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D E C I S I O N
of 7 February 2002

Case Number: T 1010/97 - 3.3.6

Application Number: 90309255.9

Publication Number: 0415652

IPC: C11D 3/386

Language of the proceedings: EN

Title of invention:

Bleaching compositions containing an oxidant bleach and enzyme granules

Applicant:

The Clorox Company

Opponent:

-

Headword:

Bleaching composition containing enzyme granules/CLOROX

Relevant legal provisions:

EPC Art. 56

Keyword:

"Inventive step (no) - obvious application of known coating"

Decisions cited:

-

Catchword:

-



Case Number: T 1010/97 - 3.3.6

D E C I S I O N
of the Technical Board of Appeal 3.3.6
of 7 Febraury 2002

Appellant: The Clorox Company
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 2 May 1997 refusing
European patent application No. 90 309 255.9
pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: P. Krasa
Members: L. Li Voti
C. Rennie-Smith

Summary of Facts and Submissions

I. This appeal lies from the decision of the Examining Division to refuse European patent application No. 90 309 255.9, relating to a bleaching composition containing an oxidant bleach and enzyme granules, for lack of an inventive step of the claimed subject-matter.

II. The decision of the Examining Division was based upon claims 1 to 9, filed with the Appellant's (Applicant's) letter of 21 June 1996, claim 1 of which reads as follows:

"1. A dry, granular oxidant bleach and enzyme composition which has enhanced enzyme stability despite prolonged storage in the presence of said oxidant bleach, and improved enzyme solubility in an aqueous medium, said bleach composition comprising:

(a) an oxidant bleach selected from the group consisting of alkali metal perborates, alkali metal percarbonates, hydrogen peroxide adducts, and mixtures thereof; and

(b) a hydrolase which is coated substantially completely by:

(i) a water soluble alkali metal silicate coating, or

(ii) a water soluble polymer and, as an additive, a transition metal incorporated in an effective amount to enhance hydrolase stability."

Dependent claims 2 to 9 related to particular embodiments of the claimed granular product.

III. In the written procedure the Examining Division cited the following documents

(1): EP-A-0 290 223

(2): EP-A-0 206 417

(3): WO-A-87/07 292

and found that the claimed invention did not fulfill the patentability requirements of the EPC and specifically that the claimed subject-matter did not involve an inventive step over document (1).

In particular the Examining Division found that document (1) had already provided a solution to enzyme denaturation, especially in the presence of strong bleach oxidants such as organic peroxyacids. It was therefore to be expected that the same effect would be maintained in contact with weaker bleach oxidants such as those of claim 1 of the present application. Moreover the invention of document (1), though specifically directed to compositions comprising organic peroxyacids, was not limited to such compositions but extended to any oxidant bleach.

Therefore, it was obvious for the skilled person to coat the enzymes as taught in document (1) in the presence of weaker inorganic oxidants and to expect an improved enzyme stability therefrom.

IV. An appeal was filed against this decision.

The Appellant submitted in writing and at the oral proceedings held before the Board on 07 February 2002 that

- inorganic oxidants such as percarbonate or perborate were regarded in the prior art to be sufficiently compatible with enzymes;
- the prior art did not recognize that such "weaker oxidants" would under harsh conditions, such as high temperatures, release highly oxidant species which were not less harmful to enzymes than the strong oxidants specifically addressed in document (1);
- the inventors of document (1) did not consider the disclosed invention to encompass the use of "weaker" inorganic bleaches such as perborate or percarbonate and therefore this document did not mention that the protection conferred to the enzymes by the coating disclosed therein would be maintained in the presence of the aggressive degradation products of inorganic bleaches;
- following the teaching of document (1) the skilled person would have had no motivation for coating the enzyme in the presence of "weaker" inorganic oxidants, thereby increasing costs, and even though he could have provided enzymes with the disclosed coating in the presence of such bleaches, he would not have done so in the expectation that enzymatic stability would be improved.

V. In a communication dated 20 October 2000 the Board introduced the following document into the proceedings under Article 114(1) EPC:

(4): "Waschmittelchemie" by Henkel & Cie GmbH (1976), Dr. A. Hütig Verlag, pages 166 to 167.

The Board stated in its communication that

- the subject-matter disclosed in document (1) differed from that of claim 1 of the present application only insofar as bleaches like alkali metal perborate, alkali metal percarbonate, hydrogen peroxide adducts or mixtures thereof were not explicitly disclosed, even though being implicitly encompassed by the words "oxidant bleach";
- the prior art considered granulated enzymes to have a satisfactory stability in the presence of perborate under normal conditions; however, this was not the case under harsh conditions of temperature and humidity as taught in documents (3) and (4);
- therefore, the skilled person had, in the light of this common general knowledge, a motivation to protect the enzymes in the presence of inorganic bleaches like perborate or percarbonate in order to improve their stability.

