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**Datasheet for the decision
of 28 March 2019**

Case Number: T 0797/17 - 3.3.07

Application Number: 09796394.6

Publication Number: 2370051

IPC: A61K8/73, A61Q5/02, A61Q19/10,
C11D3/22, C11D17/00

Language of the proceedings: EN

Title of invention:
STRUCTURED AQUEOUS DETERGENT COMPOSITIONS

Patent Proprietor:
Unilever PLC
Unilever N.V.

Opponents:
THE PROCTER & GAMBLE COMPANY
Colgate-Palmolive Company

Headword:
Detergent compositions/ P&G

Relevant legal provisions:
EPC Art. 123(2), 100(b), 56

Keyword:

Amendments - allowable (yes)

Grounds for opposition - insufficiency of disclosure (no)

Inventive step - (yes)



Beschwerdekammern

Boards of Appeal

Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0
Fax +49 (0)89 2399-4465

Case Number: T 0797/17 - 3.3.07

D E C I S I O N
of Technical Board of Appeal 3.3.07
of 28 March 2019

Appellant: THE PROCTER & GAMBLE COMPANY
(Opponent 1) One Procter & Gamble Plaza
Cincinnati, Ohio 45202 (US)

Representative: Gill Jennings & Every LLP
The Broadgate Tower
20 Primrose Street
London EC2A 2ES (GB)

Respondent: Unilever PLC
(Patent Proprietor 1) a company registered in England and Wales
under company no. 41424
Unilever House
100 Victoria Embankment
London
Greater London EC4Y 0DY (GB)

Respondent: Unilever N.V.
(Patent Proprietor 2) Weena 455
3013 AL Rotterdam (NL)

Representative: Whaley, Christopher
Unilever Patent Group
Colworth House
Sharnbrook
Bedford MK44 1LQ (GB)

Party as of right: Colgate-Palmolive Company
(Opponent 2) 300 Park Avenue
New York NY 10022 (US)

Representative: Jenkins, Peter David
Page White & Farrer
Bedford House

John Street
London WC1N 2BF (GB)

Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 25 January 2017
rejecting the opposition filed against European
patent No. 2370051 pursuant to Article 101(2)
EPC.**

Composition of the Board:

Chairman J. Riolo
Members: A. Usuelli
 C. Schmidt

Summary of Facts and Submissions

- I. European patent No. 2 370 051, based on European patent application No. 09796394.6, was granted on the basis of 11 claims.

Independent claim 1 read as follows:

"1. A structured aqueous detergent composition comprising modified cellulose and surfactant characterised in that the composition comprises:

- a) 0.2 to 10 wt %, preferably 0.4 to 7 wt%, anionic surfactant or zwitterionic surfactant or mixtures thereof,
- b) 0.5 to 5 wt %, preferably 1 to 2 wt%, dispersed modified cellulose biopolymer, wherein the modification consists of the cellulose having its C6 primary alcohols oxidised to carboxyl moieties (acid/COOH-) on 10 to 70% of the glucose units and substantially all the remainder of the C6 positions occupied by unmodified primary alcohols,
- c) 0 to 10 wt % non-surfactant electrolyte;
- d) 0 to 15 wt% other conventional detergent composition additives
- e) water."

Independent claim 9 of the patent related to a process for preparing the composition of claim 1.

- II. Two oppositions were filed against the patent on the grounds that its subject-matter lacked novelty and inventive step, was insufficiently disclosed and extended beyond the content of the original application. The documents cited during the opposition proceedings included the following:

D1: WO 99/57158
D5: US 5,437,810
D6: US 2,589,190
D8: EP 1566390
D14: US 2003/0083491

III. In its decision posted on 25 January 2017 the opposition division rejected the oppositions. The opposition division came *inter alia* to the following conclusions:

- (a) In claim 1, the deletion of the word "balance" before the word "water" did not infringe Article 123(2) EPC.
- (b) Methods for making a selective partial oxidation of primary alcohol groups of cellulose were generally known in the art and they were disclosed for instance in D1, D8 and D14. Thus, the skilled person was able to prepare the modified dispersed cellulose biopolymer defined in claim 1. Hence, the requirement of sufficiency of disclosure was met.
- (c) The subject matter of the main request involved an inventive step starting from D5 as the closest prior art and having regard to the teaching of the other relevant documents.

