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D E C I S I O N
of 21 April 2004

Case Number: T 0582/03 - 3.3.6

Application Number: 95935125.5

Publication Number: 0785979

IPC: C11D 1/72

Language of the proceedings: EN

Title of invention:

Biodegradable surfactant and blends thereof as a rinse aid

Applicant:

Arch Chemicals, Inc.

Opponent:

-

Headword:

Biodegradable surfactant/ARCH CHEMICALS

Relevant legal provisions:

EPC Art. 56

Keyword:

"Inventive step (no): selection of a specific surfactant from a known class - technical advantage not convincingly proved - obvious to try"

Decisions cited:

-

Catchword:

-



Case Number: T 0582/03 - 3.3.6

D E C I S I O N
of the Technical Board of Appeal 3.3.6
of 21 April 2004

Appellant: Arch Chemicals, Inc.
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 19 December 2002
refusing European application No. 95935125.5
pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: P. Krasa
Members: L. Li Voti
U. J. Tronser

Summary of Facts and Submissions

I. This appeal lies from the decision of the Examining Division to refuse European patent application No. 95 935 125.5, relating to a biodegradable surfactant composition comprising an epoxy-capped poly(oxyalkylated) alcohol.

II. In its decision, the Examining Division, referring to document

(1): WO-A-94/22800

found that the claimed subject-matter lacked an inventive step in the light of the teaching of this document.

III. An appeal was filed against this decision.

A new set of 7 claims was filed with the statement of the grounds of appeal, claim 1 of which read as follows:

"1. A surfactant composition characterized by containing a liquid or solid carrier and a compound of the formula:

$R^6O[CH_2CH(CH_3)O](CH_2CH_2O)_{10}[CH_2CH(OH)(CH_2)_3CH_3]$ wherein R^6 is a combination of butyl, hexyl, octyl and decyl."

This set of claims contained also a claim directed to a method for cleaning soiled tableware by contacting it in a dishwashing machine with an aqueous wash bath having dispersed therein an effective amount of the composition of claim 1 to obtain a clean tableware having substantially reduced films and spots (claim 6)

and one directed to a method for cleaning hard surfaces by contacting them with an effective amount of the composition of claim 1 (claim 7).

Under cover of a letter dated 27 January 2004 the Appellant filed a new set of claims replacing the set previously on file. This set of three claims consisted only of the previous claims 1, 6 and 7.

IV. The Appellant has submitted in writing that

- document (1), though disclosing a class of epoxy-capped poly(oxyalkylated) alcohols having a general formula including the specific compounds of claim 1, suggested to select surfactants having an epoxy capping moiety with a C₁₂₋₂₂ linear hydrocarbon rest in order to improve the rinsing efficiency of the disclosed compositions (page 7, lines 4 to 17);
- therefore, the skilled person, faced with the technical problem of providing compositions having superior rinsing performance, e.g. increased reduction in spotting and filming of tableware, would have selected a surfactant having a longer epoxyalkane moiety than the surfactant of present claim 1;
- document (1) thus led away from the claimed invention;
- moreover, the subject-matter of present claim 1, being limited to the specific surfactant of example 5, displayed better rinsing properties

than the compositions disclosed in the examples of document (1), containing surfactants with a longer epoxy capping group; in fact the sum of the figures for spotting, streaking and filming of the products of examples 1, 2 and 3 of document (1) was greater than the corresponding sum for the product of example 5 of the present application;

- this result was surprising and could not have been predicted in the light of the teaching of document (1);
- the claimed subject-matter thus involved an inventive step.

V. The Board expressed its provisional opinion in a communication dated 30 September 2003.

The Appellant was informed *inter alia* that

- the tests of example 5 did not appear to prove convincingly that the surfactant of present claim 1 provided better rinsing properties than the surfactants tested in document (1);
- the technical problem underlying the claimed invention had to be seen, in such a case, as the selection of a liquid surfactant from the general formula of document (1), which surfactant brings about a significant reduction in spotting and filming of tableware when used in an automatic dishwasher, as compared to conventional surfactants.

- VI. The Appellant requests that the decision of first instance be set aside and that a patent be granted on the basis of the claims 1 to 3 filed under cover of a letter dated 27 January 2004.

