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Datasheet for the decision of 6 October 2020

Case Number: T 1897/18 - 3.3.06

Application Number: 10178151.6

Publication Number: 2264137

IPC: C11D3/386, C11D3/37

Language of the proceedings: EN

Title of invention:
A laundry detergent composition comprising glycosyl hydrolase

Patent Proprietor:
The Procter & Gamble Company

Opponents:
Novozymes A/S
Henkel AG & Co. KGaA

Headword:
Glycosyl hydrolase and random graft copolymer /PROCTER & GAMBLE

Relevant legal provisions:
EPC Art. 56, 83

Keyword:
Sufficiency of disclosure - (yes)
Inventive step - (yes) : unexpected improvement shown - burden of proof on the respondents/opponents

Decisions cited:
T 0848/04, T 2579/11

Catchword:

Europäisches Patentamt
European Patent Office
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Beschwerdekammern

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Case Number: T 1897/18 - 3.3.06

D E C I S I O N
of Technical Board of Appeal 3.3.06
of 6 October 2020

Appellant: (Patent Proprietor)	The Procter & Gamble Company IP Department One Procter & Gamble Plaza Cincinnati, OH 45202 (US)
Representative:	Russell, Tim Venner Shipley LLP 200 Aldersgate London EC1A 4HD (GB)
Respondent 1: (Opponent 1)	Novozymes A/S Krogshøjvej 36 2880 Bagsværd (DK)
Representative:	Potter Clarkson The Belgrave Centre Talbot Street Nottingham NG1 5GG (GB)
Respondent 2: (Opponent 2)	Henkel AG & Co. KGaA Henkelstrasse 67 40589 Düsseldorf (DE)
Representative:	Henkel AG & Co. KGaA CLI (Patente) 40191 Düsseldorf (DE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 25 May 2018 maintaining European Patent No. 2264137 in amended form.**

Composition of the Board:

Chairman	J.-M. Schwaller
Members:	L. Li Voti
	C. Heath

Summary of Facts and Submissions

I. The appeal of the patent proprietor (the appellant) is against the decision of the Opposition Division to maintain European patent n° 2 264 137 in amended form on the basis of auxiliary request 8 filed during oral proceedings on 20 April 2018.

II. With its statement of grounds the patent proprietor defended the patent as granted and filed six sets of amended claims as auxiliary requests 1 to 6.

III. In their replies both respondents raised objections under articles 123(2), 54, 56 and 83 EPC and requested inter alia that auxiliary requests 1 and 5 be not admitted into the appeal proceedings. In particular they maintained that the claimed subject-matter lacked inventive step over the combination of **D1** (US 2007/0281879 A1) or **D22** (EP 1 876 227 A1) with **D9** (WO 01/062903 A1), or the combination of D1, D9 and **D23** (Appendix 1, Supplementary results dated 30 June 2005 and filed in case EP 01 905 635.7).

IV. The following documents were also referred to inter alia by the parties:

D3: Declaration of Lars Anderson dated 9 November 2016
D6: Declaration of Bernard Henrissat dated 7 November 2016;
D7: Technical report and submissions of P&G during examination proceedings, dated 15 June 2011;
D37: A. Ariza et al., "*Structure and Activity of Paenibacillus polymyxa Xyloglucanase from Glycoside Hydrolase Family 44*", THE JOURNAL OF BIOLOGICAL

CHEMISTRY, vol. 286, no. 39, pages 33890-33900, September 30, 2011;
D42: B. Henrissat, "*A classification of glycosyl hydrolases based on amino acid sequence similarities*", Biochem. J. (1991) 280, 309-316;
D43: Extracts from http://www.cazy.org, 06.02.2019, relating to glycosyl hydrolase families 5, 12, 44 and 74.

V. Following the board's preliminary opinion respondent 2 declared not willing to attend oral proceedings but maintained its request to dismiss the appeal.

VI. During the oral proceedings, which were held in the absence of both respondents, the appellant withdrew its main request and auxiliary requests 1 to 5.

VII. The final requests of the parties were established as follows:

The appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of auxiliary request 6 filed with the letter dated 4 October 2018.

Both respondents requested in writing that the appeal be dismissed.

VIII. Claim 1 according to auxiliary request 6 reads as follows:

"*1. A laundry detergent composition comprising:*
(i) a glycosyl hydrolase having enzymatic activity towards both xyloglucan and amorphous cellulose substrates, wherein the glycosyl hydrolase belongs to GH family 44;

(ii) a random graft co-polymer comprising:
(a) hydrophilic backbone comprising monomers selected from the group consisting of: alkoxy units; and
(b) hydrophobic side chain(s) selected from the group consisting of: vinyl ester of a saturated C_1-C_6 mono-carboxylic acid; and
(iii) detersive surfactant."