IV. Opponent-1 (the appellant) filed an appeal against that decision. The following document was submitted by the appellant with the statement setting out the grounds of appeal:

D20: Experimental report

- V. In its reply filed on 11 October 2017 the patent-proprietor (the respondent) requested the dismissal of the appeal and filed six auxiliary requests.
- VI. In a communication pursuant to Article 15(1) RPBA the Board expressed the opinion that the patent met the requirement of Article 123(2) EPC and was sufficiently disclosed. It also considered that the patent involved an inventive step starting with D18 as the closest prior art document.
- VII. In a letter of 28 January 2019, the respondent filed six new auxiliary requests replacing the previous auxiliary requests. It also submitted the following documents:
- AD2: Declaration of Ms Scott of 27 January 2019
AD3: Experimental report on structuring effects of oxidised cellulose nanofibrils with sodium dodecyl sulphate in water
- VIII. Oral proceedings were held on 28 March 2019. They were not attended by opponent-2, who had informed the Board accordingly.
- IX. The appellant's arguments can be summarised as follows:
(a) Article 123(2) EPC

In claim 1 as filed, item (e) was "balance water". Given the amounts of the other components, the term "balance" implicitly required at least 60% water to be present. This implicit limitation was no longer present in claim 1 as granted due to the deletion of the term "balance". Hence, the requirement of Article 123(2) EPC was not met. The expression "the composition comprises"

did not indicate that other components could be present in the composition as argued by the respondent. This expression merely referred to the additional additives that were part of component (d). No other substances in addition to the components listed in the claim were present in the composition. Thus, the maximum amounts of components (a) to (d) in original claim 1 implied that component (e), i.e. water, was present in an amount of at least 60%.

(b) Sufficiency

The description of the patent did not provide any evidence that the modified cellulose biopolymers prepared in the examples did not contain any -CHO groups and were oxidized only at position 6, as required by claim 1. In paragraph [0036] of the patent it was simply assumed that all the oxidation took place at position 6. However, in the technical declaration AD2 filed by the respondent it was admitted that some oxidation occurred at positions 2 and 3. Furthermore, several prior art documents such as D1, D8 and D14 pointed out the difficulties of performing a selective oxidation of cellulose. Hence, the skilled person would not have been able to prepare the modified cellulose derivatives defined by feature b) of claim 1.

(c) Inventive step

Document D18 was the closest prior art. This document disclosed microfibrinous cellulose which could be used to provide suspensions of particulates in thickened systems, in particular detergents. The composition of the patent differed from those of D18 only in that a modified cellulose was used. The technical problem was to provide an alternative detergent composition.

Document D8 disclosed modified carbohydrates for use as rheology modifiers. D6 described salts of oxidised cellulose derivatives to enhance the detergent characteristics of detergents compositions. The skilled person would have arrived at the composition of the patent in suit by combining the teachings of D18 with D8 or D6. Moreover, the scope of claim 1 was very broad and also included compositions that did not have the desired rheology and were therefore useless. This was another reason why the subject-matter of claim 1 lacked inventive step.

X. The respondent's arguments can be summarised as follows:

(a) Article 123(2) EPC

Claim 1 as filed provided an open definition of the compositions in view of the term "comprising". Accordingly, other substances could be present in addition to components (a) to (e) and the claim did not imply the presence of at least 60% water as argued by the appellant. Hence, the deletion of the term "balance" did not result in addition of subject-matter.

(b) Sufficiency of disclosure

Paragraph [0071] provided detailed information of how to carry out the selective oxidation of cellulose. It specified in particular the amounts of NaOCl and NaBr to be used. Table 1 showed that the oxidation system used allowed the preparation of a modified cellulose biopolymer as defined in claim 1 of the patent. D8 and D14 did not relate precisely to the same type of oxidation described in the patent. The TEMPO oxidation system used for preparing the modified cellulose

derivatives was a general process that could be adapted to achieve the degree of oxidation required. AD2 confirmed the possibility of using the TEMPO oxidation system to perform a selective oxidation at position 6.

