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D E C I S I O N
of 13 December 2001

Case Number: T 0761/97 - 3.3.6

Application Number: 91907253.8

Publication Number: 0524220

IPC: D21C 9/00

Language of the proceedings: EN

Title of invention:
A pulping process using cellulase

Patentee:
Novozymes A/S

Opponent:
Ciba Spezialitätenchemie Holding AG
GENENCOR INTERNATIONAL INC.

Headword:
Pupling process/NOVOZYMES

Relevant legal provisions:
EPC Art. 123, 54, 56

Keyword:
"Novelty of a use claim (yes)"
"Inventive step (no) - application of a known enzymatic action with a reasonable expectation of its beneficial effect"

Decisions cited:
G 0010/91, T 1105/92

Catchword:
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Case Number: T 0761/97 - 3.3.6

D E C I S I O N
of the Technical Board of Appeal 3.3.6
of 13 December 2001

Appellant: (Opponent O2)
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-

Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 6 May 1997 rejecting the oppositions filed against European patent No. 0 524 220 pursuant to Article 102(2) EPC.

Composition of the Board:

Chairman: P. Krasa
Members: L. Li Voti
M.-B. Tardo-Dino

Summary of Facts and Submissions

I. The present appeal is from the decision of the Opposition Division to reject the oppositions against European patent No. 0 524 220 relating to a pulping process.

II. Two notices of opposition were filed against the patent, wherein Opponent 01 and the Appellant (Opponent 02) sought revocation of the patent on the grounds of Article 100(a) EPC, in particular because of an alleged lack of inventive step of the claimed subject-matter, and of Article 100(b) EPC.

The oppositions were based *inter alia* upon the following documents:

(1): JP-A-58231379 (English translation)

(2): EP-A-0262040

(4): Tappi Journal, June 1989, pages 187 to 191; Pommier et al. "Using enzymes to improve the process and the product quality in the recycled paper industry"

III. In its decision, the Opposition Division found that

- the open-ended range of pulp consistencies in Claim 1 was implicitly limited by the stiffness of the pulp and therefore the claimed invention was realizable throughout the claimed range of pulp consistencies;

- the claimed subject-matter was novel over document

(1) since this prior art, relating to the addition of a cellulase to a pulp of high consistency, taught only the use of the enzyme for saving energy in a following beating step and not for improving the drainage properties of the pulp;

- documents (2) and (4) taught the addition of cellulase to a low consistency diluted cellulose pulp in order to improve its drainability and did not suggest its addition to a high consistency pulp in a pulper;

- a pulper was primarily constructed for slushing the pulp and not for mixing additives into it;

- therefore the claimed invention and the patent in suit fulfilled the patentability requirements of the EPC.

IV. An appeal was filed against this decision.

Opponent 01 did not lodge an appeal and is thus a party as of right to the proceedings in accordance with Article 107 EPC, second sentence.

However, as communicated by letter, neither the Appellant nor Opponent 01 attended the oral proceedings which took place before the Board on 13 December 2001.

V. At the oral proceedings the Respondent (Patent Proprietor) filed a new main request.

The version of Claim 1 of this request for the following designated Contracting States AT, BE, CH, DK, ES, FR, GR, IT , LU, NL and SE reads as follows:

"1. Use of a cellulase in a pulping process for improving the drainage properties of the pulp, characterized by a pulp consistency above 8%."

The version for the designated Contracting States DE and GB further specifies in Claim 1 that the used cellulase is derived from a strain of Aspergillus, Trichoderma, Humicola or Bacillus.

The respective Claims 1 of these two versions are accompanied by dependent Claims 2 to 6 (version for DE and GB) and 2 to 7 (version for the other designated Contracting States), relating to particular embodiments of the use of Claim 1.

The Respondent also agreed during oral proceedings to discuss novelty of the claimed subject-matter in the light of the teaching of document (1).

VI. The Appellant's arguments submitted in writing can be summarized as follows:

- the teaching of the patent in suit would not allow the reader to produce the indicated effect, i.e. improved drainability, throughout the claimed range of pulp consistency levels;

- documents (2) and (4) already suggested the addition of cellulase to a cellulose pulp suspension for improving its drainability;

- the claims did not require the addition of the enzyme to a pulper;

- since the enzyme had necessarily to be in contact

with a pulp for a certain period of time in order to bring about its action, it was obvious for a skilled person to add the enzyme at any suitable early point during the stock preparation, e.g. in the pulper, and there did not exist any prejudice in the prior art against the addition of a cellulase to a pulp having a consistency of above 8%;

- consequently, the claimed subject-matter did not involve an inventive step.