VI. At the oral proceedings held before the Board on 7 February 2002 the Appellant agreed to modify the wording of claim 1 as set out in point II above by inserting the word "film-forming" before the words "water soluble polymer" in paragraph (b)(ii).

Moreover it was agreed that a granular detergent composition comprising a granulated or prilled hydrolase, commercially available at the priority date of the present application, and an inorganic bleach of the type used in present claim 1 had to be regarded as

the most suitable starting point for the assessment of inventive step, this prior art differing from the subject-matter of present claim 1 only insofar as the enzyme did not comprise the coating specified therein.

- VII. The Appellant requests the decision of the first instance to be set aside and that a patent be granted on the basis of the claims filed with its letter of 21 June 1996 with the further amendment to claim 1 as introduced during oral proceedings (see point VI above).

Reasons for the Decision

1. *Most suitable starting point and Technical problem*

- 1.1 The present application and in particular claim 1 relates to enzyme-containing oxidant bleach compositions wherein the enzyme is a hydrolase coated with a material selected from a water soluble alkali metal silicate or a water soluble film-forming polymer and, as an additive, a transition metal (see page 3, lines 7 to 8 and 14 to 19; page 6, lines 22 to 24 and 34 to 40 of the published A2 document the text of which is identical to that of the application as filed - all references herein to the application as filed thus being to the A2 publication).

The technical problem specifically addressed in the application as filed consists in the provision of an enzyme-containing oxidant bleach composition wherein a hydrolase, which is an enzyme commonly used in a detergent bleach composition (page 4, lines 11 to 13), has an improved resistance to degradation during storage in the presence of an oxidant bleach selected from alkali metal perborate, alkali metal percarbonate,

hydrogen peroxide adducts or mixtures thereof, with respect to an uncoated enzyme and has sufficient solubility in the washing liquor (see page 3, lines 8 to 14 and page 4, lines 48 to 50).

- 1.2 Document (1), considered by the Examining Division to represent the starting point for assessing inventive step, though relating to a similarly formulated technical problem (page 2, lines 47 to 49), deals explicitly only with the stability of hydrolytic enzymes in the presence of strong oxidant bleaches such as organic peroxyacids and hypochlorite (page 2, lines 42 to 43; page 3, lines 42 to 54 and page 4, lines 26 to 29) and not in the presence of inorganic bleaches such as perborate or percarbonate; therefore it does not qualify in the Board's view as a suitable starting point for discussing inventiveness of a granular composition comprising such inorganic bleaches.

On the contrary, and as the Appellant accepted at the oral proceedings, the Board considers a granular composition comprising a commercially available granulated or prilled enzyme (such as indicated on page 7, lines 45 to 47 of the present application) and an inorganic bleach of the perborate or percarbonate type and differing from the claimed subject-matter only insofar as the enzyme does not comprise the specific coating of claim 1, as the most suitable starting point for the assessment of inventive step.

Granulated or prilled enzymes were in fact considered in the prior art to have a satisfactory stability in the presence of weaker inorganic oxidants under normal conditions (see e.g. document (1), page 3, lines 42 to 48; document (2), page 2, lines 3 to 4 and document (3) page 2, lines 10 to 14 and document (4) page 167, first five lines below Figure 10 and

Figure 10, curve b) and to be more stable in the presence of inorganic bleaches than enzyme powders (see document (4), page 167, lines 1 to 2 and 6 to 7 below Figure 10 and Figure curve b vs. curve a).

Such a prior art composition is disclosed, for example, in the comparative embodiment of the illustrative example 12 of the present application (page 14, lines 4 to 15) which discloses a percarbonate based dry bleach comprising an uncoated Alcalase 2.0T or in document (4), a general textbook about detergents, which represents the common general knowledge of the skilled person at the priority date of the present application (see page 167, first four lines below Figure 10) and which discloses a heavy duty laundry detergent composition comprising a perborate bleach and a prilled enzyme.

Therefore this prior art has to be considered a more realistic starting point for the assessment of inventive step than document (1).

1.3

Taking into consideration the results of example 12 of the present application, showing an improved stability of Alcalase (a commercially available proteolytic enzyme), coated according to the present invention, in a granular composition comprising percarbonate with respect to an uncoated Alcalase (89% of the enzyme remaining after 4 weeks storage at 90 °F (about 32 °C) and 85% relative humidity and 73% after 24 weeks under the same conditions as against 72% and 58%, respectively, of the uncoated enzyme) the Board is convinced that the present application solved the underlying technical problem as defined above also under conditions of elevated temperature and humidity which increase enzyme denaturation (see page 8, lines 16 to 18 of the application).