Dependent claims 2 to 10 relate to particular embodiments of the composition of claim 1 and claim 11 relates to a method of laundering including the step of contacting a liquid laundry detergent composition according to claims 1-10 with water to form a wash liquor.

Reasons for the Decision

1. Sufficiency of disclosure (Article 83 EPC)

As respondent 2, who was the only one to raise this objection, did not reply to the provisional opinion, the board has no reason to depart therefrom.

1.1 In particular, the description of the patent (page 5, lines 51-52 and examples) and the corresponding passages of the application as filed clearly identify some of the specific glycerol hydrolase enzyme(s) (in the following **GH(s)**) which comply with the requirements of claim 1 at issue, namely the GH family 44 GHs from *Paenibacillus polyxyma* (wild-type), such as XYG1006 described in WO 01/062903 or variants thereof, and the XYG1006 enzyme according to SEQ ID: 1.

1.2 Moreover, it is undisputed that at the priority date of the patent the skilled person was able to determine

whether or not an enzyme was active towards the specific substrates defined in claim 1 at issue. This is confirmed by the cited prior art, for example document **D8** (WO 99/02663 A1), which illustrates (page 3, lines 1-32) known GHs having both activities towards xyloglucan and amorphous cellulose.

1.3 Therefore the skilled person was able, by following the teaching of the description and using common general knowledge, to prepare - i.e by merely mixing the ingredients - a laundry detergent composition comprising i) the required GH enzyme, ii) the random graft copolymer and iii) the detersive surfactant as defined in claim 1.

1.4 Even though the examples of the patent concern only one GH enzyme according to claim 1 at issue, there is no reason to believe that the skilled person was not able to find without undue burden further GH enzymes belonging to family 44 and having the required activities.

1.5 The board therefore concludes, in the absence of evidence to the contrary, that the disclosure of the patent allows the person skilled in the art to carry out the invention in the whole range claimed and complies with the requirements indicated in established jurisprudence (see Case Law of the Boards of Appeal of the EPO, 9th edition 2019, II.C.5.2-5.4, pages 355-358 and II.C.7.1.2, pages 372-373).

1.6 The claimed invention thus complies with the requirements of article 83 EPC and the ground under Article 100(b) EPC does not prejudice the maintenance of the patent.

2. Added matter (Article 123(2) EPC) and novelty (Article 54 EPC)

As the respondents did not substantiate any specific objection under these articles, the board does not see any particular reason to diverge from its preliminary opinion that the claims of this request comply with the requirements of article 123(2) EPC and are novel over the cited prior art.

3. Inventive step (Article 56 EPC)

3.1 The invention as defined in claim 1 concerns a laundry detergent composition comprising i) a glycosyl hydrolase belonging to family 44 and having enzymatic activity towards both xyloglucan and amorphous cellulose substrates, ii) a specified random graft copolymer and iii) detersive surfactants.

3.2 The purpose of the patent in suit (paragraphs [0001], [0004], [0007] and [0008]) is the provision of a compacted laundry detergent composition which though containing a minor amount of surfactants does not suffer from a loss in fabric cleaning performance and shows a significant improvement in cotton soil release profile, whiteness maintenance profile and dingy cleaning performance.

3.3 There was common ground among the parties that document D1 was the starting point for evaluating inventive step. In particular, example 5 (formulations I, II, III or IV) of D1 was considered to represent the closest prior art. Since the compositions therein described (paragraphs [0005] and [0022]) comprise surfactant levels similar to those disclosed in the patent in suit

and provide excellent removal of oily stains the board has no reason to take a different stance.

3.3.1 Respondent 2 cited D22 as an alternative starting point for the evaluation of inventive step. However, in reply to the board's provisional opinion that this document was less relevant than D1, it only reiterated its objection based on D1 as the closest prior art. Since the arguments submitted on the basis of D22 were substantially the same as those provided starting from D1, the board sees no need to further discuss D22.

3.4 It is not in dispute that the closest prior art (D1/ example 5) differs from the subject-matter of claim 1 at issue only in that it does not comprise a family 44 GH enzyme having enzymatic activity towards both xyloglucan and amorphous cellulose substrates.

3.5 The appellant submitted that the technical problem underlying the invention starting from this prior art was to provide a laundry detergent composition showing unexpected improved whiteness performance.

3.5.1 The board notes that D7 reports whiteness performance values measured on white cotton fabrics soiled with carbon black and vegetable oils and washed with a laundry detergent composition. The results show that such a detergent composition comprising a combination of a variant of the GH enzyme XYG 1006 belonging to family 44 with the copolymer defined in claim 1 has a significant higher whiteness performance on various types of cotton than similar compositions comprising the same amounts of either the enzyme or the copolymer. D7 even shows that doubling the amounts of enzyme or copolymer does not lead to any significant further improvement in whiteness performance.