VII. The Respondent's counter-arguments presented in writing and orally can be summarized as follows:

- the claimed use related to the improvement of the drainage properties of the treated pulp in comparison to a pulp not treated enzymatically;

- no evidence was brought by the Appellant that the claimed use was not realisable throughout the entire range of pulp consistencies encompassed by Claim 1 and, on the contrary, the indications contained in the patent in suit were sufficient for carrying out the invention successfully;

- document (1) disclosed the addition of cellulase to a high consistency pulp in order to save energy in the following beating step and not for improving the drainage properties of the pulp; therefore, this document did not disclose the claimed use;

- the general teaching of the prior art led to the addition of cellulase to a diluted pulp; in

particular document (4) contained a pointer in its Figure 4 for adding cellulase to a pulp consistency near 3% and suggested that no advantage had to be expected by adding the enzyme to a pulp having more than 8% consistency;

- therefore following the teaching of the prior art the skilled person would not have tried to add the enzyme to a pulp having a consistency of above 8% with a reasonable expectation of improving the drainage properties of the pulp.

VIII. The Appellant requested that the decision be set aside and the patent be revoked.

The Respondent requested that the patent be maintained on the basis of the claims of the request filed during oral proceedings.

IX. At the end of the oral proceedings, the chairman announced the decision of the Board.

Reasons for the Decision

1. *Procedural issues*

The only request, filed at the oral proceedings by the Respondent, was admitted to the proceedings by the Board.

This request was filed subsequently to a discussion upon the interpretation of Claim 1 as a precaution against a possible finding of lack of novelty in the light of document (1), which the Respondent accepted to

discuss at the oral proceedings (see point 4.1 below).

In the Board's view the amended claims consisted in the rewording of the granted process claims into use claims and amounted to a limitation to embodiments already contained in the original claims.

Therefore none of these amendments led to a substantial change in the subject-matter of the proceedings, which would have needed ample reconsideration by the Board or by the Appellant.

Since the Appellant that chose not to appear at the oral proceedings should have expected this kind of request, its consideration by the Board was moreover not prejudicial to its right to be heard.

Therefore, the Board finds that this request amounted to a fair attempt by the Respondent to defend its patent and did not delay the proceedings.

2. *Article 123 EPC*

The Board is satisfied that the claims of the request comply with the requirements of Article 123 EPC; since this request fails for other reasons, it is not necessary to give herein further details

3. *Interpretation of Claim 1 and sufficiency of disclosure*

3.1 The Respondent admitted at the oral proceedings that the wording "pulping process" in Claim 1 has to be construed as a "pulp manufacturing process" and that thus Claim 1 does not require the cellulase to be added to a specific point before or during the stock

preparation, e.g. in a pulper, but encompasses its addition at any suitable place during the pulp manufacture where the pulp consistency is above 8%.

The Board finds this interpretation of the claim to be in agreement with the description of the patent wherein the high consistency pulper is considered as a non-exclusive possibility for the addition of the cellulase: "the cellulase **can be added**...using any type of known high-consistency pulper" (page 3, lines 3 and 4).

The Board also finds that the range of pulp consistencies of Claim 1 is in fact not open ended but bears an implicit upper limit which is coincidental with the operability of the pulp, e.g. a limit of 20% as suggested in the patent in suit (page 2, line 25).

3.2 The patent in suit describes how the claimed invention can be performed and suggests means for allowing a sufficient contact time between the enzyme and the pulp (see page 3, lines 3 to 17). Moreover Example 1 shows that the treatment of a pulp having a consistency of above 8% leads to an improvement of its drainage properties.

The Board has also no reason to doubt that an improvement in drainability can be achieved by the addition of cellulase under appropriate conditions which could be easily selected by the skilled person making use of his technical knowledge of enzymes and paper stock processing.

The Respondent has furthermore not brought any evidence that the claimed use would not bring about the desired

effect throughout the claimed range of operable pulp consistencies.

Therefore the claimed invention is sufficiently disclosed in the patent in suit.

