional subsequent chemical alterations necessary to arrive at the claimed compound*, the court cannot say that one skilled in the art would have had a reason to alter [the analog] as [defendant] Mylan suggests." *Id.* at 469.

Appellant's reliance on the *Pfizer* court's analysis regarding lead compounds — i.e., "compounds known in the art that would have served as logical 'starting points[] for further development efforts'" — is misplaced for similar reasons. *Pfizer*, 71 F. Supp. 3d at 469. In the instant case, Kabanov itself provides the reason for, and reasonable expectation of success in, combining the claimed ingredients.

Appellant argues that Example 29 of Kabanov teaches away from the invention because "(1) bifenthrin is dissolved only with the aid of an organic solvent (ethanol); and (2) bifenthrin is not stable in the mixture, since it is disclosed by Kabanov that bifenthrin crystallizes from the dispersion after as little as 24 hours." Appeal Br. 5. Appellant argues that, in view of such disclosures, a skilled artisan would not have been motivated to use the disclosed polymeric dispersant or have a reasonable expectation of success in using such a dispersant. *Id.*

We are not persuaded. As an initial matter, Appellant does not explain why dissolving bifenthrin in ethanol would teach away from the combination of bifenthrin and a claimed polymer dispersant, especially since Example 29 of Kabanov explicitly teaches combining bifenthrin with a claimed polymeric dispersant. Moreover, while the bifenthrin, Ethacryl M, and Arquad 18-50 were all initially dissolved in ethanol, after the ingredients were mixed, the ethanol was evaporated and the solid compositions rehydrated in water. FF22.

Similarly, Appellant provides no persuasive evidence that bifenthrin is not stable in Kabanov's mixture for purposes of use as a pesticide because it may crystallize after 24 hours. In this regard, we note that Example 29 teaches that Kabanov's dispersion containing 0.4 mg/mL of bifenthrin was stable at least 24 hours. FF22. In contrast, the comparative physical stability analysis performed in the Specification, which is alleged to "indicat[e] good physical stability" for the inventive compositions, was tested only over a 50 minute period. FF5. In other words, Appellant's Specification demonstrates that "good stability" within the context of the presently claimed invention includes that shown over periods of less than 24 hours.

Appellant further contends that a skilled artisan would not necessarily look to Kabanov to find a solution to make a stable aqueous dispersion of bifenthrin,[7] because bifenthrin is *non-ionic* and Kabanov teaches that "the

[7] We note that claim 1 does not require an aqueous composition, although dependent claims 10–12, 15, 18, and 21 recite a composition of claim 1 further comprising an aqueous-based liquid fertilizer and claims 22–24

primary reason for the invention described therein is to provide a water-insoluble pesticidal aggregate that can be applied to an area and not be washed away or into the ground in its *ionic* form." Appeal Br. 8 (emphasis added). We are not persuaded because Kabanov in fact teaches bifenthrin as a particularly preferred pesticide for its composition and also teaches example formulations containing bifenthrin in water. FF15, FF20–FF22.

Appellant next contends that Kabanov does not teach or suggest the claimed percentages of the components in the composition. Appeal Br. 5–7. Appellant argues that "[t]here is no reasonable interpretation of Kabanov that would provide an expectation that the claimed percentages can be obtained, i.e., no reasonable expectation of a successful result can be gleaned from the teaching of Kabanov." *Id.* at 6.

We are not persuaded for the reasons already discussed above: Kabanov teaches pesticide amounts for its compositions that overlap the weight percentage range recited in claim 1, FF17, and further evidences that the amounts of pesticides and polymers are result-effective variables. FF17, FF18, FF22. Neither has Appellant shown that the claimed ranges of ingredient amounts are critical, e.g., that compositions having ingredient amounts within the claimed ranges exhibit unexpected properties.

