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Datasheet for the decision of 31 October 2007

Case Number: T 1153/05 - 3.3.06

Application Number: 99958956.7

Publication Number: 1129163

IPC: C11D 3/386

Language of the proceedings: EN

Title of invention:
Fluidized bed low density granule

Applicant:
GENENCOR INTERNATIONAL, INC., et al

Opponent:
-

Headword:
Enzyme granule/GENENCOR

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step (main request) - no: obvious modification of the prior art"
"Admissibility (auxiliary requests I and II) - no: late filed and not prima facie allowable"
"Inventive step (auxiliary request III) - yes: non-obvious modification"

Decisions cited:
-

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 1153/05 - 3.3.06

D E C I S I O N
of the Technical Board of Appeal 3.3.06
of 31 October 2007

Appellants: GENENCOR INTERNATIONAL, INC.
Applicants: 925 Page Mill Road
Palo Alto, California 94304 (US)

and

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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 13 April 2005 refusing European application No. 99958956.7 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: P.-P. Bracke
Members: P. Ammendola
A. Pignatelli

Summary of Facts and Submissions

I. This appeal is from the decision of the Examining Division refusing the European patent application No. 99 958 956.7, internationally published as WO 00/29534, on the ground that the enzyme granules for use in liquid detergents claimed in the then pending main request and sole auxiliary request were obvious in view of the prior art and, thus, contravened Article 56 EPC.

II. In its decision the Examining division found, in particular, that the claimed enzyme granules according to the main request only differed from the enzyme granules disclosed in the examples of document

(3) = US-A-5 324 649

in that the density of the claimed enzyme granules was specified to be lower than 1.4 g/cm^3. The Examining division considered that the person skilled in the art would have considered obvious to set the amount of low-density fillers in the enzyme granules of the prior art so as to render the overall granule density more similar to that of the liquid detergent composition in which the granules were to be stably suspended, thereby arriving at the claimed subject-matter.

III. The Applicants (hereinafter "Appellants") appealed this decision and filed with the grounds of appeal a novel set of amended claims labelled as **main request**.

Claim 1 thereof read:

"1. A multi-layered enzyme granule for use in liquid detergents, comprising:

(i) an inert seed or carrier particle,

(ii) a low-density filler layer coated onto said inert seed or carrier particle,

(iii) an enzyme coated over said low-density filler layer, and

(iv) an outer coating surrounding said inert seed or carrier particle, said low-density filler and said enzyme,

wherein the multi-layered granule has a true density of less than 1.4 g/cm^3, a total dust figure of less than 50 mg/pad, as determined by the Heubach test, and a retained activity in storage of at least 50% in liquid detergent for 3 weeks at 35°C."

The Appellants subsidiary requested oral proceedings.

IV. In a communication dated 11 July 2007, the Board informed the Appellants of its preliminary opinion on the case and summoned the party to oral proceedings to be held on 31 October 2007.

V. With facsimile of 29 October 2007 the Appellants filed two sets of amended claims respectively labelled as **auxiliary request I** and **auxiliary request II**.

Claim 1 of the auxiliary request I differed from claim 1 of the main request in that the wordings "*(iii) an enzyme coated*" and "*said enzyme, wherein the*

multilayered granule" were respectively replaced by "*(iii) an enzyme layer coated*" and "*said enzyme layer, wherein the low density filler is present in an amount of 20 to 50% by weight, relative to the total weight of the final multi-layered enzyme granule, and is selected from the group consisting of perlite, fumed silica, starch, cellulose fibers, DE, feather particles, zeolites, flour, fragments of milled plant-derived materials and mixtures thereof, and wherein the multilayered granule*".

Claim 1 of the auxiliary request II differed from claim 1 of the auxiliary request I in that the wording "*(iii) an enzyme layer coated over said low-density filler layer*" was replaced by "*(iii) an enzyme layer consisting exclusively of enzyme and optionally one or more enzyme protecting agents, selected from the group consisting of ammonium sulfate, ammonium citrate, urea, guanidine hydrochloride, guanidine carbonate, guanidine sulfamate, thiourea dioxide, monoethanolamine, diethanolamine, triethanolamine, amino acids, bovine serum albumin, casein and betain, coated direactly over said low-density filler layer*".