4. *Novelty*

4.1 Novelty of the claimed subject-matter was not contested by the Appellant and was not a ground for opposition.

As stated in G 10/91 (OJ EPO 1993, 420, point 1 of the opinion) a Board of appeal is not obliged to consider all the grounds of opposition referred to in Article 100 EPC, going beyond the grounds covered by the statement under Rule 55(c) EPC. Moreover new grounds can only be introduced into opposition appeal proceedings with the consent of the Patent Proprietor (point 3 of the opinion).

At the oral proceedings the Respondent accepted to discuss document (1) with regard to novelty.

4.2 Document (1) discloses a pulping process wherein cellulase is added to a pulp of consistency greater than 8% for permitting an energy saving in the subsequent beating step (passage bridging pages 2 and 3 and Example 1). Since this step is identical with that carried out in the patent in suit it could implicitly bring about an improvement of the drainage properties of the pulp, which properties are measured under diluted conditions and represent the drainability of the pulp upon the wire of the papermaking machine. Such drainage properties are commonly estimated, e.g., by means of the standardized Schopper-Riegler test (SR

values) or Canadian Freeness test (CSF values) wherein high values of SR and low values of CSF indicate a poor drainage (see page 2, lines 5 to 17 and 25 to 27 of the patent in suit).

However, as the Respondent pointed out, document (1) is silent about the further process steps which must still be carried out before draining on the wire of the papermaking machine; moreover other conventional steps carried out during the stock preparation such as mechanical refining could negatively influence the drainage properties of the pulp as shown in document (4) (Figure 7) and explained in document (2) (page 2, lines 9 to 10 and 17 to 19).

Therefore, an improvement of the drainage properties of the pulp would depend on all the steps carried out before draining, which steps are, however, not disclosed in document (1).

Therefore, the Board finds that document (1) does not implicitly disclose an improvement of the drainage properties of the pulp and the subject-matter of Claim 1 is thus novel over this document.

5. *Inventive step*

5.1 Most suitable starting point *and Technical problem*

The patent in suit, and in particular the subject-matter of claim 1, relates to the use of a cellulase in a high consistency pulp manufacturing process for improving the drainage properties of the cellulosic pulp, i.e. the capability of draining water from the pulp on the wire section of the papermaking machine. A

good drainability of the pulp is essential in a papermaking process for allowing a high capacity of the paper line (page 2, lines 12 and 13).

As admitted by all parties, documents (2) and (4), though dealing with the technical problem of improving the drainage properties of a cellulosic pulp, are explicitly concerned with a low consistency pulping process and thus do not require, in contrast to a high consistency pulping process, the use in the pulp manufacture of a high consistency pulper (see page 3, lines 3 and 4 of the patent in suit). These documents thus do not qualify as the most suitable starting point for the assessment of inventive step.

Moreover, document (1), though dealing with the treatment of a pulp having a consistency greater than 8%, copes with the different technical problem of saving energy in the beating step (page 2, lines 20 and 21), which has nothing in common with an improvement of the drainage properties of the pulp and which is a step not required in Clam 1 of the patent in suit. Therefore, the Board finds that this document is also not a suitable starting point for assessing inventive step.

Since a process of pulping at high consistency of above 8%, e.g. of up to 20%, was common in the prior art, as also acknowledged in the patent in suit (page 2, line 25), and this prior art differs from the process of the claimed subject-matter only insofar as no cellulase is added for improving the drainage properties of the pulp, such a process is found by the Board to represent the most technically realistic and logical starting point for assessing inventive step

(see T 1105/92, point 4.2 of the reasons for the decision, not published in the OJ EPO).

The patent in suit suggested the improvement of the drainability of the pulp in a high consistency pulping process as the underlying technical problem (page 2, lines 25 to 27 and 33 to 34).

In the light of the illustrative examples of the patent in suit, especially Example 1, the Board has no reason to doubt that this existing technical problem was effectively solved by the addition of a cellulase.

5.2 Evaluation of inventive step

The claimed subject-matter differs from the known high consistency pulping process insofar as a cellulase is added during the pulp manufacturing at a consistency of above 8% for improving the drainage properties of the pulp.

Document (2) generally describes the use of a cellulase for improving the drainage properties of a cellulosic pulp. Requirement for this improvement is the addition of the cellulase to a pulp having a freeness greater than 25 SR (page 2, lines 32 to 35 and 57 to 61 and claim 1) and a control of the contact time of the enzyme with the pulp (page 3, lines 14 to 16).