Reasons for the Decision

1. The Board is satisfied that the claims filed under cover of a letter dated 27 January 2004 meet the requirements of Articles 84 and 123(2) EPC and that the claimed subject-matter is novel over the cited prior art.

Since the appeal fails on other grounds further details are unnecessary.

2. *Inventive Step*

- 2.1 The present application and, in particular, the subject-matter of claim 1 relates to a composition comprising a liquid biodegradable surfactant which can be used in autodish cleaning applications or as a rinse aid in industrial and institutional dishwashing applications (see page 1, lines 1 to 5 and page 8, lines 3 to 13).

The description of the present application acknowledges that document (1) already disclosed compositions comprising nonionic surfactants having an excellent combination of biodegradability, low foaming and rinsing properties, e.g. a significant reduction in spotting and filming of tableware, as compared to

conventional surfactants, when used in automatic dishwashers (see page 4, line 25 to page 5, line 14).

The Board thus takes document (1), which relates to the same technical field as the present application, as the most suitable starting point for the evaluation of inventive step of the claimed subject-matter, as also found in the decision of first instance (see points 1 and 4 of the reasons for the decision). The Appellant has not disputed this finding.

This document discloses the use of epoxy-capped poly(oxyalkylated)alcohols having a general formula which encompasses the surfactants of present claim 1 (see page 4, line 21 to page 5, line 7). A surfactant having all the features of the present claim 1 is, however, not specifically disclosed in this document.

- 2.2 The description of the present application states that the known surfactants of document (1) are typically solids and thus undesirable and costly for the preparation of liquid detergents (page 5, lines 14 to 19).

The alleged technical problem underlying the present invention is thus defined in the description of the present application as the provision of liquid surfactants compositions having properties similar to those of the products of document (1) (page 5, lines 19 to 28).

The Board notes, however, that document (1) already discloses a general class of low foaming surfactants which, when formulated into powder or liquid detergent

products, provides good rinsing properties and a significant reduction in spotting and filming of tableware as compared to conventional surfactants (see page 1, lines 1 to 7; page 4, lines 14 to 20; page 5, line 34 to page 6, line 5; page 7, lines 22 to 27).

Moreover, even though the specific surfactants used in the examples of document (1) are solid, the general formula of the class of surfactants used in document (1) (see page 4, line 21 to page 5, line 7) encompasses the surfactant of present claim 1, which is liquid, and includes thus necessarily solid and liquid surfactants as well. The same conclusion can be drawn for the preferred class of surfactants indicated in this document, which has an alcoholic portion having a C_{4-12} , more preferably a C_{6-10} , alkyl radical (page 6, lines 22 to 24), 1 to 2 and more preferably 1 propylene oxide group (page 5, lines 1 to 2), from 10 to 25 and more preferably from 10 to 20 ethylene oxide groups (page 5, lines 2 to 5) and 1 to 2, most preferably one epoxyalkane capping group (see page 5, lines 5 to 7), having a linear hydrocarbon radical containing from 2 to 26 carbon atoms (page 4, lines 27 to 29 and page 7, lines 4 to 9) and, preferably from 2 to 22 carbon atoms, depending on the desired efficacy (see page 7, lines 13 to 17) of the surfactant.

Therefore, since document (1) had already provided low foaming liquid surfactants having good rinsing properties, the technical problem underlying the claimed invention cannot be considered to be that identified on page 5, lines 19 to 28 of the application in suit.

2.3 The description of the present application notes also that the specific surfactant of example 5, which is the subject-matter of present claim 1, exhibits an unexpectedly high defoaming efficacy and a very low foam generating capacity in the presence of protein soils (see page 9, lines 1 to 14 and page 14, lines 12 to 17 and page 22, line 18 to page 23, line 14).

The Appellant has thus identified the technical problem underlying the claimed invention in the statement of the grounds of appeal as the selection of a liquid surfactant from the broader teaching of document (1), which surfactant provides a better overall reduction in streaking, spotting and filming (see page 2 of the statement of the grounds of appeal).

Support for this alleged superior performance of the selected surfactant is found, in the Appellant's view, in the comparison of the performance of the selected surfactant reported in table 5 of the present application with the results reported in table I of document (1) in regard to different surfactants falling under the general formula of that document (which surfactants are solid and have a longer epoxyalkane capping rest as already explained above).