VI. At the oral proceedings held as scheduled before the Board the Appellants filed a set of eight amended claims labelled as **auxiliary request III**.

Claim 1 and 8 of this request read, respectively:

"1. A multi-layered enzyme granule for use in liquid detergents, comprising:

(i) an inert seed or carrier particle,

(ii) a low-density filler layer coated onto said inert seed or carrier particle,

(iii) an enzyme layer consisting exclusively of enzyme coated directly over said low-density filler layer, and

(iv) an outer coating surrounding said inert seed or carrier particle, said low-density filler layer and said enzyme layer,

wherein the low density filler is present in an amount of 20 to 50% by weight, relative to the total weight of the final multi-layered enzyme granule, and is selected from the group consisting of perlite, fumed silica, starch, cellulose fibers, DE, feather particles, zeolites, flour, fragments of milled plant-derived materials and mixtures thereof, and

wherein the multi-layered granule has a true density of less than 1.4 g/cm^3, a total dust figure of less than 50 mg/pad, as determined by the Heubach test, and a retained activity in storage of at least 50% in liquid detergent for 3 weeks at 35°C.",

and

"8. A method of making the multi-layered enzyme granule of claim 1, comprising:

a) selecting the inert seed or carrier particle;

b) coating such particle from step a) with the low-density filler layer; and

c) coating the filler layer with the enzyme layer; and

d) applying the outer coating."

The remaining claims 2 to 7 described preferred embodiments of the granules of claim 1.

VII. The Appellants considered, in essence, that the subject-matter of claim 1 of the main request solved vis-à-vis the granules of document (3) the three-fold problem of rendering available enzyme granules which

(a) do not settle in liquid detergent compositions
(b) ensure that the enzymatic activity of the granules is retained to the extent specified in the claim during storage of the liquid detergent composition

and

(c) satisfy the low-dust requirement also given in the claim.

The skilled person starting from document (3) would have no reason to expect that this three-fold improvement of the prior art could be obtained by increasing the portion of low density filler and, thus, by reducing the overall density of the prior art granules. On the contrary, the skilled person would have expected that an increase of the relative amount of the low density filler and the corresponding decrease of the enzyme content in the granules would produce a loss in enzyme stability and dust characteristics of the granules of the prior art.

In respect of the admissibility of the late filed auxiliary requests I to III the Appellants argued that it would be immediately apparent that these requests were clearly allowable.

In particular, claim 1 of the auxiliary request I would specify the nature and the amount of the low-density filler, rendering the claimed subject-matter even less obvious for the skilled person starting from document (3).

Claim 1 of the auxiliary request II was based on the disclosure in the description of the application as originally filed and published at page 12, lines 12 to 31, when considering that enzyme protecting agents could only reasonably be placed in the enzyme layer. Moreover, document (3) was totally silent as to the possible presence of such ingredients which promote the retention of enzyme activity.

In respect of claim 1 of the auxiliary request III, the Appellants argued that document (3) expressly indicated that the low dust properties of the granules of the prior art depended on the presence of PVA in the enzyme layer. Hence, the low dust properties of the claimed granules wherein the enzyme layer contained only enzyme were surprising.

VIII. The Appellants requested that the decision under appeal be set aside and that a patent be granted on the basis of the main request as filed with the grounds of appeal or, alternatively, according to the auxiliary request I or II submitted under cover of the facsimile of 29 October 2007 or according to the auxiliary request III filed during the oral proceedings before the Board.

Reasons for the Decision

Main request

1. The Board is satisfied that the claims of this request comply with the requirements of Articles 54, 84 and 123(2) EPC.

2. *Inventive step (Articles 52(1) and 56 EPC): claim 1*

2.1 This claim (see above section III of Facts and Submissions) defines enzyme granules characterized by a specific multi-layered structure formed of at least four layers (i) to (iv) and further characterised by three granule properties, i.e. a density of less than 1.4 g/cm^3, a total dust figure of less than 50 mg/pad (Heubach) and a retained activity in storage of at least 50% in liquid detergent for 3 weeks at 35°C.