2. *Evaluation of inventive step*

2.1 As already explained above in point 1.2, granulated or prilled enzymes were considered in the prior art to have a satisfactory stability in the presence of weaker inorganic oxidants under normal conditions; however, it was also known that this was not the case under harsh conditions of temperature and/or humidity as taught in document (3) (page 2, lines 10 to 17) and in document (4) (page 167, lines 5 and 6 below Figure 10 and Figure 10, curve d).

In particular Figure 10 of document (4) shows that a prilled enzyme, stable in the presence of perborate under normal conditions (slightly less than 100% stability after 8 weeks), is considerably denaturated under harsh conditions of e.g. 30°C and 50% relative humidity and, respectively, 15°C and 90% relative humidity (only 50% stability after 8 weeks).

Therefore, contrary to the Appellant's submissions (see point IV above), it was known to the skilled person at the priority date of the present application that inorganic bleaches like perborate or percarbonate were very aggressive to enzymes at least under harsh conditions of increased temperature and humidity and that therefore a need remained to improve the stability of enzymes in such type of compositions (see especially document (3), page 2, lines 18 to 22).

2.2.1 Document (1) relates to enzyme-containing oxidant bleach compositions, especially organic diperacid based bleaching products. Such compositions show improved enzyme stability during prolonged storage under harsh temperature and/or humidity conditions, while maintaining enzyme solubility (page 2, lines 42 to 46 and page 7, lines 47 to 49).

In order to provide increased enzyme stability during storage and sufficient enzyme solubility in aqueous media, the hydrolase used in document (1) is coated with a material such as sodium silicate, optionally in combination with sodium carbonate and/or with a protective agent such as transition metals or with a film-forming water-soluble polymer in conjunction with transition metals (see page 5, lines 53 to 57 and page 6, lines 6 to 13 and 18 to 21).

2.2.2 The teaching of this document, though concerned in particular with strong oxidants such as organic peracids, extends to any oxidant bleach (see page 2, lines 43 to 44 and 47 to 48 and page 3, lines 5 to 9; claim 7), and thus also encompasses inorganic peroxygen bleaches like perborate or percarbonate. This becomes even more evident from the passage on page 5, lines 3 to 4 of the description reading "... Such organic acids serve to dilute the diperacid, if present..." suggesting that other bleaches than the organic peracids were also considered in the framework of document (1).

2.2.3 Nor can the Board accept the Appellant's argument that a bleach like perborate should not be considered as an oxidant bleach according to the teaching of document (1) since it can be used in the enzymatic coating as a reducing agent (see claim 12 and page 6, line 15).

This optional embodiment implies the presence of acidic oxidant species (see page 6, lines 15 to 16), e.g. the above mentioned organic peracids, but need not be contemplated in the absence of such peracids, i.e. for other embodiments encompassed by the broadest teaching of this document as explained hereinabove.

Therefore, it was obvious for a skilled person in the light of the teaching of document (1) to try the type of coating suggested therein in compositions comprising the less aggressive inorganic bleaches like those of the known commercial products discussed in point 1.2 above with reasonable expectation of an improved stability of the enzymes even under harsh storage conditions.

2.2.4 Moreover, contrary to the Appellant's submissions, while additional costs resulting from the provision of an enzymatic coating may play a role in relation to economic considerations, this cannot amount to a technical prejudice against the application of the teaching of document (1) to weaker inorganic bleaches.

2.3 The Appellant stated also that such "weaker" inorganic oxidants would under harsh conditions, such as high temperatures, release highly oxidant species which were not less harmful to enzymes than the strong oxidants specifically addressed in document (1). This submission has not however been supported by any evidence and must, therefore, be disregarded as a mere allegation.

On the contrary, by comparing examples 6 and 12 of the present application, it appears that organic peracids as used in example 6 are much more aggressive than percarbonate as used in example 12. In fact, the uncoated enzyme maintained only 4% of its activity in the presence of peroxyacids and 72% in the presence of percarbonate after storage for four weeks at 90°F (about 32°C) and 85% relative humidity, i.e. under very harsh conditions.

The coated enzymes displayed similar stability against both oxidants, retaining 87% and 89% of their activity respectively.

In the Board's view these examples thus confirm it was common general knowledge at the priority date of the present application that inorganic bleaches such as perborate or percarbonate are less aggressive also under high temperature and high humidity conditions than organic peracids (see e.g. document (2), page 2, lines 3 to 6).

Thus, the skilled person applying that common general knowledge would have expected that the coating suggested in document (1) for enzyme protection would solve the technical problem defined in the patent application in suit and would thereby have arrived directly at the claimed solution.

2.4 The Board finds therefore the subject-matter of claim 1 lacks inventive step.

Since the subject-matter of claim 1 lacks inventive step there is no need to consider further the dependent claims.

Order

For these reasons it is decided that:

1. The appeal is dismissed.

The Registrar:

The Chairman:



G. Rauh



P. Krasa

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