Even though according to the illustrative examples of this document the cellulase is added only to diluted pulps of up to 5% consistency, the technical teaching of document (2) is not limited to particular pulp consistencies. This document is instead silent about the influence of the pulp consistency on the

achievement of the described effect.

Considering that the disclosure of a document is not limited to the illustrative examples but includes the description and the claims, the Board finds therefore that it was obvious for the skilled person, following the teaching of this document, to try to add the enzyme to the commonly used high consistency pulp manufacturing process, e.g. at an early stage of or before the stock preparation when the pulp is still at a consistency of above 8%; provided that the treated pulp had an SR value above 25 and that the contact time of the enzyme was controlled as suggested in document (2), the skilled person would have also expected therewith an improvement of the drainability of the pulp.

In this respect the Respondent did not submit that there existed any prejudice against the addition of an enzyme to a pulp of higher consistency (see the decision under appeal, point 6.2).

Moreover as explained hereinabove under point 3.1, Claim 1 does not require the addition of the cellulase to a high consistency pulper but just requires that it is added at any possible point during the preparation of the pulp provided the consistency is greater than 8%. Therefore, the finding of the first instance that a skilled person would not have added the cellulase to a high consistency pulper which is a machine for separating the fibres and not for adding other chemicals is not relevant for the assessment of inventive step and does not need to be evaluated by the Board.

The Respondent has argued that document (4), reporting the effect of cellulase on pulp processing for improving the drainability of the cellulosic pulp and referring to document (2) (page 187, abstract and page 190, first six lines below the heading "Discussion") suggested an optimum action of the cellulase for a pulp having 3% consistency (see page 189, middle column, paragraphs below the heading "Pulp consistency" and Figure 4 as well as page 191, left column, second full paragraph below the heading "Conclusions"). The experiment showing the dependency of the freeness gain, i.e. of the improved drainage properties, on pulp consistencies within the range of 1 to 5% consistency (Figure 4) shows a peak around 3% consistency and a decreasing slope up to 5%, which, if extrapolated, would lead to 0% increase at about 8% consistency. Therefore, the skilled person would have expected the freeness gain to decrease further above 5% consistency and to disappear around and above 8% consistency. For these reasons he would have not been motivated to apply the teaching of document (2) to a high consistency pulping process for improving the drainage properties of the pulp with a reasonable expectation of success.

The Board finds, however, that the experimental results of this Figure 4 are limited to certain specific process conditions and concern only the tested range of 1 to 5% consistency. Moreover, these results should not be interpreted independently from the other experimental data furnished in document (4). For example, Figure 2 shows that the initial freeness of the pulp has also a strong impact upon the freeness gain, a greater gain being achieved by using a pulp of lower CSF initial freeness (see page 189, left column,

paragraphs below the heading "Influence of initial freeness"). Therefore, taking these results into account, a repetition of the experiment of Figure 4 with a pulp having a lower CSF initial freeness would shift the curve of Figure 4 towards greater freeness gains; in this case, even accepting that the optimum improvement would be achieved at 3% pulp consistency and that the freeness gain would decrease towards 5%, an increase would still have to be reasonably expected at higher consistencies of above 8%, since a simple extrapolation would still lead to a positive freeness gain.

Therefore, in the Board's view, even when taking into account the teaching of document (4) the skilled person would have applied the teaching of document (2) to a pulp of high SR initial freeness (corresponding to a low CSF initial freeness as explained under point 4.2 above) as suggested in this document independently of its consistency and would have expected an improvement of the pulp drainability also with a pulp of above 8% consistency.

Therefore it was obvious for the skilled person to add a cellulase to a high consistency pulp for solving the existing technical problem as defined in point 5.1 above.

The claimed subject-matter is found thus to lack inventive step.

5.3 The arguments put forward hereinabove apply also to the claims for GB and DE, since some of the particular enzymes of this Claim 1 had already been used according to document (2) to improve the drainage properties of

cellulosic pulps, e.g. a cellulase derived from a strain of Trichoderma (Example 1) or Aspergillus (Example 6), and the other selected enzyme species do not bring about any unexpected advantage with respect to those already known and used according to document (2).

Therefore also the subject-matter of this Claim 1 lacks an inventive step.

Order

For these reasons it is decided that:

1. The decision is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

G. Rauh P. Krasa