The Appellants have convincingly argued that, as it is also apparent from page 2, line 30 to page 3, line 9, of the application as internationally published, the presence of these three properties implies that the claimed subject-matter addresses the technical problem of providing enzyme granules that:

a) do not settle during storage even when dispersed in liquid detergent compositions;

b) retain their enzymatic activity, i.e. are chemically stable, even when dispersed in liquid detergent compositions,

and

c) produce limited amounts of health-hazardous dust during their preparation and handling.

2.2 The Board notes that document (3) (see column 1, lines 23 to 27 and 58 to 60, column 2, lines 3 to 6, column 3, lines 19 to 24, column 6, lines 1 to 9 and 29 to 30, column 7, lines 10 to 15, and column 12, lines 25 to 30, as well as the examples) expressly states that the granules disclosed therein are suitable for (solid) detergent compositions and possess simultaneously several improved properties, including improved dust characteristics and an increased stability in detergent formulations. Since, as also implicitly confirmed in the present application as published (see page 2, line 30 to 34), substantially the same ingredients harsh towards the enzyme are present in liquid as well as in solid detergent compositions, the skilled reader of document (3) would recognise that the stability considered in this citation corresponds to the retention of enzyme activity aimed at in the patent in suit. Hence, for the skilled person the granules of this prior art already display the desirable properties mentioned above as b) and c). Thus, the Board concurs with the decision under appeal and with the Appellants that the multi-layered enzyme granules disclosed in this citation represent a reasonable starting point for the assessment of inventive step.

2.3 It is undisputed that the multi-layered structure of claimed granules differs from that present in the granules of e.g. the examples of document (3) only for the specified relative amount of the low-density filler ingredient, such as e.g. starch, already present in

undetermined amounts in the granules of the prior art. Indeed, whereas in the claimed granules this amount must be sufficient for ensuring a low density of the granules, document (3) mentions neither the density of the granules nor the amount of starch present in the granules of this prior art.

It is also undisputed and self-evident to the skilled person that the settling of a solid dispersed in a liquid phase is due to the superior density of the dispersed solid, i.e. that a rapid settling is instead not expected when the solid and the liquid possess about the same density.

2.3.1 Accordingly the Board has no reason to depart from the finding of the Examining division that the density distinguishing the claimed granules from those of the prior art allows to avoid settling of the enzyme granules in conventional liquid detergent compositions whose density is normally lower than 1.4 g/cm^3.

2.4 The Appellants have argued that the claimed granules would instead be superior to those of the prior art in terms of enzyme activity retention and low dust formation as well, as suggested by the fact that already the conditions used for testing these properties in the application are more severe than those used, e.g., in the examples of document (3). In the opinion of the Appellants also such superior properties would surprisingly be ensured by the low density of the granules of the invention.

2.4.1 The Board notes, however, that the patent in suit does not even suggest that the presence of specific amounts

of the low density filler or of the resulting low density of the granules contribute at improving the stability and dust characteristics of the enzyme granules. On the contrary, the density of the claimed granules is exclusively mentioned in the application as relevant for achieving the non-settling characteristics.

2.4.2 Moreover, even though the test conditions used for evaluating the granule dust and stability properties in the examples of document (3) are less severe than those indicated in present claim 1, it remains the fact that these test conditions are different. Hence, in the absence of any evidence to the contrary, this difference does not allow any reliable prediction as to whether the granules of the prior art would or not display improved dust and stability features also when tested under the same (more severe) conditions used in the present application.

2.4.3 The Board notes instead that, as already observed above (see point 2.2), also the granules disclosed in document (3) are explicitly described to possess "*improved*" dust and stability characteristics. Moreover, according to the description at column 6, lines 1 to 9 and 29 to 39, and column 7, lines 10 to 15, of document (3) these properties are dependent on the PVA-containing enzyme layer and coating layer, i.e. layers possibly identically present as (iii) and (iv) in the claimed granules. The Board concludes, therefore, that comparable levels for these properties are rather to be expected in the claimed granules and in those of the prior art in view of their structural similarity.

