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# D E C I S I O N
# of 9 February 2000

**Case Number:** T 0255/96 - 3.3.6

**Application Number:** 90915097.1

**Publication Number:** 0495836

**IPC:** C11D 3/386

**Language of the proceedings:** EN

**Title of invention:**
Dye transfer inhibition

**Patentee:**
NOVO NORDISK A/S, et al

**Opponent:**
Henkel Kommanditgesellschaft auf Aktien
Unilever N.V.

**Headword:**
Dye transfer/NOVO NORDISK

**Relevant legal provisions:**
EPC Art. 54(2)(3), 56, 123(2)(3)

**Keyword:**
"Novelty - yes (functionally defined technical feature acknowledged as distinguishing feature)"
"Inventive step - yes: process simplification with respect to prior art"

**Decisions cited:**
T 0666/89, T 0763/89

**Catchword:**

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Beschwerdekammern | Boards of Appeal | Chambres de recours

**Case Number:** T 0255/96 - 3.3.6

**D E C I S I O N**
**of the Technical Board of Appeal 3.3.6**
**of 9 February 2000**

**Appellant:** (Opponent 01)
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**Decision under appeal:** **Interlocutory decision of the Opposition Division of the European Patent Office posted 23 January 1996 concerning maintenance of European patent No. 0 495 836 in amended form.**

**Composition of the Board:**

**Chairman:** P. Krasa

**Members:** G. N. C. Raths
J. Van Moer

## Summary of Facts and Submissions

I. This appeal lies from the Opposition Division's decision maintaining in amended form European patent No. 0 495 836. In two notices of opposition, both based on lack of novelty and inventive step, the following documents had been submitted, inter alia:

(3) WO-A-8 909 813,

(4) Bumpus, J.A. et al., Biodegradation of Crystal Violet by the White Rot Fungus Phanerochaete chrysosporium, Applied and Environmental Microbiology, 54, 1988, 1143-1150,

(5) Jeffrey K. Glenn et al., Decolorization of Several polymeric Dyes by the Lignin-Degrading Basidiomycete Phanerochaete chrysosporium, Applied and Environmental Microbiology, 45, 1983, 1741-1747,

(6) Wolfgang Schreiber, Degradation of 3-hydroxyflavone by horse radish peroxidase, Biochemical and Biophysical Research Communications, 63, (2), 1975, 509-514,

(7) A. Ben Aziz, et al., Carotene-bleaching activities of lipoxygenase and heme proteins as studied by a direct spectrophotometric method, Phytochemistry, 10, 1971, 1445-1452,

(8) Bruce P. Wasserman et al., Effect of Hydrogen peroxide and Phenolic Compounds on Horseradish Peroxidase-Catalyzed Decolorization of Betalain

Pigments, Journal of Food Science, 49, 1984, 536-538,

(10) US-A-4 077 768.

II. Claims 1, 15 and 21 of the patent as maintained by the Opposition Division read:

"1. A process for inhibiting the transfer of a textile dye from dyed fabric to another fabric when said fabrics are washed and/or rinsed together in a wash liquor, characterized by comprising:
1)a) adding an enzyme exhibiting peroxidase activity to the wash liquor in which said fabrics are washed and/or rinsed, and
b) adding hydrogen peroxide, a hydrogen peroxide precursor, or an enzymatic system capable of generating hydrogen peroxide at the beginning of or during the washing and/or rinsing process,
or,
2) adding an enzyme exhibiting oxidase activity on phenolic compounds."

"15. A process for bleaching textile dyes in solution or dispersion, characterized by comprising adding to said solution or dispersion an enzyme exhibiting oxidase activity on phenolic compounds, and an additional oxidisable substrate."

"21. A bleaching agent for inhibiting the transfer of a textile dye from a dyed fabric to another fabric when said fabrics are washed and/or rinsed together in a wash liquor, characterized by comprising an enzyme exhibiting oxidase activity on phenolic compounds, in

the form of a non-dusting granulate, a stabilized liquid or a protected enzyme."

III. In its decision, the Opposition Division found that the subject-matter of the claims as maintained was novel in view of document (3) and inventive in view of documents (4),(5) and (10).

Both Appellants lodged an appeal against this decision.

IV. Appellant I (Opponent 01) argued in essence

- that document (5) concerning the decolorization of, inter alia, textile dyes like methylene blue, by Phanerochaete chrysosporium disclosed that dyes were decolorized by the ligninolytic activity which was a peroxidase activity of the microorganism;

- that document (4) disclosed the decolorization of crystal violet by lignin peroxidase of Phanerochaete chrysosporium which microorganism also exhibited oxidase activity. Supplemental glucose promoted degradation of crystal violet, possibly by serving as a substrate for glucose oxidase.