3.5.2 Respondent 1 objected to that the GH enzyme used was not characterised in detail in D7, let alone that it was a GH enzyme according to claim 1 at issue. Therefore the results in the experimental report D7 should be disregarded as decided in case **T 2579/11** (reasons, points 2.5.1 and 2.5.2, and Case Law of the Boards of Appeal of the EPO, 9th edition 2019, I.D.4.1, page 189).

3.5.3 The board disagrees with the respondent in this respect because the enzyme used is clearly defined in D7 as being a variant of the XYG1006 enzyme disclosed in US 2004/0266642 (of **GH family 44**), and thus corresponds to the class of enzymes described in the patent (page 5, lines 51-52), namely "GH family 44 glycosyl hydrolases from *Paenibacillus polyxyma* (wild-type) such as **XYG1006** are described in WO01/062903 **or are variants thereof**". Moreover, the patent proprietor confirmed at the oral proceedings before the opposition division that the enzyme used was **Whitezyme** supplied by Novozymes, i.e. an enzyme according to claim 1 at issue. This statement was also accepted in the decision under appeal. The burden of proof that the GH enzyme used in D7 is not one according to claim 1 at issue is thus clearly on the respondent's side. In the absence of contrary evidence, the board has thus no reason to believe that the GH enzyme used in D7 is not in accordance with claim 1 at issue. The board therefore cannot accept the respondent's conclusion that the results of D7 are not verifiable and should be disregarded.

3.5.4 For the board, even though D7 concerns only a single GH enzyme according to claim 1, this experimental report clearly confirms what is stated in the patent in suit (paragraph [0008]) and in the corresponding part of the original application, namely that the combination of

such an enzyme with the chosen copolymer provides significant improvement in whiteness performance. Therefore, even though the application as filed did not comprise any comparative tests supporting the efficiency of the claimed combination, D7 confirms the original teaching and is thus to be accepted and considered (Case Law of the Boards of Appeal of the EPO, 9th edition 2019, I.D.4.6, pages 195-197).

3.5.5 Respondent 2, referring to D6 or D42, argued that other enzyme(s) belonging to the family GH 44, though having similar specific structural characteristics and amino acid sequences might have a much lower activity, with the consequence that similar improvements in whiteness might not be obtained.

For the board, this assertion is purely speculative and even though the GH family 44 of claim 1 at issue includes a growing number of enzymes, with some of them being still unknown or not classified at the priority date of the patent (as shown by comparing the relevant excerpts from http://www.cazy.org contained in D3 and D43) the claim at issue is definitely limited to those GH enzymes belonging to family 44 which have enzymatic activity towards both xyloglucan and amorphous cellulose.

Also the postpublished article D37 - which discloses the structure and activity of the GH family 44 enzymes from *Paenibacillus polyxima*, i.e. those used in the examples of the patent in suit and tested in D7 - states (page 33890, left column, last paragraph; page 33891, left column, lines 13-19 below figure 1; and page 33893, right column, first paragraph below heading "RESULTS AND DISCUSSION") that **only two structures** of the family 44 GH enzyme reported sofar had been found

to be "bifunctional glucanase-xylanases" and that the enzyme from *Paenibacillus polyxima* discussed in the article has an atypical specificity against xyloglucan and amorphous cellulose.

Therefore, the class of enzymes of claim 1 at issue having specificity against xyloglucan and amorphous cellulose includes definitely a very limited number of GHs.

For the board, contrary to what was stated in the decision under appeal, it is thus plausible, in the absence of contrary evidence, that the effect shown in D7 is also to be expected by using other GH enzymes falling under the wording of claim 1 at issue.

3.5.6 Even though the experimental report D7 does not provide a direct comparison with the closest prior art, it is credible that the incorporation of a GH enzyme according to claim 1 into the compositions of the closest prior art would provide a similar significant improvement in whiteness, since the compositions of the closest prior art already contain a polymer similar to that used in D7.

As regards the decision **T 848/04** cited by the respondents, this concerned a case in which the achievement of a synergistic effect between a lipase and an amine was obtained by using specific ratios of the two components (points 2.6-2.8 of the reasons); the present case however concerns instead an improved effect obtained by the addition of the GH enzyme of claim 1 at issue to the composition of the closest prior art and thus this is a different issue. The above cited decision is therefore not relevant to the present case.

3.5.7 Respondent 2 also objected to that the requested patent monopoly was not justified by the actual contribution to the art.