Appellant contends that "[i]t is only required that the [claimed] range [of ingredient amounts] have support in the specification" and that "there is no requirement to show the criticality of the claimed range for water and bifenthrin" or to show "that the appellants' claims are operational over the

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recites an insecticidal composition comprising, respectively, at least about 50 wt%, 55 wt%, and 60 wt% of water.

full scope of the claims." Appeal Br. 9–10. Appellant contends that, furthermore, "the prior art provides the evidence that changing the parameters of the claims does have implications on such things as stability." *Id.*

We are not persuaded. As discussed above, Kabanov teaches pesticide amounts in its composition that overlap with the recited ingredient amounts and also suggests that amounts of pesticides and polymeric dispersants are result-effective variables. Thus, Kabanov renders claim 1 prima facie obvious. The Federal Circuit has explained that

> "[o]ne way for a patent applicant to rebut a prima facie case of obviousness is to make a showing of 'unexpected results,' *i.e.,* to show that the claimed invention exhibits some superior property or advantage that a person of ordinary skill in the relevant art would have found surprising or unexpected." *In re Soni,* 54 F.3d 746, 750, 34 USPQ2d 1684, 1687 (Fed.Cir.1995). When an applicant seeks to overcome a prima facie case of obviousness by showing improved performance in a range that is within or overlaps with a range disclosed in the prior art, the applicant must "show that the [claimed] range is *critical,* generally by showing that the claimed range achieves unexpected results relative to the prior art range." *In re Woodruff,* 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed.Cir.1990).

In re Geisler, 116 F.3d 1465, 1469–1470 (Fed. Cir. 1997).

As for Appellant's argument that "the prior art provides the evidence that changing the parameters of the claims does have implications on such things as stability," we note that what is needed to rebut the prima facie case of obviousness is to show the criticality of the *claimed range*, not merely that the parameter at issue affects the property of the composition. *See, e.g.*, *In re Dill*, 604 F.2d 1356, 1361 (CCPA 1979) ("The evidence presented to

rebut a prima facie case of obviousness must be commensurate in scope with the claims to which it pertains.").

Appellant contends that the Examiner has erroneously ignored the "use of the restrictive and limiting claim language 'consisting essentially of.'" Appeal Br. 9. Appellant contends that Kabanov "requires a combination of a polymeric dispersant acting in concert with an amphiphilic dispersant[/surfactant]" and that "[t]he claimed invention does not claim such a combination," which in fact teaches away. Appeal Br. 6, 7.

We are not persuaded. As discussed above with respect to the rejection over Jadhav, claim 1 uses the transitional phrase, "consisting essentially of," which permits inclusion of components not listed in the claim that do not "materially affect the basic and novel properties of the invention." *AK Steel Corp.*, 344 F.3d at 1239. Appellant has not persuasively shown that the inclusion of the surfactant taught in Kabanov would materially affect such properties of the invention. MPEP § 2111.03(III) (explaining that Appellant has the burden of showing that additional steps or materials in the prior art would "materially change the characteristics of applicant's invention").

Appellant concedes that "surfactants are not excluded by necessity from the claimed invention" and that, in fact, certain claims depending from claim 1 (e.g., claims 13 and 15) explicitly recite a composition that further comprises at least one additive selected from the group consisting of, among others, surfactants. Appeal Br. 7–8. However, Appellant contends that the Specification teaches "the preferred use of an *anionic* surfactant in cases where a charged surfactant species is specified" and that Kabanov "clearly teaches away from the combination of either: (a) an anionic polymeric

dispersant and an anionic surfactant . . . (b) a neutral polymeric dispersant and an anionic surfactant." *Id.* Appellant further contends that "the patentability of the dependent claims is not negated if the base claims are not obvious." *Id.*

We are not persuaded. We agree that the Specification teaches preferred anionic surfactants. Spec. ¶ 17. However, given their broadest reasonable interpretation, Appellant's claims are not limited to combinations of anionic or neutral polymeric dispersants and anionic surfactants; thus, contrary to Appellant's apparent argument, Kabanov does not teach away from the claims. Importantly, as discussed above, Appellant does not point to any persuasive evidence that the surfactants taught in Kabanov, including that used in Example 29, would materially affect the basic and novel properties of the invention.

