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File Number: T 242/90 - 3.3.1

Application No.: 82 201 171.4

Publication No.: 0 075 995

Title of invention: Detergent compositions containing mixtures of
alkylpolysaccharide and nonionic surfactants

Classification: C 11 D 3/22

D E C I S I O N
of 10 December 1991

Proprietor of the patent: THE PROCTER & GAMBLE COMPANY

Opponents: Hüls Aktiengesellschaft
Henkel KG a A
BASF AG
Staley Continental, Inc.

Headword: Alkylpolyglucoside Procter

EPC Articles 54 and 56

Keyword: "Novelty (affirmed)"
"Inventive step (denied)"

Headnote



Case Number : T 242/90 - 3.3.1

D E C I S I O N
of the Technical Board of Appeal 3.3.1
of 10 December 1991

Appellant : Hüls Aktiengesellschaft
(Opponent) Postfach 1320
W - 4370 Marl 1 (DE)

Appellant : Henkel
(Opponent) Kommanditgesellschaft auf Aktien
TFP/Patente
Postfach 1100
Henkelstrasse 67
W - 4000 Düsseldorf 1 (DE)

Other party: BASF Aktiengesellschaft, Ludwigshafen
(Opponent) -Patentabteilung - C6-
Carl-Bosch-Strasse 38
W - 6700 Ludwigshafen (DE)

Other party: Staley Continental, Inc.
(Opponent) 1 Continental Towers
1701 Golf Road
Rolling Meadows, Illinois 60008 (US)

Representative: ter Meer, Nicolaus, Dipl.-Chem. Dr.
Patentanwälte
ter Meer, Müller, Steinmeister
Mauerkircherstrasse 45
W - 8000 München 80 (DE)

Respondent: THE PROCTER & GAMBLE COMPANY
(Proprietor of the patent) 301 East Sixth Street
Cincinnati, Ohio 45202 (US)

Representative : Lawrence, Peter Robin Broughton
GILL JENNINGS & EVERY
53-64 Chancery Lane
London WC2A 1HN (GB)

Decision under appeal : Interlocutory decision of Opposition Division of
the European Patent Office of 30 November 1989,
posted on 9 February 1990, concerning maintenance
of European patent No. 0 075 995 in amended
form.

Composition of the Board :

Chairman : K.J.A. Jahn
Members : R.W. Andrews
J.-C. Saisset

Summary of Facts and Submissions

- I. European patent No. 0 075 995 in respect of European patent application No. 82 201 171.4, which was filed on 22 September 1982, was granted on 20 May 1987 (cf. Bulletin 87/21).
- II. Notices of opposition, which were filed on 3 February, 17 February, 18 February (duly confirmed telex) and 19 February 1988, requested the revocation of the patent on grounds of insufficiency and lack of novelty and inventive step. The oppositions were supported, inter alia, by the following documents:
- (1) US-A-3 983 078
 - (2) US-A-4 147 652
 - (9) Technical Bulletin, Triton CG-110 (Rohm & Haas) and
 - (14) EP-A-0 070 074.

During the course of the opposition and appeal proceedings the following documents were referred to:

- (27) DE-B2-2 412 839 and
- (35) The Journal of the American Oil Chemists' Society, Volume 47, pages 162 to 167, 1970.

- III. By a decision delivered orally on 30 November 1989, with the corresponding interlocutory decision being issued on 9 February 1990, the Opposition Division maintained the patent on the basis of Claims 1 to 8 filed on 23 October 1989 and Claim 9 as amended in the course of the oral proceedings.

The Opposition Division held that the disclosure of the invention was sufficient and that the claimed subject-matter was novel.

The Opposition Division also decided that the subject-matter of the amended claims involved an inventive step since there was no suggestion in the cited prior art that the use of the specified alkylpolyglucosides in combination with ethoxylated alcohols would result in improved detergency for a variety of fabric types. Furthermore, in the Opposition Division's opinion, even if it would have been obvious to combine a non-ionic ethoxylated alcohol surfactant with an alkylpolyglucoside, it would not have been obvious to select from all the possible alkylpolyglucosides the ones specified in Claim 1.

IV. Appeals were lodged against the decision by Opponents 01 and 02 on 20 March and 29 March 1990 respectively with payment of the prescribed fees. Statements of grounds of appeal were filed on 9 and 12 June 1990. In these statements and further submissions filed on 22 October and 13 November 1991 and during the oral proceedings held on 10 December 1991, at which both the Appellants and Respondent were represented, the Appellants essentially put forward the following arguments.