He concluded that the process of Claim 15 was anticipated by documents (4) or (5).

He further argued

- that document (7) disclosed the use of oxidases oxidizing phenolic substances; according to

documents (4) or (5) oxidases hindered the colouring of other fabrics in solutions, as the dyes are oxidized in the solution; it could be concluded from document (7) that this oxidative destruction of the dye would also take place under washing conditions.

He concluded

- that the subject-matter of Claim 1 and of Claim 21 as maintained by the Opposition Division were rendered obvious by the combined teaching of documents (7) and (4) or (7) and (5).

V. Appellant II (Opponent 02) argued

- that the process of bleaching fabric according to Claim 20 of document (3) comprised the use of an enzyme having peroxidase activity and of hydrogen peroxide; as the term "fabrics" would encompass "dyed fabrics", no difference could be seen between the subject-matter of Claim 1 of the patent in suit and that of Claim 20 of document (3),

- that, therefore, the subject-matter of Claim 1 would lack novelty;

- that peroxidases were structurally related to the compounds used in document (10) because they contained a haem group as prosthetic group,

- that documents (4) and (5) referred to peroxidases capable of decolorizing fabric dyes,

- that in view of documents (4),(5) and (10) the subject-matter of Claims (1), (15) and (21) lacked an inventive step.

VI. The Respondents (Proprietors) argued with respect to novelty

- that the stains referred to in document (3) resulting from blackcurrant juice, red wine and tea (page 12, lines 11 to 13; page 15, line 3; page 16, lines 6 to 8) could not be considered as being textile dyes,

- that the ligninolytic cultures of Phanerochaete chrysosporium disclosed in documents (4) and (5) had peroxidase activity whereas Claim 15 was limited to oxidase activity on phenolic compounds,

with respect to inventive step

- that document (10) required a controlled release of hydrogen peroxide which was not necessary in his invention,

- that there was no hint in document (10) to replace the specific iron porphin, haema chloride and iron phthalocyanine by an enzyme having peroxidase activity or an enzyme having oxidase activity on phenolic compounds,

- that documents (4) and (5) referred to dyestuffs which were no textile dyes,

- that document (8) which concerned stimulation by

phenolic compounds of peroxidase catalysed decolorization of betalain pigments failed to indicate that phenol improved the dye transfer inhibition.

VII. Oral proceedings took place on 9 February 2000.

The Appellants requested that the decision under appeal be set aside and that the European patent No. 0 185 243 be revoked.

The Respondents requested that the appeals be dismissed and that the patent be maintained with the claims according to a main request submitted during oral proceedings or, in the alternative, according to the first or second auxiliary moves submitted with letter of 11 February 1997. The claims of the main request differed from those of the patent as maintained by the Opposition Division in that "for said enzyme" was added at the end of Claim 15. At the end of the oral proceedings the Chairman announced the Board's decision.

## Reasons for the Decision

1. *Amendments (main request)*

The Board is satisfied that the claims of the main request meet the requirements of Articles 123 and 84 EPC. As no objections were raised in this respect, no detailed reasoning needs to be given.

2. *Novelty*

2.1 Claim 1

2.1.1 Article 54(3) EPC

Claim 1 of the patent in suit is directed to a process for inhibiting the transfer of a textile dye from a dyed fabric to another fabric by adding the agents as defined above to the wash liquor.

Therefore this process necessarily requires - one could say as a "starting material" - a fabric which was dyed with a textile dye. Thus, when evaluating novelty, the purpose of the claimed process for inhibiting the transfer of a textile dye from a dyed fabric to another fabric" is, in the circumstances of this case, not to be disregarded as a mere use aimed at, but is in fact a functionally defined technical feature of the process. It defines the particular fabric to be present in the claimed process.

Claim 20 of document (3), which is state of the art according to Article 54(3) EPC, is directed to a process for bleaching fabric comprising treating fabric with an enzyme having peroxidase activity in the presence of hydrogen peroxide.

This process contains no qualification in respect to fabric. Nor does document (3) contain any reference to fabric dyed with a textile dye.