Hence, in the absence of any experimental comparison demonstrating the superiority of the granules of the invention in terms of enzymatic activity retention and reduced dust formation, neither the disclosure of document (3) nor that of the application as filed render credible that the amount of low density filler in layer (ii) that is necessary to ensure the desired density of the granules of the invention, would also ensure levels of dust reduction and stability achieved in the granules of the invention that are appreciably superior to those already achieved by the prior art granules.

2.5 The Appellants have also argued that the skilled person would expect that by increasing the amount of the low density ingredient one would inevitably obtain less enzymatic activity and more dust formation because of the porous and/or frail nature of such low density fillers and of the inevitable decrease in enzyme concentration.

2.5.1 The Board notes however that the presently claimed subject-matter appears to possibly also embrace modifications of the examples of document (3) in which the additional amount of filler possibly needed to achieve the desired density is incorporated in replacement of, for instance, the sucrose in the granule core, thereby leaving unchanged the weight concentration of the enzyme in the granule. Nor have the Appellants presented some evidence suggesting that the level of enzymatic activity provided by the granules of the invention is surprisingly superior to that foreseeable in view of the actual concentration of the enzyme ingredient therein.

2.5.2 Moreover, the application as filed does not even contain a clear allegation as to the fact that an increase in the relative amount of the low-density filler in the granules of the prior art would be regarded by the skilled person as potentially detrimental to the maintenance of the desired dust reduction and activity retention. In particular, the Board finds that, contrary to the Appellant's allegations, the generic statements in the application at page 4, lines 5 to 9, that the production of a granule possessing simultaneously at least two of the several desired properties (including those listed above, point 2.1 "a)" to "c)") has been "*especially challenging*" for the industry, does not necessarily imply that these properties were considered so interconnected as to render unlikely the achievement of the aimed density without loosing enzyme activity and limited dust formation. Finally, these statements, beside being vague, could as well only reflect a (possibly erroneous) opinion of the authors of the application, rather than undisputed common general knowledge as to the negative consequences of an amount of filler such as starch, sufficient to ensure that the granule density remains lower than 1.4 g/cm^3.

2.5.3 Hence, the Appellants' argument resumed above at point 2.5 lacks credibility because it is supported neither by some experimental evidence nor by, for instance, other elements rendering credible the existence of a generally accepted prejudice against the possibility of retaining enzyme activity and limited dust formation when varying - possibly by increasing -

the granule density by varying - possibly by increasing - the relative amount of the low density filler.

2.6 Accordingly, the Board concludes that the sole technical problem credibly solved by the claimed granules vis-à-vis the prior art is that of rendering available enzyme granules that do not settle in liquid detergent compositions (see also above point 2.3.1), while retaining the dust and stability characteristics already present in the granules of the prior art.

2.7 This problem has been solved by setting the relative amount of the low-density filler present (in undisclosed amounts) in the cores of the granules of e.g. the examples of document (3) so that the overall granule density is lower than 1.4 g/cm^3.

2.7.1 As indicated above (see point 2.3) it is self-evident to the skilled person that the achievement of the desired non-settling characteristics require to match the granule density with that of the liquid detergent compositions in which the granules are to be dispersed. Hence it is obvious to solve the posed problem by modifications of the granules of the prior art that, without affecting the good dust and stability characteristics to be retained, allow to achieve granule densities comparable to those normally possessed by liquid detergent compositions.

As the fillers, such as starch, that are present in the core of the granules exemplified in document (3) (see column 4, lines 33 to 42 and the examples) are by definition ingredients having only the function to add bulk, and since many of these fillers, including starch,

are manifestly less dense than other enzyme granule ingredients as well as of the conventional liquid detergents, the Board concurs with the decision under appeal that a person skilled in the art who is aiming at suppressing settling problems of enzyme granules, would have considered obvious to regulate the amount of the starch filler in the enzyme granules exemplified in the prior art in order to render the granule density more similar to that of the liquid detergent composition, thereby arriving at the claimed subject-matter without exercising any inventive ingenuity.

2.8 Hence, the subject-matter of claim 1 of the main request does not comply with the requirements of Article 56 EPC and, thus, this request is not allowable.