Opponent 01 contended that, in the assessment of inventive step, documents other than those relating to laundry detergent compositions must be taken into consideration, since the skilled person must be considered to have knowledge of all areas in the detergency field.

This Appellant also argued that it is possible to derive the claimed compositions from the disclosure of

document (2) taken by itself or combined with that of document (9).

Appellant 02 maintained that the closest prior art was document (1) or (27) both of which relate to optimised laundry detergent compositions containing mixtures of non-ionic surfactants. In this Appellant's opinion, the combination of the disclosure of either of those documents with that of document (3) and that of document (6) or (35) rendered the subject-matter of the disputed patent obvious.

This Appellant also considered that the restriction of the alkylpolyglucosides to the ones specified in the present Claim 1 was arbitrary and of no technical significance.

Both Appellants denied that the specified alkylpolyglucosides could be considered to represent a selection in the manner suggested by the Opposition Division. In the absence of any selection the claimed compositions represented a non-inventive aggregation of known components.

- V. The Respondent contended that the object of the invention was to provide improved detergent compositions which give good detergency for all types of soils for a variety of fabric types. Although the Respondent admitted that the claimed compositions did not provide excellent detergency in all circumstances, he insisted that they had the virtue of avoiding bad results for any particular soil and/or fabric. This property is essential for a commercial laundry detergent composition.

The Respondent also submitted that the disclosures of Triton CG-110 and Triton BG-10 and the numerous vague and generic disclosures of vast ranges of alkylpolyglucosides

and other sugar-based surfactants did not provide any information that would have been relevant to the laundry detergent formulator and that there was nothing in the cited prior art to suggest that the defined compositions containing the defined materials would have the surprising properties that are disclosed in the patent in suit.

According to the Respondent, document (35) represented very relevant prior art. Although he admitted that some of the alkylpolyglucosides disclosed in this document were identical to those covered by the patent in suit, he argued that there was no incentive to combine them with non-ionic surfactants. In the Respondent's opinion, since there was no reason to make the claimed laundry detergent compositions, the compositions were inherently inventive, and it was not necessary to rely on a synergistic effect. Nevertheless, the examples in the disputed patent and the late filed experimental evidence clearly demonstrated a synergistic effect for the combination of alkylpolyglucosides and non-ionic surfactants.

VI. The Appellants requested that the decision under appeal be set aside and that the patent be revoked. The Respondent requested that the patent be maintained on the basis of the claims in accordance with the main or the three auxiliary requests as filed during the oral proceedings.

Claims 1 and 4 of the main request read as follows:

"1. A laundry detergent composition containing

B. from 1% to 90% by weight of a non-ionic detergent surfactant of the formula $R^n(OC_2H_4)_nOH$, wherein R^n is a primary or secondary alkyl chain of from 8 to 22 carbon atoms and n is an average of from 2 to 12

C. from 0 to 90% by weight of a detergency builder, characterised in that the composition includes

A. 1% to 90% by weight of an alkylpolyglucoside detergent surfactant of the formula $R^2O(C_nH_{2n}O)_y$ (glucosyl) x , wherein R^2 is alkyl having 12 to 18 carbon atoms, x is 1 1/2 to 3, n is 2 or 3, y is from 0 to 10, and the weight ratio of A:B is 1:10 to 10:1.

4. The process of cleaning mixed hydrophobic and hydrophilic fabrics in an aqueous detergent solution containing from 0.01% to 1% by weight of the detergent composition of any preceding claim."

Claims 1 and 3 of the second auxiliary request are identical with these claims except that the weight ratio of A:B is 1:3 to 3:1.

Claim 1 in accordance with the first and third auxiliary requests is directed to the use of 1% to 90% by weight of the alkylpolyglucoside as defined in Claim 1 of the main request in a laundry detergent composition containing from 1 to 90% by weight of the non-ionic detergent surfactant as defined in Claim 1 of the main request and 0 to 90% by weight of a detergency builder for improving cleaning of a variety of fabric types wherein the weight ratios of alkylpolyglucoside to non-ionic surfactant are 1:10 to 10:1 and 1:3 to 3:1 respectively.

Claims 4 and 3 of these requests relate to a process of cleaning mixed hydrophobic and hydrophilic fabrics in an aqueous detergent solution containing 0.01% to 1% by weight of the detergent composition defined in any preceding claim.

VII. At the conclusion of the oral proceedings, the Board's decision to revoke the patent was announced.

Reasons for the Decision

1. The appeal is admissible.
2. There are no formal objections under Article 123 EPC to any of the present statements of claims. Thus, Claim 1 of the main or first auxiliary request is based on Claims 1 and 2 as filed and granted in combination with page 3, lines 6 and 7 of the published patent application (cf. also page 3, lines 6 and 7 of the printed patent specification). Support for the cleaning of a variety of fabric types in the first and third auxiliary requests is to be found on page 1; line 27 of the published patent application and page 2, line 22 of the printed patent specification.

