Ex parte Kosanke et al.

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SEP 28 1995

PAT.&T.M. OFFICE
BOARD OF PATENT APPEALS
AND INTERFERENCES

Paper No. 15

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JOHN W. KOSANKE,
ROBERT M. OSBURN AND
RAYMOND S. SMITH

Appeal No. 94-1083
Application 07/612,395[1]

ON BRIEF

Before GARRIS, WARREN, and ELLIS, *Administrative Patent Judges*.

GARRIS, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on an appeal from the final rejection of claims 1 through 32, which are all of the claims in the application.

The subject matter on appeal relates to a process for making a composition containing dormant dried microorganisms and to the composition itself. This appealed subject matter is adequately

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[1] Application for patent filed November 13, 1990.

illustrated by independent claims 1, 6, 13 and 22, which read as follows:

1. A process for making a composition containing dormant dried microorganisms, comprising:

culturing a species of microorganism capable of surviving in a desiccated state in a growth medium to form a culture;

mixing the culture containing the microorganisms and growth medium with an inert powdered clay carrier; and

then incubating the culture-carrier mixture for at least about one day under conditions effective to maintain a substantially constant moisture level in said mixture and to increase the microorganism count in said mixture; and

then drying the resulting mixture for at least about one day so that the moisture level in said microorganism is gradually reduced to less than about 15 wt. % on a wet basis to form said composition.

6. An inoculant composition, consisting essentially of a mixture of dry, dormant but viable *Rhizobium* bacteria and residual culture medium distributed on particles of a clay carrier, wherein the bacteria-carrier mixture has been air-dried to a moisture content less than about 15 wt. %, and the bacteria are present at a density in excess of 10^9 viable bacteria per gram of said carrier.

13. A biocidal composition, comprising a mixture of dry, dormant but viable microorganisms capable of living in the soil in the presence of a plant to be protected and having a biocidal effect on an organism that impedes growth of the plant to be protected, which microorganisms are distributed on particles of a carrier, wherein the microorganism-carrier mixture has been air-dried to a substantially moisture free state.

22. A process for making a composition containing dormant, dried but viable microorganisms, comprising:

culturing a species of microorganism in a growth medium to form a culture;

adding an osmoprotectant to said culture in an amount effective to increase survival of said microorganisms following drying and rehydration;

mixing the microorganisms with an inert carrier; and

then drying the resulting mixture for at least about one day to a substantially dry, dormant state.

The references relied upon by the examiner as evidence of obviousness are:

Porter et al. (Porter)	2,932,128	Apr. 12, 1960
Carney	3,115,404	Dec. 24, 1963
Hettrick	3,898,132	Aug. 5, 1975
Schaefer (published World Intell. Prop. Org. Application)	WO 87/02,660	May 7, 1987

Le Rudulier et al. (Le Rudulier), "Molecular Biology Of Osmoregulation", *Science*, 224, 1064-1068 (1984).[2]

Le Rudulier et al. (Le Rudulier), "Salt Tolerance in Rhizobium: A Possible Role For Betaines", 39, *FEMS Microbiology Reviews*, 67-72 (1986).[2]

Claims 1 through 7, 10 through 19, and 26 through 31 stand rejected under 35 U.S.C. § 103 as being unpatentable over Schaefer in view of Carney and Hettrick.

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[2] There are two Le Rudulier references of record in this application. As pointed out by the appellants on page 15 of their main Brief, "[i]t remains unclear which of the two papers [authored by Le Rudulier] the examiner is relying on, or whether both were intended." Because of this lack of clarity, we will assume, as did the appellants, that the examiner has relied upon both of these Le Rudulier references as evidence of obviousness.

Claims 8, 9 and 22 through 25 stand rejected under 35 U.S.C. § 103 as being unpatentable over Schaefer, Carney and Hettrick, as applied above, and further in view of the Le Rudulier references.

Finally, claims 20, 21 and 32 stand rejected under 35 U.S.C. § 103 as being unpatentable over Schaefer, Carney and Hettrick, as applied above, and further in view of Porter.

Rather than reiterate the respective positions advocated by the appellants and the examiner concerning the above noted rejections, we refer to the main and reply briefs and to the answer for a complete exposition thereof.

Our study of the record on this appeal leads us to conclude that we cannot sustain the examiner's § 103 rejections of claims 1 through 21 and 26 through 32. However, we will sustain the § 103 rejection of claims 22 through 25. Our reasons are set forth below.

