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**Datasheet for the decision
of 3 November 2014**

Case Number: T 0960/12 - 3.3.05
Application Number: 04740630.1
Publication Number: 1656192
IPC: B01D11/04, G01N1/40, C12N15/10
Language of the proceedings: EN

Title of invention:

METHODS FOR EXTRACTION AND CONCENTRATION OF HYDROPHILIC
COMPOUNDS FROM HYDROPHOBIC LIQUID MATRICES

Applicant:

Merck Patent GmbH

Headword:

Extraction/MERCK

Relevant legal provisions:

EPC Art. 54(1), 54(2), 56, 123(2)

Keyword:

Amendments - allowable (yes)
Novelty - (yes)
Inventive step - (yes) - non-obvious alternative

Decisions cited:

Catchword:



**Beschwerdekammern
Boards of Appeal
Chambres de recours**

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Case Number: T 0960/12 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 3 November 2014

Appellant: Merck Patent GmbH
(Applicant) Frankfurter Strasse 250
64293 Darmstadt (DE)

Representative: Merck Patent GmbH
64271 Darmstadt (DE)

Decision under appeal: **Decision of the Examining Division of the European Patent Office posted on 25 November 2011 refusing European patent application No. 04740630.1 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman G. Rath
Members: J.-M. Schwaller
M. Blasi

Summary of Facts and Submissions

- I. This appeal lies from the decision of the examining division refusing European patent application No. 04 740 630.1, in the version filed with letter dated 28 October 2011, under Articles 123(2), 54(1)(2) and 56 EPC.
- II. In the contested decision, the examining division held that the method for detection and/or quantification by extraction and concentration of contaminants in the form of hydrophilic compounds, biological materials or particles dispersed or distributed in hydrophobic liquid matrices, as defined in claim 1 then on file was obvious in the light of the disclosure of document
- D5: US 2002/0068309 A1
- in combination with document
- D6: C. Gaylarde et al., "*Microbial contamination of stored hydrocarbon fuels and its control*", *Revista de Microbiologia* (1999), 30, pages 1 to 10.
- Further, document
- D1: US 5 271 840
- was held to anticipate the reagent kit defined in claim 11 then on file.
- III. With the statement of grounds of appeal dated 2 April 2012, the appellant filed an amended set of ten claims replacing the claims underlying the contested decision.

IV. In a communication dated 1 August 2014, the board informed the appellant that:

- a) claims 2, 4 to 7, 9 and 10 did not appear to meet the requirements of Article 123(2) EPC;
- b) a patent could be granted on the basis of claims 1, 3 and 8.

V. With letter of 5 August 2014, the appellant submitted a new set of three claims corresponding to claims 1, 3 and 8 submitted with the grounds of appeal. This new set reads as follows:

"1. A method for detection and/or quantification by extraction and concentration of contaminants in form of hydrophilic compounds, biological materials or particles dispersed or distributed in fuel as hydrophobic/non-polar/non-ionic liquid matrices comprising the following steps:

- a) providing a sample of a hydrophobic liquid as hydrophobic/nonpolar/non-ionic liquid matrix;*
- b) adding to said sample an aqueous capture solution comprising 0,5 - 10,00 g soy lecithin, 0,01 - 0,20 g methylene blue, 0,01 - 0,05 g sodium hypochlorite and 1000,00 g water, which is added to the sample in a low ratio of 1 : 10 or less;*
- c) mixing said sample and said capture solution thoroughly;*
- d) allowing the aqueous phase to separate from the sample phase;*
- e) measuring the hydrophilic compound or the biological material or particles in the aqueous phase.*

2. A method according to claim 1, wherein the added capture solution contains lecithin in an effective concentration between 0,1 and 1% (w/v).

3. A reagent for quantification by extraction and concentration of hydrophilic compounds, biological materials or particles dispersed or distributed in hydrophobic/nonpolar liquid matrices comprising 0,5 - 10,00 g soy lecithin, 0,01 - 0,20 g methylene blue, 0,01 - 0,05 g sodium hypochlorite and 1000,00 g water."

VI. The appellant requested that the contested decision be set aside and that a patent be granted on the basis of claims 1 to 3 filed with its letter of 5 August 2014, description pages 2 and 3 filed with its letter of 5 August 2014, description pages 4 to 18 as filed and figures 1 and 2 as filed.

