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D E C I S I O N
of 27 July 1993

Case Number: T 0601/91 - 3.3.1

Application Number: 84303874.6

Publication Number: 0132043

IPC: C07H 15/04

Language of the proceedings: EN

Title of invention:

Improved process for preparing alkyl glycosides

Patentee:

The Proctor & Gamble Company

Opponent:

Henkel Corporation

Headword:

Alkyl glycosides/PROCTER & GAMBLE

Relevant legal norms:

EPC Art. 54(1), (2), 56

Keyword:

"Novelty (confirmed); after amendment"

"Inventive step (yes)"

Decisions cited:

T 0219/83, T 0313/86, J 0002/87, J 0003/87

Catchword:

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Case Number: T 0601/91 - 3.3.1

D E C I S I O N
of the Technical Board of Appeal 3.3.1
of 27 July 1993

Appellant:
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Decision under appeal: Interlocutory decision of the Opposition Division
of the European Patent Office delivered orally on
15 April 1991, with written reasons posted on
22 May 1991, concerning maintenance of European
patent No. 0 132 043 in amended form.

Composition of the Board:

Chairman: K.J.A. Jahn
Members: J.M. Jonk
M.K.S. Aús Castro

Summary of Facts and Submissions

I. The grant of European patent No. 0 132 043 in respect of European patent application No. 84 303 874.6 was announced on 23 December 1987 (cf. Bulletin 87/52).

II. A notice of opposition was filed on 21 September 1988 by Henkel Corporation, requesting the revocation of the patent on the grounds of lack of novelty and lack of inventive step. The opposition was supported by six documents, of which only

(1) US-A-2 356 565 and

(3) US-A-3 839 318

are relevant to this decision.

III. By a decision delivered orally on 15 April 1991, with written reasons posted on 22 May 1991, the illegible page 4 being reissued on 11 July 1991, the Opposition Division maintained the patent in suit on the basis of Claims 1 to 8 filed on 21 September 1989, Claim 1 reading as follows:

"A process for preparing alkyl glycosides having from 8 to 30 carbon atoms in the alkyl chain, characterised by the step of reacting, in the presence of an acid catalyst, a monohydric alcohol containing from 8 to 30 carbon atoms with a source of monosaccharide moiety, wherein as catalyst is used the acid form of an anionic surfactant."

The Opposition Division held that the subject-matter of the claims was novel, because the catalyst in Example 6 of document (3) was substantially sulphuric acid. In the judgment of the Opposition Division, any conversion of

sulphuric acid with the fatty alcohol only would lead to the forming of minor amounts of the corresponding alkyl hydrogensulphate, owing to the large excess of the alcohol. Furthermore, the subject-matter of the claims also involved an inventive step because the skilled person would have had no reason to expect that the catalyst mentioned in document (1) for the preparation of lower alkyl glycosides could be used for improving the direct acetalation of the monosaccharide moiety with fatty alcohols. Moreover, the compound di-isobutyl naphthalenesulphonic acid, falling under the scope of the catalysts claimed in the patent in suit, was only mentioned in document (1) in a list of catalysts which were not anionic surfactants.

- IV. An appeal was lodged against this decision on 17 July 1991, and the appeal fee was paid on the same date.

Taking into account the re-set of the term of appeal to 11 July 1991 by the Formalities Officer of the Opposition Division, a Statement of Grounds of Appeal was submitted on 7 November 1991.

- V. The Appellant maintained the novelty objection based on the content of Example 6 of document (3). In support he submitted on 17 March 1993 the following document:

(17) Test-report, containing Attachments 1 to 17.

He argued that this document, particularly Attachments 4 (a graph of titration results showing a loss of acidity) and 7, 8A, 9, 10 and 11 (NMR-spectra), proved the *in situ* conversion of the sulphuric acid into a substantial amount of C₈/C₁₀-alkyl hydrogensulphate.

The Appellant also argued that, even if the claimed subject-matter could be considered novel, it would not involve an inventive step for the following reasons:

- Carboxylic acids, such as stearic acid, falling under the scope of the claimed catalyst, could not act as a catalyst in the present process.