Independent claims 1 and 27 are directed to a process for making a composition containing dormant dried microorganisms which includes the step of incubating a culture-carrier mixture for at least about a day under conditions effective to maintain a substantially constant moisture level in the mixture and to increase the microorganism count in the mixture. In the claimed process, the mixture resulting from the aforementioned incubation step is subjected to a drying operation for at least about one

day. With respect to this incubation feature, the examiner's obviousness position is expressed on page 3 of the answer as follows:

> Schaefer shows it to be old in the art to form mixtures of a microorganism <u>and its culture medium</u> and to subsequently blend this mixture with a dry particulate water dispersible carrier, eg. [sic] a dry fine grain clay such as attapulgite. Where the claims call for subsequent incubation of the microorganism/medium/carrier blend prior to the initiation of a dormant phase, it would be obvious to incorporate the teachings of Carney. Carney shows it to be old in the art to incorporate a microorganism and its culture medium into a carrier and to subsequently allow fermentation to continue until enough moisture has been removed so as to initiate a dormant phase (col. 5, line 64- col. 6, line 20). [emphasis in original]

In our opinion, the examiner's position is not well-founded.

We share the appellants' view that Carney contains no teaching or suggestion of incubating a culture-carrier mixture for at least about one day under substantially constant moisture level conditions and then drying the resulting mixture for at least about one day as required by the claims under consideration. In the process of Carney, the particles of culture-carrier are enclosed with a film or barrier which is water repellant in a relatively dry storage environment. This barrier is formed by adding a silicone oil emulsion to the culture-carrier mixture to thereby form a silicone soap film on

mixture particles. To dry this film, a material such as methylcellulose powder is added which reacts with the moisture content of the wet silicon soap and some of the moisture from the culture medium to thereby form a gel coating over a dry silicone soap layer which in turn isolates the aforementioned particles of the culture-carrier mixture. During storage of the so-enclosed particles, the microorganisms therein continue to grow until the moisture content of the particle is reduced to about two or three percent at which level the microbial life becomes inert. Concerning these matters, see lines 46 through 62 in column 4, lines 25 through 75 in column 5, and lines 1 through 18 in column 6 of the Carney patent.

It is clear from the above noted discussion of the Carney disclosure that patentees' process includes incubation of microorganisms during storage of the culture-carrier mixture particles formed by his process. However, there is absolutely no teaching or suggestion in the Carney patent that this incubation period lasts for at least about one day and is under conditions effective to maintain a substantially constant moisture level as required by the process of claims 1 and 27. In fact, it could be reasonably argued that the moisture level which exists during Carney's storage/incubation period is reduced ultimately to about two or three percent rather than maintained substantially constant for at least about one day.

Under the circumstances recounted above, we are constrained to conclude that neither Carney nor the other prior art applied by the examiner in rejecting claims 1 and 27 contains any teaching or suggestion of incubating a culture-carrier mixture for at least about a day under conditions effective to maintain a substantially constant moisture level in the mixture and then drying the resulting mixture for at least about one day as required by each of these claims much less any teaching or suggestion of the specific moisture level range of about 25 to 33 weight percent recited in the incubation step of claim 27. It follows that we cannot sustain the examiner's rejection of independent claims 1 and 27 or of claims 2 through 5 and claims 28 through 31 respectively which depend (at least ultimately) therefrom as being unpatentable over Schaefer in view of Carney and Hettrick. Likewise, we cannot sustain the rejection of claim 32 which ultimately depends from independent claim 27 as being unpatentable over the Schaefer, Carney and Hettrick references and further in view of Porter since this last mentioned patent fails to supply the deficiencies discussed above.

Concerning the § 103 rejection of inoculate composition claims 6, 7 and 10 through 12 over Schaefer, Carney and Hettrick, the appellants have correctly argued that these references contain no teaching or suggestion of the claim 6 requirement for a bacteria density in excess of 10^9 viable bacteria per gram of

carrier. Indeed, we find no disclosure at all in these references regarding any numerical value for bacteria density, and the examiner points to none. For all that can be determined from the record on this appeal, the processes of the prior art applied by the examiner would be incapable of making an inoculate composition having a bacteria density level even remotely close to that here claimed.

In light of the foregoing, it is clear that we cannot sustain the examiner's rejection of independent composition claim 6 or of claims 7 and 10 through 12 which depend therefrom as being unpatentable over Schaefer in view of Carney and Hettrick. Moreover, since the Le Rudulier references do not supply the deficiency in question, we also cannot sustain the § 103 rejection of claims 8 and 9, which ultimately depend from claim 6 as being unpatentable over Schaefer, Carney and Hettrick and further in view of the Le Rudulier references. Similarly, because Porter does not cure these same deficiencies, we are unable to sustain the rejection of claim 20, which incorporates composition claim 6, as being unpatentable over Schaefer, Carney and Hettrick in view of Porter.