Claims 2 to 4 of the main or first auxiliary request correspond respectively to Claims 5, 9 and 10 as filed and granted Claims 3 to 5.

The restriction of the weight ratio of A:B to 1:3 to 3:1 in Claim 1 of the second and third auxiliary requests finds a basis in Claim 5 as filed and granted Claim 3. Claims 2 and 3 in accordance with these requests correspond to Claims 9 and 10 as filed and Claims 4 and 5 as granted.

3. The disputed patent relates to a laundry detergent composition containing an alkylpolyglucoside of the specified formula as one of the surfactant ingredients.
 - 3.1 Appellant O1 considered document (2) to be highly

relevant. This document discloses a liquid cleaning concentrate consisting of from about 10% to about 35% by weight of alkali metal hydroxide, from about 0% to about 50% by weight of a non-ionic surfactant containing a polyoxyethylene group, from about 0% to about 50% by weight of an alkylglucoside or a glycidyl ether of an alcohol having 12 to 24 carbon atoms or an alkyl phenol, the balance being water, with the proviso that the total amount of non-ionic surfactant and the alkylglucoside or glycidyl ether be in the range of about 10% to about 50% by weight (cf. Claim 1). According to column 3, lines 11 to 25 the alkylglucoside can be represented by the formula ROG_nH , wherein G is a glycosyl radical, R is an alkyl radical having 6 to 16 carbon atoms and n varies between 1 and 10, the compound comprising a mixture of n values, the average of which will be less than 5.

According to page 7, lines 7 to 10 of the disputed patent the present compositions may contain other adjunct components in their conventional art-established levels for use (i.e. from 0 to about 90%) such as sodium hydroxide as a pH adjusting agent. From this it is clear that the level of sodium hydroxide in the present laundry detergent composition would be well below that of those prior art compositions. Therefore, this document does not qualify as the closest prior art.

3.2 In the Board's judgement, document (35), which was acknowledged by the Respondent as being highly relevant, represents the closest state of the art. This document discloses solid and liquid laundry detergent compositions containing alkylpolyglucosides, some of which fall under the formula specified in Claim 1 in accordance with all the Respondent's requests. In addition to 15% alkylpolyglucoside, the solid formulations consist of 35% sodium triphosphate, 10% sodium metasilicate, 39% sodium

carbonate and 1% sodium carboxy methyl cellulose. The liquid compositions contain 15% alkylpolyglucoside, 35% tetrapotassium pyrophosphate, 1% sodium carboxy methyl cellulose and 49% distilled water (cf. Table X on page 165).

In the light of this closest prior art, the technical problem underlying the patent in suit is to be seen in providing a laundry detergent composition containing an alkylpolyglucoside having good detergency for a variety of soils and fabric types, i.e. a product suitable for commercial exploitation.

According to the disputed patent, this technical problem is solved by a laundry detergent composition containing an alkylpolyglucoside of the specified formula and a polyethoxylated alcohol non-ionic surfactant of the defined formula. In accordance with the main and second auxiliary requests the weight ratios of alkylpolyglucoside to polyethoxylated alcohol are 1:10 to 10:1 and 1:3 to 3:1 respectively.

In view of Examples I to V and VII to IX of the disputed patent and the results of the experimental report submitted by the Respondent on 19 November 1991, the Board is satisfied that it is plausible that this technical problem has been solved.

- 3.3 Both Appellants alleged that the technical affect would not be obtained throughout the whole range of the weight ratio of 1:10 to 10:1. However, in the absence of any evidence to support this allegation, the Board finds, in accordance with the Board's established jurisprudence relating to the onus of proof in appeals against decisions of the Opposition Division, in favour of the Respondent (Patentee) in this respect.

4. After examination of the cited prior art, the Board has concluded that the subject-matter as claimed in accordance with all the Respondent's requests is novel.

In the Board's judgment, document (14), which pursuant to Article 54(3) and (4) EPC is comprised in the state of the art, is not prejudicial to the novelty of the subject-matter of the disputed patent, since there is no specific disclosure in this document of a laundry detergent composition comprising a mixture of present components A and B.

5. It still remains to be decided whether the subject-matter claimed in accordance with each of the Respondent's requests involves an inventive step.

5.1 Main and second auxiliary requests

According to document (35), higher alkylpolyglucosides are non-ionic surfactants which show good functionality in various applications, including detergents. They are good foamers with low surface tension, are compatible with inorganic builders, and are biodegradable (cf. Abstract on page 162).