- The skilled person, having regard to his common general knowledge and the pH-values indicated in Examples 6 and 7 of document (3), would have understood that in the process of Example 6 of document (3) *in situ* C₈/C₁₀-alkyl hydrogensulphate was formed and that this half-ester was the true catalyst. Moreover, the *in situ* formation of the half-ester was also apparent, even after years, from the analyses of commercial product samples. Therefore, it would have been obvious to the skilled person to replace the sulphuric acid in the process of the Example 6 by this pre-formed half-ester. In support of the common general knowledge at the relevant time with respect to the forming of the half-ester, the Appellant mentioned the following documents:

- (7) Paul Karrer, "Lehrbuch der organischen Chemie", 10th Edition (1948), Georg Thieme Verlag, Stuttgart, pages 122 and 123;

- (8) L.F. Fieser/M. Fieser, "Lehrbuch der organischen Chemie", 1954, pages 138 and 139;

- (17) (Attachment 1) "The ethyl-sulphuric acid reaction", by P.M. Evans and J.M. Albertson, 6 January 1917; and

(17) (Attachment 2) J. Amer. Chem. Soc., Vol. 56
(1934), pages 677 to 679.

- The claimed process was also obvious to the skilled person in the light of the combined teaching of documents (1) and (3), because document (3) disclosed the preparation of higher alkyl glycosides by reacting glucose with higher alcohols in the presence of acids such as those described in the prior art (H_2SO_4 , HCl, sulphonic ion exchange resins, HNO_3 , etc.), and document (1) mentioned di-isobutyl naphthalenesulphonic acid as a particular suitable catalyst in such a process. In this connection, the Appellant asserted that the process of document (1) was not restricted to the production of lower alkyl glycosides, but also related to the preparation of higher molecular products.

- The likewise claimed trans-acetalation of lower alkyl glycosides with higher alcohols lacked inventive step because it was known from

(21) US-A-3 547 828

that the preparation of lower alkyl glycosides and their trans-acetalation with higher alcohols could be carried out with the same catalysts, i.e. such as those disclosed in document (1) including the compound di-isobutyl naphthalenesulphonic acid.

VI. During oral proceedings, held on 27 July 1993, the Respondent filed a new set of claims, Claim 1 reading as follows:

"A process for preparing alkyl glycosides having from 8 to 30 carbon atoms in the alkyl chain by mixing and

reacting a monohydric alcohol containing an alkyl group of from 8 to 30 carbon atoms with a source of monosaccharide moiety and an acid form of an anionic surfactant as catalyst."

In addition, the representative of the Respondent signed a declaration that these claims excluded processes in which the anionic surfactant catalyst was formed by *in situ* reaction between sulphuric acid and the alcohol in the presence of the source of monosaccharide, as well as processes in which sulphuric acid was added to the reaction mixture.

In these circumstances the Appellant conceded that the subject-matter of the claims was novel. He maintained, however, the objections regarding inventive step.

VII. Regarding inventive step the Respondent argued that it would not be obvious to the skilled person to combine the teaching of documents (3) and (21) with that of document (1) because document (1) clearly pointed away from the direct acetalation of glucose with fatty alcohols. In addition, he contended that only by way of the claimed process, i.e. both in the direct acetalation and in the trans-acetalation embodiment, could a control of the forming of the undesirable polysaccharides and the development of undesirable colour be achieved. Furthermore, he disputed that carboxylic acids falling under the scope of the claimed catalysts would not be suitable in the present process.

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

The Respondent requested that the appeal be dismissed with the proviso that the patent be maintained on the

basis of Claims 1 to 7 and an adapted description both filed during oral proceedings.

- IX. At the conclusion of the oral proceedings the Board's decision to maintain the patent as requested by the Respondent was announced.

Reasons for the Decision

1. *Admissibility*

- 1.1 The time limit for filing an appeal is fixed by Article 108 EPC and cannot be changed by the first instance. The question whether this time limit is observed has to be decided by the Board of Appeal (cf. T 313/86 - not published - paragraph 2 of the Reasons). Consequently, the first instance had no competence to re-set the time limit in question. However, in application of the principle of good faith governing the relations between the EPO and the users of the EPO system, a party to the proceedings before the EPO should not suffer a disadvantage as a result of having been misled by an erroneous communication of the EPO (cf. J 2/87, OJ EPO 1988, 330 and J 3/87, OJ EPO 1989, 3). In these circumstances, the appeal complies with Article 106 to 108 and Rule 64 EPC and is, therefore, admissible.

2. *Amendments under Article 123 EPC*

- 2.1 The subject-matter of present Claim 1 is based on Claims 1 and 2, in combination with lines 42 and 43 of both pages 2 and 3 of the specification of the patent as granted, and supported by Claims 1 and 2, in combination

with page 3, lines 1 and 2, and page 5, lines 29 and 30 of the patent application as filed.