3.5.8 For the board, since the patent teaches that the combination of specific GH family 44 enzymes and polymer provides benefits in terms of significant whiteness improvement, and since the range of GH family 44 enzymes having the required dual activity is very limited, this argument cannot be accepted either.

3.5.9 The burden of proof to show that such a significant whiteness improvement has not been credibly obtained throughout the entire breadth of claim 1 lies thus on the opponents (see Case Law of the Boards of Appeal of the EPO, 9th edition 2019, point 5.2.1 pages 775-776) and cannot simply be shifted to the patent proprietor, as decided by the opposition division.

3.5.10 Since the respondents did not provide any evidence in this respect, they have not discharged their burden of proof that the technical problem of providing an unexpected improved whiteness performance was not solved over the entire breadth of the claimed subject-matter.

3.5.11 The board thus agrees with the appellant that the technical problem underlying the invention is to be formulated as the provision of a further laundry detergent composition providing an unexpected improvement in whiteness performance and that the technical problem posed has been convincingly solved by means of the laundry detergent composition of claim 1.

3.6 It remains thus to be evaluated if it was obvious for the skilled person to incorporate a GH family 44 enzyme

having activity towards xyloglucan and amorphous cellulose into the compositions of the closest prior art D1 with the expectation of providing a composition showing a significant increase in whiteness performance.

3.6.1 D1 (paragraph [0049]) suggests that further enzymes, such as xyloglucanases, can be added to the compositions disclosed therein; however, it does not contain any teaching that would lead the skilled person to try the specific glycosyl hydrolase of family 44 of claim 1 at issue in order to improve significantly whiteness. D1 (paragraph [0005]) only teaches that the grease cleaning polymer chosen (which may correspond to the random graft copolymer of claim 1 at issue), in addition to be helpful in removing oily stains, reduces the viscosity of the liquid components but D1 does not contain any explicit indication of components especially suitable for improving whiteness.

Therefore, the skilled person faced with the technical problem posed would have rather looked for possible components known to improve whiteness among the long list of detergent adjunct materials disclosed in paragraphs [0036] - [0058], and so he would not have found in D1 any incitation to incorporate a xyloglucanase in the compositions of example 5 with the expectation of significantly improving whiteness.

3.6.2 As regards D9, this document discloses xyloglucanases complying with the requirements of claim 1 at issue, like XYG1006 (see example 3), as well as detergent compositions comprising such an enzyme (see example 4) and D9 further teaches (page 3, lines 22-26; page 5, lines 18-22) that such compositions show excellent performance especially for removing or bleaching

specific soils resulting from xyloglucan-containing food or plants.

For the board, even though the skilled person could have tried to incorporate such enzymes in the laundry detergent composition of D1 because of their known xyloglucanase activity, he would not have done so with the expectation of obtaining the desired significant improvement in whiteness performance.

Therefore, starting from the closest prior art, the skilled person would have considered the enzymes of D1 to be a possible solution to the posed technical problem only with previous knowledge of the claimed invention, i.e. retrospectively.

3.6.3 As regards the experimental report D23, this contains some comparative tests including a comparison of the enzyme XYG 1006 (according to claim 1 at issue) with Endolase®, which is a GH and one of the cellulases possibly used according to the closest prior art, i.e. in the absence of the copolymer of claim 1 at issue.

The board however notes that in D23 a great part of the experimental results are concealed and do not allow a full assessment of its relevance. Furthermore D23 explicitly indicates in its first paragraph (below heading "Iron-oxide post-staining"), that **post-staining was required** for visualising the xyloglucanase effect (i.e. the effect of XYG1006) since **the difference in whiteness** after washing was **too low** (only about 1 unit was measured). Therefore, it must be concluded that D23 actually shows that under normal washing conditions **no significant improvement of the whiteness** is obtained just by replacing one of the cellulases used in the closest prior art with a GH enzyme according to claim 1

at issue. D23 thus does not provide any hint that the GH of claim 1 would provide significant improved whiteness when added to a composition comprising a random graft copolymer according to claim 1 at issue.

Therefore, the skilled person would also have considered D23 only with previous knowledge of the claimed invention, i.e. retrospectively.

3.7 For the board, it follows from the above considerations that the subject-matter of claim 1, and of claim 2 to to 11 which depend thereon, was not obvious to the skilled person from the known prior art, with the consequence that the ground under Article 100(a)/56 EPC does not prejudice the maintenance of the patent in an amended form.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the department of first instance with the order to maintain the patent on the basis of claims 1-11 according to Auxiliary Request 6 as filed with letter dated 4 October 2018 and a description to be adapted thereto.

The Registrar: The Chairman:

A. Pinna J.-M. Schwaller

Decision electronically authenticated