Document (3) discloses a detergent additive comprising an enzyme having peroxidase activity in combination

with hydrogen peroxide, a hydrogen peroxide precursor or an enzymatic system capable of generating hydrogen peroxide (page 3, lines 4 to 9, and page 9, lines 22 to 32); said additive is capable of bleaching fabrics, in particular, stained fabrics: "As the peroxidase will generally show affinity for coloured substances present in the stain which act as substrates for the enzyme (these will typically be natural dyestuffs such as various polyphenols), bleaching will be targeted to the stains" (sentence bridging pages 3 and 4).

Thus, as far as document (3) refers to coloured fabric at all, it discloses only the treatment of fabric stained typically by natural dye stuffs.

The Appellants submitted that "fabric" means coloured and uncoloured fabric; consequently document (3) discloses a process in which dyed fabric is used and, therefore, anticipates the subject-matter of present Claim 1. The Board accepts that the generic term "fabric" embraces the sub-generic term "coloured fabric" which in turn encompasses "fabric dyed with a textile dye".

However, the mere fact that specific subject-matter is encompassed by the generic disclosure of a prior document without being therein designated as such will not destroy the novelty of the specific subject-matter (see T 763/89, point 2.5 of the Reasons for the Decision, not published in the OJ EPO). Decision T 666/89 which was referred to by the Appellants in support of their position, relates to overlapping ranges of parameters and is, in the Board's judgement, not applicable to the present case in which the

relationship of a generic term and a sub-generic term is at stake.

For the above reasons the Board concludes that the subject-matter of Claim 1 was not clearly and unambiguously derivable from document (3).

2.1.2 Article 54(1), (2) EPC

The Board is satisfied that the subject-matter of Claim 1 is not disclosed in any of the other citations on file. Since no objections based on any of these cited documents were raised in this respect finally, no detailed reasoning needs to be given.

2.1.3 It follows from the above that the subject-matter of Claim 1 is novel.

2.2 Claim 15 (main request)

The Board is satisfied that the subject-matter of Claim 15 is novel. Since after the addition of "for said enzyme" at the end of Claim 15 (see point VIII) the novelty objection was no longer maintained by the Appellants, no detailed reasons have to be given.

2.3 Claim 21 (main request)

The Board is satisfied that the subject-matter of Claim 21 is novel; since no objections based on any of the cited documents were raised in this respect, no detailed reasoning needs to be given.

3. *Inventive step (main request - Claim 1)*

3.1 Claim 1 of the patent in suit concerns a process for inhibiting the transfer of a textile dye from a dyed fabric to another fabric when said fabrics are washed and/or rinsed together in a wash liquor.

3.2 Document (10) disclosed a process for washing or bleaching textiles wherein the dye transfer is inhibited by the use of an oxidizing bleaching agent, e.g. hydrogen peroxide, together with a catalytic compound, such as iron porphin, haemin chloride or iron phtalocyanines (abstract and column 5, lines 1 to 2). Thus, the process disclosed in citation (10) differs from that of the patent in suit in the catalytic compound used.

3.3 The objective of document (10) is the same as that of the patent in suit.

3.4 Therefore, document (10) is taken by the Board as starting point for evaluating inventive step. According to document (10) dye transfer, i.e. staining of fabrics by dyes bleeding out from other fabrics, was inhibited by using a bleaching agent, i.e. a hydrogen peroxide releasing agent, together with a catalyst in the washing bath. The release of the bleaching agent should be at a rate not greater than that at which it was removed from the bath by reaction with substances in said bath. The release should be controlled so that the oxidising agent was introduced into solution throughout the period that dye transfer might take place (column 4, lines 54 to 63).

3.5 Therefore, with respect to document (10) the problem underlying the patent in suit was how to inhibit dye transfer without having to control the release of the bleaching agent.

3.6 Instead of a compound selected from iron porphin, haemin chloride or iron phthalocyanine according to document (10), an enzyme exhibiting peroxidase activity or, alternatively, an enzyme exhibiting oxidase activity on phenolic compounds is suggested to be used as catalyst according to the claimed solution of the existing technical problem.

In example 9 of the patent in suit, a swatch dyed with Congo Red as a model dye for azo textile dyes was washed together with a clean multi-swatch comprising six strips: triacetate, cotton, nylon, polyester, orlon and viscose rayon; the results show that dye transfer is not remedied by hydrogen peroxide alone, but significantly reduced by the peroxidase treatment without release control of the peroxide. Examples 6 to 8, 10 and 11 disclosing similar experiments corroborate these results.