Present Claims 2 to 7 are identical with the respective Claims 3 to 8 of both the patent as granted and the originally filed patent application.

Thus, all claims of the new set of claims filed during oral proceedings comply with the requirements of Article 123 EPC.

3. *Interpretation of the claims*

3.1 The process according to present Claim 1 of the disputed patent concerns a process for preparing alkyl glycosides having from 8 to 30 carbon atoms in the alkyl group. The process comprises mixing and reacting a corresponding monohydric alcohol with a source of monosaccharide moiety and an acid form of an anionic surfactant as catalyst. As set out in the description of the patent in suit, this process overcomes the drawbacks of the prior art acetalation of monosaccharides with fatty alcohols in the presence of acid catalysts, such as sulphuric acid, which results in the formation of coloured end-products having an undesirable level of polysaccharides (cf. page 2, lines 5 to 8 in combination with lines 18 to 23; page 4, lines 19 to 27; and Example 1).

3.2 Even from the description of these serious drawbacks resulting from the use of sulphuric acid as a catalyst, it can already be concluded that an *in situ* reaction of alcohol, monosaccharide and sulphuric acid, or the presence of sulphuric acid as additional catalyst has never been contemplated as part of the invention. — Accordingly, the description of the present patent does not comprise any pointer to the use of these two possibilities.

3.3 In order to express the intention of the Respondent that these two possibilities should be excluded unambiguously from the claimed process, he signed, during the oral proceedings, a corresponding declaration, which forms part of the official records.

3.4 Therefore, in the Board's judgment, Claim 1 in its present version is to be construed in the literal sense of its wording, i.e. including the mixing of the monohydric alcohol with the source of monosaccharide moiety and the claimed catalyst, and excluding such processes in which sulphuric acid is added to the mixture and the claimed catalyst is formed by an *in situ* reaction between the sulphuric acid and the alcohol in the presence of the source of monosaccharide moiety.

4. *Novelty*

4.1 After examination of the cited prior art, the Board has reached the conclusion that the subject-matter as defined in all claims is novel. In this context, it is pointed out by the Board that Example 6 of document (3) does not involve the mixing of the reaction components with the pre-formed catalyst as claimed in the disputed patent (cf. the experimental evidence provided by the Appellant, particularly document (17), page 2, second paragraph, lines 10 to 26 and page 3, last line to page 4, line 10, and Attachment 4 to this document, which shows that at room temperature no *in situ* formation of C₈/C₁₀-alkyl hydrogensulphuric acid arises). Since this issue is no longer in dispute, it is not necessary to give further details for this finding.

5. *Inventive step*

5.1 Closest state of the art

5.1.1 The Board considers that the closest state of the art with respect to the direct acetalation of the monosaccharide moiety is the disclosure of document (3). This document describes a process for the direct preparation of higher alkyl glycosides by reacting glucose with higher alcohols in the presence of an acid catalyst, such as sulphuric acid, under careful control of the reaction conditions (cf. column 1, lines 46 to 53; column 4, lines 15 to 18; and Claim 1). Moreover, it indicates that by careful control of the reaction conditions oligomerisation, degradation and charring of glucose can be avoided (cf. column 1, lines 57 to 59).

5.1.2 Regarding the other embodiment of the claimed process in which short chain alkyl glycosides are used as the source of monosaccharide moiety (cf. the disputed patent, page 2, lines 50 to 54) the Board considers document (21) to be the closest state of the art. This document discloses the preparation of higher glycosides by reacting a short chain glycoside, such as butyl glycoside, with a higher alcohol having 11 to 32 carbon atoms at a temperature of 80 to 120°C and at a reduced pressure in the presence of an acid catalyst, preferably sulphuric acid (cf. column 2, lines 27 to 40).

5.2 Problem and solution

5.2.1 The Respondent has argued that the direct acetalation of the monosaccharides as claimed compared with that of document (3) has the advantages of a faster reaction — rate, and at the same time the provision of products having a lower level of undesirable polysaccharides and less undesirable colour. He has also contended that by

the claimed trans-acetalation the same advantages are achieved.

5.2.2 Therefore, in the light of the closest state of the art for both embodiments of the claimed process, i.e. the direct acetalation and the trans-acetalation, the common technical problem to be solved by the patent in suit is the provision of a process for the preparation of alkyl glycosides having from 8 to 30 carbon atoms in the alkyl group in which the reaction rate is faster and the resulting products contain less polysaccharides and have less undesirable colour (cf. also page 2, lines 24 and 25, of the disputed patent).