As for independent claim 13, which is directed to a biocidal composition, we again share the appellants' viewpoint that the applied references of Schaefer, Carney and Hettrick contain no teaching or suggestion of the claimed microorganism-carrier mixture wherein the microorganism is one having a biocidal effect

on an organism that impedes growth of the plant to be protected. With respect to this matter, the examiner seems to contend that "parameters such as the particular microorganism ... would ... be well-known parameters easily determined by a skilled routineer having the references before him" (answer, page 4). Nevertheless, the examiner has proffered no evidence at all that there would have been a reasonable expectation of success in using a "biocidal" microorganism in a composition of the type defined by independent claim 13. *In re O'Farrell*, 853 F.2d 894, 903, 7 USPQ2d 1673, 1681 (Fed. Cir. 1988)(for obviousness under § 103, a reasonable expectation of success is required).

Accordingly, we cannot sustain the § 103 rejection of independent claim 13 or of claims 14 through 19 and 26, which depend therefrom, as being unpatentable over Schaefer in view of Carney and Hettrick. Correspondingly, because Porter fails to supply the aforementioned deficiencies of the other references, we also cannot sustain the § 103 rejection of claim 21, which incorporates composition claim 13, as being unpatentable over Schaefer, Carney and Hettrick and further in view of Porter.

In summary, we have not sustained any of the examiner's above noted § 103 rejections of claims 1 through 21 and 26 through 32.

However, we will sustain the § 103 rejection of claims 22 through 25 as being unpatentable over Schaefer, Carney and Hettrick and further in view of the Le Rudulier references. The

appellants' independent claim 22 concerns a process for making a composition containing dormant, dried but viable microorganisms which includes the step of adding an osmoprotectant to a culture in an amount effective to increase survival of the microorganisms following drying and rehydration. According to the appellants, the applied references simply would not have suggested adding an osmoprotectant such as betaine in the culturing step of the prior art. It is the appellants' opinion that the examiner's rejection of this claim is based upon the inappropriate obvious-to-try standard. We cannot agree.

From our perspective, the teachings of the Le Rudulier references (*e.g.*, see the disclosure at item (3) in the right hand column on page 71 of *FEMS Microbiology Reviews* and the disclosure at the first full paragraph in the right most column on page 1067 of *Science*) would have suggested adding an osmoprotectant such as betaine to a microorganism culture based upon a reasonable expectation of enhancing the survivability of the microorganisms. For example, the osmoprotection provided by betaines to the bacterium *Rhizobium meliloti* against stress (see the aforementioned disclosure in *Science*) quite plainly would have led to an expectation of enhanced survivability.

The appellants seem to believe nonobviousness is evinced by specification Example 10 which is said to illustrate that adding

betaine prior to drying was effective to enhance survival whereas adding it later after partial drying was ineffective. Our review of this example does not lead to such an interpretation. By way of exemplification, Samples 1 and 2 of Example 10 relate to betaine addition at mixing and during drying respectively. Contrary to the appellants' representation, however, the addition of betaine during drying (Sample 2) leads to results which clearly are quite effective, rather than ineffective, and are very similar to the results obtained from betaine addition prior to drying (Sample 1).

The foregoing circumstances convince us that we should sustain the § 103 rejection of independent claim 22 and of claims 23 through 25 which depend therefrom or refer back thereto as being unpatentable over Schaefer in view of Carney[3] and Hettrick and further in view of the Le Rudulier references.

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[3] As we have previously indicated, the process of Carney results in particles of microorganism-carrier enclosed with a film or barrier (i.e., silicone soap coated with methylcellulose powder and, for example, clay) which is water repellant in a relatively dry storage environment. It could be argued that this film or barrier, by virtue of its water repellency in a relatively dry storage environment, meets the broad definition of an osmoprotectant since it would protect the enclosed microorganisms from osmotic stress during storage. If so, it appears that appellants' composition claim 24, for example, would be anticipated by Carney. The appellants and the examiner should consider these matters in the event of further prosecution.

The decision of the examiner is affirmed-in-part.

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

AFFIRMED-IN-PART

BRADLEY R. GARRIS Administrative Patent Judge	)
CHARLES F. WARREN Administrative Patent Judge	) BOARD OF PATENT APPEALS AND INTERFERENCES
JOAN ELLIS Administrative Patent Judge	)

Appeal No. 94-1083
Application 07/612,395

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