Table X on page 165 of this document gives the results of tests carried out to determine the detergent effectiveness of solid and liquid formulations containing a number of alkylpolyglucosides as the sole surface active ingredient. The Respondent acknowledged that the compounds in this Table in which R is oxo-tridecyl and x is 2.2 and R is n-hexadecyl and x is 1.5 fall under the formula as defined in the present Claim 1.

From the results of these tests, the authors of this paper concluded that the solid formulations containing alkylpolyglucosides were equivalent in detergency to a commercial product (a linear alkylbenzenesulphonate) in soft water but, in hard water, their efficiency falls to about 85%. The authors expressed the opinion that adjustment of the formulation might improve this performance in hard water. With respect to the liquid formulations, the authors found that the alkylpolyglucosides perform excellently even in hard water (cf. the paragraph headed "Detergency" in the left-hand column of page 167).

Although the alkylpolyglucoside in which R is decyl and x is 2.3 gave the best results in both hard and soft water, the Board considers that this would not lead the skilled person to concentrate his attention on alkylpolyglucosides in which R is decyl, particularly since it is clear from Table X that increasing the length of the alkyl chain and varying the degree of polymerisation yielded similar degrees of detergency effectiveness. Moreover, the above-mentioned paragraph headed "Detergency" would provide the skilled person with the necessary incentive to further investigate these products with respect to their surfactant properties and laundry detergent formulations containing them.

- 5.2 It is common general knowledge that mixtures of surfactants with one another as well as with non-surface active builders and additives are the rule rather than the exception in most deterative formulations. Furthermore, it is also known that surfactants are mixed for the purpose of producing an effect not obtainable with any of the components taken separately (cf. for example, document (32), Surface Active Agents, Schwartz-Perry-Berch, Volume II, 1977, first four lines on page 318).

Therefore, commercial laundry detergent compositions normally contain more than one surfactant ingredient.

For example, this is illustrated in documents (1) and (27) where blends of surfactants are used in laundry detergent compositions. Thus, document (1) discloses granular detergent compositions comprising about 15% to about 40% by weight of a mixture of ethoxylated alcohol surfactants, from about 1% to about 20% by weight of anionic, semipolar or zwitterionic surfactant and from about 30% to about 70% of a detergency builder (cf. column 3, lines 3 to 27).

Similarly, document (27) discloses a laundry detergent composition containing 3 to 30% by weight of a mixture of surfactants consisting of 1 part by weight of non-ionic surface active compounds constituted by a mixture of ethoxylated alcohols of different degrees of ethoxylation and 0 to 3 parts by weight of an anionic surfactant, 15 to 60% by weight of water-insoluble alumino silicate (based on active substance), 2 to 45% by weight of a sequestering agent for calcium, 0 to 50% by weight of wash alkalies not capable of sequestration and 0 to 5% by weight of bleaches and other additives (cf. Claim 6).

Therefore, in the light of common general knowledge in this field as reflected in documents (1), (27) and (32) the skilled person wishing to modify the laundry detergent compositions disclosed in document (35) with the aim of providing compositions having good detergency for a variety of soils and fabric types would immediately consider blending the alkylpolyglucosides with other surfactants.

5.3 The skilled person would be even more encouraged to adopt this course of action by the disclosure of document (9). This document discloses that the alkylglucoside Triton CG-

110 is a low irritating non-ionic surfactant having good detergency and soil removal which is compatible with anionic, cationic, non-ionic and amphoteric materials (cf. page 1, especially points 3 and 4).

According to this document and the analysis of three samples of Triton CG-110 submitted by Appellant 02 on 22 October 1991 as document (36), the product contains about 35 to 41% by weight monoglucoside, about 30 to 40% oligoglucosides, less than 2% fatty alcohol and no butyl glucoside. The degree of polymerisation, (x), is about 1.5 to 1.7 and the alkyl group (R) is a 50:50 ratio of C₈ and C₁₀. Thus, the essential difference between the alkylpolyglucosides as defined in the disputed patent and Triton CG-100 lies in the length of the alkyl chain. Since this is the only essential difference, the skilled person would assume that the alkylpolyglucosides falling under the present definition would also be compatible with anionic, cationic, non-ionic and amphoteric surfactants.

Therefore, in the absence of any compatibility problems, it was obvious to solve the technical problem underlying the disputed patent by blending the alkylpolyglucoside surfactant with another surfactant.