5.2.3 The patent in suit solves this technical problem according to Claim 1 by mixing and reacting a monohydric alcohol containing an alkyl group of from 8 to 30 carbon atoms with a source of monosaccharide moiety and the acid form of an anionic surfactant as catalyst.

5.2.4 The comparative experiment of the disputed patent (Example 1, run 3) concerning the direct acetalation of glucose using sulphuric acid as catalyst - which essentially corresponds to experiments L and M of Example 8 in document (3) (carried out in accordance with Example 6) - shows, when compared with the claimed process, a slower reaction (cf. Table 1), the production of a higher content of undesirable polysaccharides (24.1% instead of 9.2% as indicated in Table 2) and a higher level of undesirable colour (cf. Table 3).

It is true that the comparative experiment of the disputed patent differs from the experiments M and L in Example 8 of document (3) in that the alcohol/sulphuric acid-mixture is homogenised by raising the temperature to 85°C before the glucose is added. However, it is the Board's position that this modification does not affect

the comparability of the experiment of the disputed patent for the purpose of demonstrating the above improvements because the possibility that some *in situ* formation of the claimed catalyst at these higher temperatures may occur would only work to the disadvantage of the Respondent who relies on these tests. Moreover, the experiments M and L in Example 8 of document (3) also show high amounts of the undesirable polysaccharides, namely 61.1% and 54.7% respectively.

5.2.5 Having regard to the structural similarity between monosaccharides (source of monosaccharide moiety in the direct acetalation embodiment of the claimed process) and the corresponding lower alkyl glycosides (source of monosaccharide moiety in the trans-acetalation embodiment of the claimed process), and taking into account that the prior art trans-acetalation using sulphuric acid as catalyst according to document (21) also provides high amounts of undesirable polysaccharides (cf. the examples), the Board considers it also plausible that the advantages demonstrated with respect to the claimed direct acetalation are also obtainable with the claimed trans-acetalation.

5.2.6 The Appellant contended that higher carboxylic acids, such as stearic acid, were not suitable as catalysts. However, this submission remained unsupported and was refuted by the Respondent relying on document (1), in which carboxylic acids are considered useful catalysts (cf. page 2, left column, line 4). In this situation, where the Board is unable to establish the facts of its own motion, it is the party whose argument rests on these alleged facts who loses (cf. for instance T 219/83, OJ EPO 1986, 211, last two paragraphs of section 12 of the Reasons). Therefore, the Appellant's submissions on this issue must fail.

5.2.7 Consequently, the Board considers it plausible that the technical problem as defined above has been solved.

5.3 Inventiveness of the solution of the technical problem.

5.3.1 As set out above, documents (3) and (21) representing the closest state of the art disclose all the technical features of the claimed process, save the use of the acid form of an anionic surfactant as catalyst. Thus, the question is whether, in the light of the prior art, the use of these compounds as catalyst involves an inventive step.

5.3.2 The Appellant argued that the skilled person, having regard to his common general knowledge, in reading Examples 6 and 7 of document (3) and thus being aware of the presence of the half-ester of sulphuric acid in the reaction mixture, would immediately recognise that the true catalyst was not sulphuric acid but its corresponding half-ester. In consequence, the replacement of the *in situ* formed half-ester in the process of document (3) by the corresponding pre-formed compound could not involve an inventive step.

5.3.3 Regarding common general knowledge at the relevant time with respect to the *in situ* formation of the half-ester the Appellant referred to documents (7), (8) and (17) (Attachments 1 and 2).

It is true that documents (7) and (8) concern general textbook knowledge. However, both documents only disclose in general terms the preparation of alkyl hydrogensulphuric acids by the equilibrium reaction of alcohols with sulphuric acid, particularly with an excess of sulphuric acid (cf. (7), page 122, last paragraph; and (8), page 139, second paragraph, indicating that the reaction water is bound by the

sulphuric acid). On the contrary, the reaction according to Example 6 of document (3) is carried out in the presence of a catalytic amount of sulphuric acid and of a large excess of both C₈/C₁₀-alcohol and glucose.