The Board notes, however, that the tests of document (1) are carried out under precise washing conditions (see page 12, lines 9 to 15 and 24 to 26), whilst example 5 of the present application does not specify the conditions used in the similar tests of the present application. Moreover, a comparison of the results reported for the commercial product Cascade in the present application and in document (1) shows slightly

diverging values in spotting. Similar differences occur also in the results of the foam test.

Moreover, the tests of the present application do not indicate which numerical variation in these results can be considered statistically significant.

The Appellant has not submitted any argument in regard to these considerations by the Board, which were already contained in point 3.3 of the communication of 30 September 2003.

The Board thus cannot accept that the tests of example 5 prove the alleged technical advantage over the surfactants tested in document (1).

The technical problem underlying the claimed invention has thus to be reformulated in more simpler terms as the selection of a liquid surfactant from the broader general formula of document (1), which surfactant also brings about a significant reduction in spotting and filming of tableware when used in an automatic dishwasher, as compared to conventional surfactants.

The Board is satisfied that the subject-matter of claim 1 solved the above technical problem.

- 2.4 The Board notes that the general formula of the surfactants used in document (1), as explained above, includes the liquid surfactant of present claim 1.

More precisely, the preferred class of surfactants includes those having

- an alcoholic portion having a C₄₋₁₂, more preferably a C₆₋₁₀ alkyl radical (page 6, lines 22 to 24), thus including the same type of radical as the surfactant of claim 1; a surfactant derived from Alfol-610, i.e. exactly the same type of mixed alcohol used in example 5 of the present application, having a mixture of butyl, hexyl, octyl and decyl radicals and subject-matter of claim 1 of the present application is, for example, used in the examples of document (1);
- one propylene oxide group (page 5, lines 1 to 2) as in the surfactant of present claim 1;
- from 10 to 20 ethylene oxide groups (page 5, lines 2 to 5), thus encompassing surfactants having 10 moles of ethylene oxide as that of claim 1;
- one epoxyalkane capping group (see page 5, lines 5 to 7) as in claim 1;
- a hydrocarbon radical of the epoxy capping group having from 2 to 26 carbon atoms (page 4, lines 27 to 29) and, preferably, from 2 to 22 carbon atoms, depending on the desired efficacy (see page 7, lines 13 to 17), thus encompassing those having 4 carbon atoms as in present claim 1 (this definition in the formula of document (1) clearly excluding in the Board's view the carbon atoms derived from the epoxy group itself).

As regards the epoxyalkane residue document (1) suggests to use, for example, a residue having 2 to 4

carbon atoms if a composition having a high cloud point (i.e. a composition liquid at ambient temperature) is desired, a residue having 6 to 10 carbon atoms if optimal defoaming efficacy is searched for and a rest having 12 to 22 carbons for optimizing rinsing (page 7, lines 13 to 17).

Since document (1) teaches that all the compounds covered by the disclosed general formula, thus also those having a shorter epoxyalkane chain, bring about a significant reduction in spotting and filming of tableware when used in an automatic dishwasher, as compared to conventional surfactants and this general formula encompasses liquid surfactants (see point 2.2 above), it was obvious for the notional skilled person, looking for liquid surfactants having the properties mentioned above, to try the compounds falling within the preferred class given in document (1), e.g. by adjusting the length of their various constituents, e.g. the alcoholic residue or the epoxyalkane chain, in dependence of the desired properties.

Moreover, even though document (1) suggests to use compounds having a longer epoxyalkane chain than in present claim 1 for achieving optimal rinsing, it also suggests, as explained above, the use of shorter compounds for improving other useful properties of the disclosed surfactants, e.g. their defoaming capacity or their cloud point.

It was thus obvious for the notional skilled person, following the teaching of document (1) and faced with the technical problem identified hereinabove, to look for compounds having balanced properties, e.g. for

compounds providing at once good rinsing and defoaming and having less tendency to be solid; it was thus obvious to try one having a shorter epoxyalkane group as suggested in the description with one having an alcoholic residue as used in the examples and thus also one having all the features of present claim 1 (see also the decision of first instance, points 6 and 7 of the reasons).

The subject-matter of claim 1 lacks thus an inventive step.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

G. Rauh

P. Krasa