Admissibility of the auxiliary requests

3. All auxiliary requests I to III are late filed (see above sections V and VI of the Fact and Submissions).

The Appellants have argued that they could nevertheless be admitted in the proceedings since it would immediately be apparent that these requests were clearly allowable.

3.1 The Board finds however that claim 1 of the auxiliary request I (see above section V of the Facts and Submissions) still embraces the same modifications of the prior art considered obvious by the Examining division. Hence, the subject-matter of this request appears *prima facie* to lack of inventive step for the same reasons as that of the main request. Accordingly,

the auxiliary request I is not admitted into the proceedings.

3.2 The Board finds that claim 1 of the auxiliary request II (see above section V of the Facts and Submissions) restricts the composition of the enzyme layer (iii) to be either enzyme only or a combination of exclusively enzyme and certain enzyme protective agent. This combination appears *prima facie* to lack of support in the application as originally filed, thereby violating Article 123(2) EPC. Accordingly, also the auxiliary request II is not admitted into the proceedings.

3.3 The Board finds instead that claim 1 of the auxiliary request III (see above section VI of the Facts and Submissions) results from a clearly allowable restriction of the claimed subject-matter excluding the presence of other ingredients in the enzyme layer (iii). As all the examples of document (3) contain instead further ingredients in the enzyme layer, it is evident that this claim no longer embraces the obvious modifications of the prior art considered in the decision under appeal. Hence, this request appears *prima facie* possibly allowable and is admitted into these appeal proceedings.

Auxiliary request III

4. Support in the application as filed, clarity and novelty (Articles 52(1), 54, 84 and 123(2) EPC)

The Board finds that the wording of the claims of this request is clear and based on the original claims 1, 3

to 7 and 28 as well as on the description as originally filed and internationally published on page 9, line 18, page 5, line 24, page 9, lines 30 to 34, from page 7, line 30 to page 8, line 1, page 10, lines 1, 10 and 19 to 22, page 13, lines 11 to 12, and Examples 1 to 5. The basis for the restriction to the enzyme layer (iii) containing only enzyme is self-evident from the name of the "*enzyme layer*" and is consistent with all the invention examples and with the fact that the whole application does not mention any other ingredient as mandatory component of such layer.

The Board is also satisfied that the claimed subject-matter is novel vis-à-vis the prior art. No reasons need to be given in these respect as claim 1 of the present request comprises all features of claim 1 of the main request considered in the decision under appeal and whose novelty was already acknowledged by the Examining division, and since all the remaining claims 2 to 8 depend on claim 1.

5. *Inventive step (Articles 52(1) and 56 EPC)*

5.1 Claim 1 of this request (see above section VI of the Facts and Submissions) requires that the enzyme layer (iii) is formed exclusively of enzyme. Hence, the claimed granules differ from those described and exemplified in document (3) not only for the relative amount of low-density filler forming the layer (ii), but also for the chemical composition of the subsequent layer, which in document (3) always contains further ingredients, such as, in particular, PVA, in addition to the enzyme.

5.2 The Board concurs with the Appellants that document (3) expressly states on column 6, lines 1 to 9, that the presence of PVA in the enzyme layer contributes to the tendency of the granule to form less dust.

Hence, the skilled person aiming at solving the problem posed (see above point 2.6) could not expect that the low dust characteristics of the granules of the prior art would also be retained when omitting the PVA ingredient from the enzyme layer.

Therefore, the Board concludes that the subject-matter of claim 1 of the auxiliary request III amounts to a non-obvious modification of the prior art and, thus, is based on an inventive step.

5.3 Claims 2 to 7 define preferred embodiments of the multi-layered enzyme granule of claim 1 and are, thus, based on an inventive step for the same reasons given above for the subject-matter of claim 1.

The same applies *mutatis mutandis* to the method of claim 8 (see above section VI of the facts and submissions).

6. The Board concludes, therefore, that the subject-matter of claims 1 to 8 of the auxiliary request III is based on an inventive step and, hence, that this request complies with the provisions of Article 56 EPC.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the first instance department with the order to grant a patent on the basis of claims 1 to 8 according to auxiliary request III and a description to be adapted.

The Registrar: The Chairman:

G. Rauh P.-P. Bracke