(c) Inventive step

D8 related to the preparation of fibres or paper products. This was in a very remote field. The skilled person would have never considered combining the teaching of this document with the teaching of the closest prior art D18. Moreover, there was no mention of cellulose derivatives in D8. The carbohydrates disclosed in this document were mainly water soluble starch derivatives. In contrast to this, the modified cellulose according to claim 1 was insoluble. Furthermore, the amount of surfactants in the compositions of D18 was above 32% whereas the compositions of D8 did not contain any surfactant. Thus, by combining the teaching of these documents the skilled person would not have obtained a composition with 0.2% to 10% surfactant as required by claim 1 of the patent. Hence, claim 1 of the patent met the requirements of inventive step.

- XI. The appellant requested that the decision under appeal be set aside and that the patent be revoked.

- XII. The respondent requested that the appeal be dismissed or that the patent be maintained on the basis of one of the six auxiliary requests filed on 28 January 2019.

Reasons for the Decision

Main request (patent as granted)

1. Article 123(2) EPC
 - 1.1 According to the appellant, the deletion in claim 1 of the term "balance" before the term "water" infringes Article 123(2) EPC. This conclusion is based on the argument that, with regard to the amounts of the components (a) to (d), the term "balance" in original claim 1 implicitly required the presence of at least 60% water. Due to the amendment made in claim 1 this implicit limitation is removed.
 - 1.2 The Board agrees with the respondent that claim 1 as originally filed did not imply the presence of at least 60% water as argued by the appellant because the composition was defined as comprising components a) to e). Hence, the claim did not exclude the presence of components other than a) to e). It follows that in claim 1 as filed the amount of water could be less than 60%.
 - 1.3 During the oral proceedings the appellant argued that the expression "the composition comprises" in the original claim 1 referred to the possibility of including other conventional additives in the composition. However, these additives were part of component (d) that was present in an amount of 0 to 15%. Thus, the composition did not include any other substance in addition to components (a) to (e).

This argument is unconvincing in the Board's view. In claim 1 as filed, as well as in claim 1 as granted, the

expression "the composition comprises" is followed by the listing of the components (a) to (e). This indicates that in addition to these components the composition may include other substances. Hence, these optional substances are not part of component (d).

1.4 On this basis the Board concludes that claim 1 meets the requirements of Article 123(2) EPC.

2. Sufficiency of disclosure

2.1 The appellant's objection of insufficiency of disclosure is based on the argument that the skilled person would not be able to prepare the modified cellulose biopolymer defined in claim 1 of the patent (component (b)).

2.2 The Board notes that according to claim 1 said modified cellulose is characterised by the fact that the primary alcohol groups at position 6 are oxidised to carboxyl moiety on 10 to 70% of the glucose units and substantially all the remaining units are occupied at the same position by unmodified primary alcohols. Furthermore, since claim 1 indicates that the "modification consists" in the oxidation of the alcohol groups at position 6, the alcohol groups at positions 2 and 3 are not transformed during the oxidation.

Thus, to obtain this product, it is necessary to transform the cellulose starting material by means of an oxidation process that needs to have the following features:

(a) It should selectively oxidise the alcohol groups at positions 6 of the glucose units, i.e. it should

not result in the oxidation of the secondary alcohols at positions 2 and 3, and

(b) It should oxidise the primary alcohol groups at position 6 to carboxyl moieties on 10 to 70% of the glucose units, the other primary alcohol groups remaining unmodified ("...substantially all the remainder of the C6 positions occupied by unmodified primary alcohols..."). This requirement implies that substantially no aldehyde moieties are formed at position 6 during the oxidation.

2.3 According to the description (paragraphs [0030] to [0035]) the modified cellulose biopolymer of claim 1 can be prepared by a TEMPO mediated oxidation of cellulose. This method is used for the preparation of the modified celluloses #1 to #8 (see [0071]). The appellant essentially argues that the TEMPO mediated oxidation would not have the features (a) and (b) described above and therefore it would not be suitable for the preparation of the modified cellulose biopolymer of claim 1.

2.4 The TEMPO mediated oxidation is known in the art, as explained in paragraph [0030] of the patent. The characteristics of this oxidation system are described in several prior art documents. It follows from the teachings of D1 (see page 1, lines 1 to 3 and page 2, lines 15 to 29), D8 (see [0013]) and D14 (see [0071]) that the TEMPO mediated oxidation can be used for the selective oxidation of primary alcohols initially to aldehydes and then to the corresponding acids. The second oxidation (from aldehyde to acid) is faster than the first one (from alcohol to aldehyde) (see D1, page 2, lines 15 to 18). The relative amounts of aldehyde and carboxy groups can be controlled (see D8, [0013]).