Furthermore, Attachments 1 and 2 of document (17) both concern specific scientific articles which, by their nature, in the Board's view, are normally not sufficient for proving common general knowledge. Even if the Board were to accept these documents as proof in this respect, Attachment 1 is only concerned with the reaction of ethyl alcohol with sulphuric acid and Attachment 2 only with a quantitative study of the reaction between lower straight chain alkyl alcohols up to n-hexyl alcohol and sulphuric acid (cf. Attachment 2, page 677, left column, last paragraph). Thus these documents also do not concern a reaction of the specific type which is indicated in the Example 6. It is true, that it is stated in Attachment 2 that the reaction between sulphuric acid and a primary aliphatic alcohol at ordinary temperatures gives only the mono-alkyl ester regardless of whether the acid or the alcohol is present in excess, but this statement is limited to the reaction at ordinary temperatures and to the reaction of ethyl alcohol (cf. page 677, left column, lines 1 to 8). In addition, it is stated in Attachment 1 that the reaction of formed ethyl hydrogensulphate with ethyl alcohol to ethyl ether and sulphuric acid according to equation G represents an important side reaction, particularly at temperatures above 70°C (cf. page 456, paragraphs 1 to 3; page 458, Table 1 and the subsequent paragraph; and page 460, second whole paragraph).

Therefore, the Board finds this evidence as a whole — insufficient to discharge the Appellant's burden of proof, and accordingly dismisses his submission that the skilled person, on the basis of his common general

knowledge, immediately would have understood that under the specific reaction conditions of Example 6 of document (3) - i.e. a large excess of both C₈/C₁₀-alkyl alcohol and glucose with respect to the sulphuric acid - the C₈/C₁₀-alkyl alcohol would react with the sulphuric acid to the corresponding alkyl hydrogensulphuric acid.

5.3.4 Furthermore, according to Example 6 of document (3), in succession, a small amount (4.0 g) of sulphuric acid is added dropwise and under stirring to a mixture of n-octanol and n-decanol, anhydrous glucose is added to the formed solution, a vacuum is applied, the reaction mixture is heated to 95°C during four hours, and the reaction is continued for another hour at a temperature of 95°C to 100°C at the same pressure (cf. column 6, lines 27 to 40). Subsequently, after releasing the vacuum and cooling, 6.4 g of 50% aqueous sodium hydroxide solution is added, so that the product in 50% aqueous isopropanol has a pH of 11.5.

The Appellant submitted that the skilled person, having regard to the "over-neutralisation" in Example 6 of document (3) to a pH of 11.5 and the "normal" neutralisation in Example 7 of the same document to a pH of 5.2 (cf. line 17) at a molar ratio of NaOH to H₂SO₄ as calculated of 2:1 and 1:1 respectively, would have concluded that the sulphuric acid is completely converted into its half-ester, which compound acts as the real catalyst.

However, in the light of the teaching of document (3) as a whole, particularly the clear indication that sulphuric acid is used as catalyst (cf. column 4, lines 15 to 18), it is the Board's position that the skilled person would have interpreted the addition of the sodium hydroxide solution according to Example 6 as the usual neutralisation step before distillation. This

point of view is confirmed by Example 1 of document (3), in which it is described that, before the distillation step, the reaction mixture containing 1.0 g of sulphuric acid is neutralised with 1.6 g of 50% sodium hydroxide solution, so that the pH of a 5% solution in 50% aqueous isopropanol is 11.3 (cf. column 4, lines 41 to 62). Moreover, in the Board's judgment, having regard to the complexity of the present type of reaction which could involve several side reactions such as those indicated in Attachment 1 of document (17) (cf. page 456, equations B to G) and to the fact that according to Example 6 the pH-value changes after the neutralisation step by mere heating the mixture (cf. lines 61 and 62), the skilled person would not have drawn any conclusion from these particular pH-values.

Therefore, the Appellant's submission in this respect also fails.

5.3.5 Accordingly, the Board finds that the technical teaching of document (3) neither suggests to the skilled person that the actual catalyst in the process of the above examples is the half-ester of sulphuric acid, nor that it gives any hint to the skilled person how the improvements aimed at according to the existing technical problem (see section 5.2.2 above) could be achieved.