- 5.4 In the Board's judgement, the use of an ethoxylated alcohol surfactant of the specified formula is also obvious, since it is well known that these products have favourable detergency properties, particularly at lower wash temperatures, and are standard components of modern detergents, present to greater or lesser extent in practically all detergent formulations. Thus, these products would be in the forefront of the skilled person's mind faced with the problem of selecting a surfactant to blend with the alkylpolyglucoside.

- 5.5 The determination of the weight ratio of alkylpolyglucoside to alcohol ethoxylate is a matter of routine experimentation which is well within the competence of the skilled person.
- 5.6 Therefore, the subject-matter of Claim 1 in accordance with the main or second auxiliary request does not involve an inventive step.
- 5.7 Dependent Claims 2 and 3 of the main request and Claim 2 of the second auxiliary request relate to preferred embodiments of the compositions according to Claim 1. It was not argued that these claims contain any independent inventive features and, lacking such features, they are unallowable in the absence of a corresponding allowable main claim.
- 5.8 Claim 4 of the main request and Claim 3 of the second auxiliary request relate to a process of cleaning mixed hydrophobic and hydrophilic fabrics using a solution of the present detergent composition. The use of aqueous solutions containing detergents at the specified concentration to wash textiles is standard procedure. Therefore, these claims merely represent the same teaching as the respective Claim 1 of each request expressed in a different manner and are also unallowable for lack of inventive step for the reasons set out above.
- 5.9 The fact that certain combinations of alkylpolyglucosides and ethoxylated alcohols demonstrate a small degree of synergism in certain circumstances cannot be regarded as an indication of the presence of an inventive step since it is common general knowledge that examples of synergism are quite commonly encountered in the detergent field (cf. document (31), Surface Active Agents, A.M. Schwartz and J.W. Perry; Volume 1, 1949, last two lines on page 372).

Therefore, the occurrence of a weak synergistic effect is not considered to be unexpected.

6. First and third auxiliary requests

6.1 Claim 1 in accordance with both those requests relate to the use of the specified alkylpolyglucosides in a laundry detergent composition containing an ethoxylated alcohol surfactant of the given formula and, optionally, a detergency builder for improving cleaning of a variety of fabric types.

The Respondent filed these claims in this particular form on the basis of the Enlarged Board of Appeal's decision G 2/88 (OJ EPO 1990, 93). However, the present case is distinguished from this earlier one insofar as the Enlarged Board's decision was solely concerned with the novelty of a claim directed to the use of a known compound for a particular purpose which is based on a technical effect, whereas in the present case the compositions involved are acknowledged to be novel (cf. paragraph 4 above).

6.2 In the Board's judgment, the closest prior art is still document (35) which discloses the use of alkylpolyglucosides falling within the present definition in laundry detergent compositions.

In the light of this prior art, the technical problem is to be seen in providing for the use of those alkylpolyglucosides in laundry detergent compositions suitable for commercial exploitation.

This technical problem is successfully solved by using the alkylpolyglucosides in a detergent composition containing the specified ethoxylated alcohol surfactant and, optionally, a detergency builder.

- 6.3 For the reasons given above in connection with the composition claims, the proposed solution to this technical problem is obvious.
- 6.4 Claims 2 and 3 and Claim 2 of the first and third auxiliary requests respectively, which relate to preferred embodiments, are, in the absence of independent inventive features, also unallowable.
- 6.5 Claim 4 and Claim 3 of the first and third auxiliary requests respectively are, in effect, identical to Claim 4 and Claim 3 of the main and second auxiliary requests (amendment of "composition in any preceding claim" to "composition as defined in any preceding claim"). Therefore, these claims are unallowable for the reasons given above in paragraph 5.8 in connection with the corresponding claims of the main and second auxiliary requests.
- 6.6 With respect to the Respondent's assertion of an improvement, it is pointed out that only those comparative tests are relevant in which compositions containing, as essential components, the alkylpolyglucosides of the closest prior art as represented by document (35) on the one hand and those comprising the alkylpolyglucosides in combination with ethoxylated fatty alcohols on the other hand are compared; i.e. examples I to IV and IX of the disputed patent and examples 1 to 6 of the Experimental Report filed on 19 November 1991. Even if it were admitted that the demonstrated improvement is significant, this is not an indication of the presence of an inventive step since it is the result of an obvious measure, i.e. the blending of an alkylpolyglucoside with an ethoxylated alcohol in order to produce a commercial product.

Order

For these reasons, it is decided that:

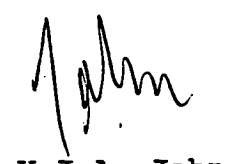
1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:



E. Gorgmaier

The Chairman:



K.J.A. Jahn

LWB