2.4.1 The indication that the TEMPO catalyst allows the selective oxidation of the primary alcohols means that the secondary alcohols groups at positions 2 and 3 of the glucose units are not oxidised. This is in line with the statement made by Ms Scott in her declaration (document AD2), according to which under the conditions described in the patent in suit "C(2)/C(3) oxidation is negligible" (last sentence of page 1). The term "negligible" indicates that any amount of by-product formed (i.e. C(2)/C(3) oxidation) is so small that it can be disregarded. The Board does not agree with the appellant's argument that the presence of negligible amounts of by-products would be excluded by claim 1 since the wording "the modification **consists** of the cellulose having its C6 primary alcohols oxidised to carboxyl moieties..." is used (emphasis added). The skilled person in the field of chemical processes knows that the absolute absence of by-products is merely an ideal situation that can never be guaranteed in real life. They would therefore rule out an overly strict interpretation of claim 1 which goes against technical common sense.

Furthermore, as discussed in paragraph 2.4.2 below, the experimental data reported in Table 1 of the patent indicate that in the preparation of samples 1 to 8 no oxidation occurs at positions 2 and 3 of the glucose units.

It follows from these considerations that the TEMPO mediated oxidation fulfils the requirement (a) of paragraph 2.2 above.

2.4.2 The fact that the oxidation from aldehyde to acid is faster than the oxidation from alcohol to aldehyde (see

point 2.4 above) signifies that once some aldehyde groups are formed, then the oxidating system will preferentially transform these aldehyde groups into carboxy moieties rather than forming further aldehyde groups from the alcohol moieties . This normally results in the presence of reduced amounts of aldehyde groups. Furthermore, as indicated in D8 the TEMPO mediated oxidation makes it possible to control the relative amounts of aldehyde and carboxy groups. In the patent in suit this control is achieved by carrying out the reaction with a TEMPO catalyst in combination with NaOCl as an oxidating agent and NaBr (paragraph [0030] to [0035]). This oxidative system is used in examples 1 to 8 of the patent. The data reported in Table 1 show that the modified cellulose samples obtained in these examples contain an amount of carboxy units which substantially corresponds to the theoretical maximum amount calculated on the basis of the number of moles of oxidating agent used (i.e. NaOCl). This means that substantially all the oxidating agent has been consumed in the oxidation of primary alcohols to carboxy moieties. In other words the "side reactions", i.e. the formation of aldehyde groups or the oxidation of secondary alcohols at positions 2 and 3, did not occur.

The appellant did not submit any evidence to show that the specific TEMPO mediated oxidation system described in the patent cannot be used to oxidise primary alcohol groups to carboxy groups without forming any significant amount of aldehyde moieties. Nor is there any prior art document to cast doubt on the effectiveness of this oxidation system in producing carboxy groups from primary alcohol groups.

Thus, the TEMPO mediated oxidation described in the patent also fulfils requirement (b) of paragraph 2.2 above.

2.5 It follows from the considerations set out above that the patent meets the requirement of sufficiency of disclosure.

3. Inventive step

3.1 The patent in suit addresses the problem of providing a structurant agent for aqueous detergent compositions that makes it possible to reduce the level of surfactants whilst maintaining the ability to provide compositions of the required rheological profile (see [0014]).

3.2 Closest prior art

3.2.1 A similar problem is addressed by document D18, which concerns the problem of providing detergent compositions of adequate thickness (see paragraphs [0001] to [0004]). This document is the closest prior art for the assessment of inventive step.

3.2.2 In the compositions of D18 microfibrinous cellulose (MFC) is used to provide a surfactant thickened system (see [0004]). The surfactant concentration in the compositions ranges from 5% to 50% (see [0007]). In the composition exemplified in Table 1 the amount of anionic or zwitterionic surfactant exceeds 30% (w/w) of the composition.

The compositions of claim 1 of the patent differ from the compositions of D18 by the presence of a modified cellulose biopolymer (feature b)) and by the amount of

anionic or zwitterionic surfactant, namely 0.2 to 10% (w/w) (feature (a)).