5.3.6 The appellant's unsupported submission that the skilled person would conclude from the presence of alkyl hydrogensulphates in commercially available higher alkyl glycosides that the real catalyst in the process of document (3) is such a half-ester also cannot be accepted by the Board because of lack of any evidence—regarding the production method of these products. Moreover, in the Board's judgment, the skilled person, having regard to the clear teaching in document (3) that

sulphuric acid is used as catalyst, would not have had any reason to analyze the reaction mixture and/or the reaction products with respect to the possible occurrence of this half-ester. In addition, even if the skilled person had found a half-ester of sulphuric acid in the reaction products or in the reaction mixture (as submitted by the Appellant on the basis of document (17)), he would have had no reason to expect that - contrary to the teaching of document (3) - this half-ester were the real catalyst and could have been used instead of sulphuric acid. Thus, in the Board's judgment, any assumption that the skilled person would have replaced sulphuric acid by an appropriate half-ester as claimed in order to solve the present technical problem could only be arrived at by an unallowable ex post-facto analysis of the prior art.

- 5.3.7 The Appellant also contended that the claimed process would have been obvious to the skilled person in the light of the combined teaching of documents (3) and (1) or, particularly with respect to the trans-acetalation, the combined teaching of documents (21) and (1).

As indicated above, document (3) - like the claimed process of the disputed patent - is related to a process in which the glucose is reacted with a fatty alcohol. It also discloses that the direct reaction of the glucose with such a higher alcohol is difficult, but can be improved by careful control of the reaction conditions (cf. column 1, lines 16 to 19 and lines 38 to 53).

Document (1) is concerned with the preparation of lower alkyl glycosides in which the alkyl groups contain a reactive halogen atom allowing the preparation of higher alkyl glycosides in a further substitution reaction (cf. page 1, left column, lines 34 to 41). In addition it is indicated that these lower alkyl groups contain one

chain of not more than 5 carbon atoms or more than one of such a short chain linked by a hetero atom (see page 1, left column, lines 34 to 41; page 1, right column, lines 34 to 44; and page 6, left column, lines 27 to 35). Thus, since document (1) is unrelated to the above defined technical problem, in the Board's judgment, the skilled person faced with this problem would not have found this document helpful to solve it. However, even if he had done so, the disclosure of document (1) that an acid, particularly sulphuric acid or one of the many other acids listed, such as di-isobutyl naphthalenesulphonic acid, which may fall under the scope of the catalysts as claimed, can be used as catalyst does not hold out any prospect that the replacement of sulphuric acid in the process of document (3) by that particular sulphonic acid would provide any advantage, let alone the advantages relied upon by the Respondent. Therefore, the submission that the skilled person would have selected this particular sulphonic acid for solving the above defined technical problem is also based on an unallowable *ex post facto* analysis.

Document (21), which was specifically mentioned by the Appellant with respect to the trans-acetalation embodiment of the claimed process, discloses - as set out above - the trans-acetalation of butyl glycoside with a higher alcohol having from 11 to 32 carbon atoms in the presence of the same catalyst as used for the preparation of the butyl glycoside, preferably sulphuric acid (cf. column 2, lines 16 to 61). It may well be that the skilled person could have concluded from the teaching of this document that other catalysts known for the preparation of lower alkyl glycosides, such as those disclosed in document (1) (cf. the paragraph bridging pages 1 and 2), i.e. including di-isobutyl naphthalenesulphonic acid, could also be used for trans-acetalation. However, in the Board's judgment, the

proper question to be asked was not whether the skilled person could have used the particular sulphonic acid mentioned in document (1) but whether he would have done so in the expectation of the solution of the above defined technical problem. However, the combined teaching of documents (21) and (1) does not give any reason to the skilled person to conclude that the replacement of the preferred sulphuric acid in the process of document (21), let alone the replacement of this acid by the above mentioned particular sulphonic acid, would provide any improvement. Thus the question whether the skilled person would have used the particular sulphonic acid in order to provide a process having a higher reaction rate and giving products which contain a lower level of polysaccharides and less undesirable colour must be answered in the negative.

5.3.8 In conclusion, the Board finds that the process according to Claim 1 involves an inventive step because it would not have been obvious to the skilled person to solve the present technical problem by mixing and reacting the reactants with the acid form of an anionic surfactant as catalyst.

6. Dependent Claims 2 to 7, which relate to preferred embodiments of the process claimed in Claim 1, are supported by the patentability of the main claim.

Order

For these reasons, it is decided that:

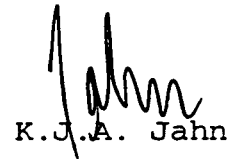
1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to maintain the patent with Claims 1 to 7 and the adapted description, both filed during oral proceedings.

The Registrar:



E. Gorgmaier

The Chairman:



K.J.A. Jahn