The patent in suit further discloses that certain oxidases, i.e. enzymes exerting oxidase activity on phenolic compounds, display the same dye transfer inhibition as do peroxidases (page 2, lines 49 to 58 and page 3, lines 10 to 12). This statement was neither contested by the Appellants nor was any evidence to the contrary made available to the Board.

Therefore, the Board is satisfied that the claimed subject-matter solves the technical problem as defined

above.

3.7 It remains to be decided whether the use of peroxidase or oxidase as a catalyst according to the patent in suit involves an inventive step.

3.8 Opponent II argued that peroxidases were structurally related to the compounds used in document (10) because they contained a haem group as prosthetic group. As, further, documents (4) and (5) disclosed the degradation of the textile dyes crystal violet and methylene blue (document (4), page 1148, right hand column, lines 20 and 21; document (5), page 1745, sentence bridging the left column and the right hand column) respectively by lignin peroxidase in the presence of hydrogen peroxide, the skilled person would have replaced the porphyrin compounds known as catalysts from document (10) by enzymes having peroxidase activity.

Even, if this argument was accepted by the Board this would, at best, put the said porphyrin compounds and enzymes exhibiting peroxidase activity on the same footing, but would give the skilled person no hint that the existing technical problem (see point 3.5) could be solved by such a replacement.

Documents (6) and (7) cited by Opponent I relate to the peroxidase bleaching of 3-hydroxyflavone and of carotene, respectively (document (6), page 511, Figure 1; document (7), page 1445, abstract). They add nothing to the information already available from documents (4) and (5).

3.9 Under these circumstances, the Board concludes that the disclosure of documents (4), (5), (6), (7) and (10) either alone or in combination did not lead the skilled person to the solution of the existing technical problem as claimed in Claim 1.

Therefore, the subject-matter of Claim 1 involves an inventive step.

4. *Inventive step (main request - Claim 15)*

4.1 Claim 15 is directed to a process for bleaching textile dyes in solution comprising the addition of an enzyme having oxidase activity on phenolic compounds and an additional oxidisable substrate for the said enzyme.

4.2 Document (5) deals with the use of Phanerochaete chrysosporium for waste water treatment in dye related industries. The Board takes this document as starting point for evaluating inventive step since it discloses that many dyes such as methylene blue or methyl red are degraded by ligninolytic cultures of said organism (page 1745, sentence bridging left and right columns, right column, lines 1 to 3).

4.3 The problem underlying the subject-matter of Claim 15 was therefore to find a further process for degrading textile dyes in solution.

4.4 According to Claim 15, textile dyes in solution are bleached by enzymes having oxidase activity on phenolic compounds together with an oxidisable substrate for said enzyme.

4.5 In example 5 of the patent in suit solutions of Congo Red and Acid Blue 45 were treated with laccase. The difference in absorbance relative to a solution without enzyme was measured after an incubation time of 16 hours.

The objection raised by Appellant II against the duration of 16 hours is not accepted by the Board since such periods of time are acceptable in the field of waste water treatment. The Board is satisfied that the problem is solved.

4.6 It remains to be decided whether the process according to Claim 15 involves an inventive step.

Since the decolorising effect was ascribed in document (5) to the ligninolytic activity of Phanaerochaete chrysosporium (see abstract) which activity was displayed by the lignin-degrading system consisting of a number of peroxidases (see document (4), page 1143, left hand column, last paragraph), the skilled person would rather have used such an enzyme exhibiting peroxidase activity to solve the said technical problem. The process according to Claim 15 comprises however enzymes having oxidase activity on phenolic compounds; this feature could not be derived from document (5). Therefore, the subject-matter of Claim 15 involves an inventive step.

5. *Inventive step (main request - Claim 21)*

Claim 21 refers to a bleaching agent for inhibiting textile dye transfer during washing and/or rinsing which again comprises an enzyme exhibiting oxidase

activity on phenolic compounds. It is based on the same inventive concept as is Claim 1 and derives its patentability from that of the latter Claim.

6. *Inventive step (main request - Dependent Claims 2 to 14, 16 to 20 and 22)*

Claims 2 to 14 derive their patentability from that of Claim 1, Claims 16 to 20 from that of Claim 15 and Claim derives its patentability from that of Claim 21.

7. *Auxiliary requests*

The auxiliary requests have not to be dealt with since the claims of the main request are allowable.

## 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 with the order to maintain the patent in amended form with the following documents:

**Claims:** 1 to 22 submitted during oral proceedings (main request)

**Description:** (pages 1 to 24) received on 8 November 1995 as second auxiliary move.

The Registrar: The Chairman:

G. Rauh P. Krasa