3.3 Technical problem

- 3.3.1 Table 2 of the patent and Tables 3 and 4 of the experimental report AD3 show that combinations of a modified cellulose biopolymer with minor amounts of anionic or zwitterionic surfactant provides a gelled material. In the respondent's opinion, these experiments demonstrate the thickening properties of the modified cellulose biopolymer and indicate that this product can be used as a structuring agent that makes it possible to reduce the amounts of surfactants.

The appellant considers instead that there is no evidence that any thickening behaviour which has been demonstrated in specific examples may exist for the entire range of compositions covered by claim 1. In this regard it refers to document D20 showing that certain combinations of anionic surfactant and modified cellulose biopolymer result in compositions of poor viscosity. In its view, the technical problem underlying the invention is therefore to be seen in the mere provision of an alternative detergent composition.

- 3.3.2 As the conclusion has been reached that an inventive step is present (see points 3.4.1 to 3.4.4 below), even assuming in the appellant's favour that there is no evidence for the technical effects claimed by the respondent, there is no need to investigate the experimental data on file further.

The Board therefore examines inventive step based on the assumption that the technical problem is the provision of an alternative detergent composition.

3.4 Obviousness

3.4.1 The main argument of the appellant is that the skilled person would find the suggestion to modify the compositions of D18 by including a modified cellulose biopolymer as defined in claim 1 of the patent in document D8.

3.4.2 The Board notes that document D8 relates to compositions containing a combination of a (poly)amine and a particular carboxylated carbohydrate. These compositions are used as coatings, inks, adhesives and in the preparation of fibres or paper products (see [0001]). Thus, D8 belongs to a remote technical field and the skilled person faced with the problem of providing a detergent composition would have no reason to consider this document.

Moreover, there is no mention of cellulose as an example of a carbohydrate anywhere in D8. The carboxylated carbohydrates disclosed in this document include glucans, especially α -glucans such as starch, starch components or starch variants (see [0007]). These carboxylated carbohydrates are partly or fully soluble in water (see ([0007]) whereas the modified cellulose biopolymer according to the patent in suit is insoluble (see [0037]).

Finally, the compositions of D8 do not contain any surfactant whereas the sole composition disclosed in D18 contains at least 30 wt% surfactant, i.e. an amount well beyond the upper limit of the range recited in claim 1 of the patent (0.2 to 10 wt%). Thus, the combined teachings of D18 and D8 do not suggest the amount of surfactants defined in claim 1 of the patent.

3.4.3 In light of the above considerations the Board concludes that the patent is inventive over the combination of D18 and D8.

3.4.4 In its written submissions, the appellant also contested inventive step also on the basis of a combination of D18 and D6. This line of attack was no longer pursued at the oral proceedings.

The Board notes that document D6 describes salts of oxidised cellulose derivatives which are useful as components of detergent compositions (see column 1, lines 33 to 40). Contrary to the modified cellulose biopolymers of the opposed patent, the products of D6 are in the form of salts and are soluble in water (column 3, lines 4 to 7). The detergent compositions of D6 are mainly in solid form (see column 6, lines 37 to 38) whereas the patent relates to aqueous compositions. The Board considers that the skilled person would have no reason to incorporate the oxidised cellulose derivatives of D6 into the compositions of D18 and at the same time lower the amount of surfactants.

Hence, the subject-matter of the patent is also inventive over the combination of D18 and D6.

3.4.5 In the course of the oral proceedings the appellant also argued that the subject-matter of claim 1 was so broad that it also included compositions which are useless as detergent compositions.

This argument fails to convince the Board due to the fact that claim 1 is limited to "aqueous detergent compositions". Hence, compositions that do not have detergent properties are excluded from the claim.

Furthermore, the only experimental data relied upon by the appellant to support its position are those disclosed in D20. As discussed above, these data concern the viscosity of selected compositions included in claim 1 characterised by the fact that they contain very small concentrations of surfactants and modified cellulose. However, if for the sake of argument it is accepted that some compositions included in claim 1 may not have the desired level of viscosity, this does not imply that they cannot be used as detergent compositions. There appears to be no indication in any of the prior art documents that a minimum level of viscosity is necessary in order to render a composition useful as detergent composition.

- 3.5 The Board therefore concludes that the subject-matter of the main request meets the requirement of inventive step.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



B. Atienza Vivancos

J. Riolo

Decision electronically authenticated