Independent claim 22 recites an insecticidal composition comprising the same ingredients recited in claim 1 and further comprising "at last about 50 wt% water, based on the weight of the composition."[8] Claims 23 and 24 depend from claim 22 and recite, respectively, a composition comprising at least about 55 wt% and 60 wt% water. Appellant argues with respect to claims 22–24 that the concentration of water and the concentration of bifenthrin taught by Kabanov are each outside of the claimed limits. Appeal

[8] We note that, because claims 22–24 use the transitional phrase "comprising" rather than "consisting essentially of," Appeal Br. 15 (Claims App.), Appellant's arguments in the Appeal Brief relating to the use of the transitional phrase "consisting essentially of," are not applicable to these claims.

Br. 6; *see also* Appeal Br. 9 (arguing that "there is no requirement to show the criticality of the claimed range for water and bifenthrin").

As an initial matter, we note that Appellant has not properly argued claims 22–24 separately by providing a separate subheading as required by rule. 37 C.F.R. § 41.37(c)(1)(iv) (stating that, "[u]nder each heading identifying the ground of rejection being contested, *any claim(s) argued separately or as a subgroup shall be argued under a separate subheading that identifies the claim(s) by number*") (emphasis added). In any event, as to Appellant's arguments regarding the claimed wt% range of bifenthrin, we are not persuaded for the same reasons set forth above in our analysis with respect to the same limitation in claim 1. With respect to the limitations that the composition comprises at least about 50 wt%, 55 wt%, or 60 wt% water, we note that Kabanov teaches that its compositions may be formed as concentrates and diluted in water, e.g., 10–100 times, to form stable aqueous dispersion. FF17. Thus, we find Kabanov teaches wt% water in the composition, like wt% of bifenthrin, to be a result-effective variable. "[D]iscovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art." *In re Boesch*, 617 F.2d at 276. Neither has Appellant provided persuasive evidence that the claimed range of concentrations for water is critical.

Accordingly, we affirm the Examiner's rejection of claim 1 as obvious over Kabanov. Claims 2–4, 9–13, 15, 16, and 18–24, which are not separately argued, fall with claim 1.[9]

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[9] As discussed above, claims 22–24 were not properly separately argued under the rules and, in any event, Appellant's arguments regarding those

C. *Nonstatutory double patenting rejections*

Appellant offers no arguments with respect to the double patenting rejections and states only that, "[i]f allowable subject matter should be found, the appellants will be willing to submit terminal disclaimers as appropriate." Appeal Br. 12. Appellant also did not file a terminal disclaimer to moot these rejections. Therefore, the obviousness-type double patenting rejections (Rejections C and D) are summarily affirmed. *See* MPEP § 1205.02 ("If a ground of rejection stated by the examiner is not addressed in the appellant's brief, appellant has waived any challenge to that ground of rejection and the Board may summarily sustain it . . . .").

CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1–4, 9–13, 15, 16, 18–24	103	Jadhav	1–4, 9–13, 15, 16, 18–24	
1–4, 9–13, 15, 16, 18–24	103	Kabanov	1–4, 9–13, 15, 16, 18–24	
1–4, 9–13, 15, 16, 18–21	Obviousness-type Double Patenting	US 8,937,054	1–4, 9–13, 15, 16, 18–21	
1–4, 9–13, 15, 16, 18–24	Obviousness-type Double Patenting	US 9,481,613	1–4, 9–13, 15, 16, 18–24	

claims are unpersuasive for the same reasons discussed above regarding claim 1.

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
Overall Outcome			1–4, 9–13, 15, 16, 18–24	

TIME PERIOD FOR RESPONSE

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

AFFIRMED