Reasons for the Decision

1. Allowability of the amendments

The claims filed with letter of 5 August 2014 do not extend beyond the content of the application as filed:

- Claim 1 is based on claim 1 as well as the passages at page 1, lines 4 to 7; page 2, lines 7 to 9; page 6, lines 9 to 15 and 17 to 19 of the application as filed.
- Claim 2 is based on the passage at page 5, lines 21 and 22 of the application as filed.
- Claim 3 is based on claim 8, claim 1 and the passages at page 1, lines 4 to 7, page 2, lines 7

to 9, and page 6, lines 5 to 15 of the application as filed.

The amendments to pages 2 and 3 of the description filed with letter of 5 August 2014 have their basis in the same passages as the corresponding amendments to the above claims.

It follows that the application documents now on file meet the requirements of Article 123(2) EPC.

2. Novelty

2.1 Document D1 (claim 1) discloses a process for separating hydrophilic molecules from hydrophobic molecules comprising the steps of:

a) forming at about 0 to 10°C an aqueous solution of the molecules to be separated with a mixed detergent of an alkyldimethylphosphine oxide wherein the alkyl moiety of the alkyldimethylphosphine oxide is a straight chain, saturated aliphatic alkane having 8 to 24 carbon atoms and a phospholipid, said oxide and phospholipid being present in a mole ratio of about 95 to 5 respectively,

b) warming the resulting solution to about 12 to 20°C, and

c) separating the resulting two phases.

D1 does not disclose the use of methylene blue or of sodium hypochlorite in said separation process.

It follows that the subject-matter of claims 1 to 3 is novel over the disclosure of document D1.

- 2.2 The board is satisfied that none of the other documents in the proceedings disclose the subject-matter of claims 1 to 3.

The application thus meets the requirements of Article 54(1), (2) EPC.

3. Inventive step

- 3.1 The invention relates to a method and a reagent kit for extraction and concentration of hydrophilic compounds dispersed or distributed in hydrophobic liquid matrices, in particular a fuel.

- 3.2 As regards the closest state of the art, since different documents come into consideration, the board first has to identify which one is the most promising starting point for assessing the inventive step of the claimed subject-matter. It is standard practice in this respect that the closest state of the art is normally a document disclosing subject-matter conceived for the same purpose or aiming at the same objective as the claimed invention and having the most relevant technical features in common, i.e. requiring the minimum of structural modifications.

- 3.2.1 The examining division started from document D5, which relates to a method for extracting ATP (adenosine triphosphate) from a biological sample, for instance a micro-organism (D5, claim 1 and paragraph [0001]) using a cationic extractant - such as benzalkonium chloride, benzenethonium chloride or dodecyl trimethyl ammonium (see D5, paragraph [0040]) - and an anionic substance, in particular sulfate ion or sodium dodecyl sulfate (see D5, paragraph [0036]).

- 3.2.2 For the board, the closest state of the art is rather document D6 since it concerns the same technical field and has the same objective as the claimed invention, namely the detection of hydrophilic compounds, e.g. micro-organisms, in fuel. D6 refers in particular (see page 6, second half of the left column) to the "Boron Microbe Monitor Test" - in which fuels are incubated over an aqueous mineral salts layer with or without biocide - and to "commercial rapid on-site kits", without however giving any specific details concerning these kits.
- 3.3 According to the application in suit, the problem was to provide capture solutions which improve the recovery of hydrophilic compounds from hydrophobic liquid matrices (page 1, lines 7, 8 and lines 1 to 6) as well as to provide a method for extraction and concentration of said hydrophilic compounds.
- 3.4 As a solution to this problem, the application in suit proposes the method and the reagent according to claims 1 and 3 at issue, respectively, which are in particular characterised in that the reagent used in the method comprises 0.5 - 10.00 g soy lecithin, 0.01 - 0.20 g methylene blue, 0.01 - 0.05 g sodium hypochlorite and 1000,00 g water.
- 3.5 For the board, in the absence of an objective comparison with the reactive kits disclosed in document D6, the problem identified in point 3.3 cannot be held to have been solved, so that it is necessary to reformulate the latter in the provision of an alternative method and reagent kit for detection and/or quantification by extraction and concentration of contaminants in the form of hydrophilic compounds,

biological materials or particles dispersed or distributed in fuel.

3.6 It then has to be determined whether the proposed solution was obvious in the light of the state of the art, in particular documents D5 and D1 which were cited in the contested decision.

3.6.1 Document D1 is not concerned with the detection and/or quantification of hydrophilic compounds, biological materials or particles dispersed or distributed in a fuel, but with the purification of proteins without significant loss of yield or biological activity. The skilled person faced with the problem underlying the invention would thus have no incentive to look at D1 in order to find a solution to this problem. For the sake of argument, even if the skilled person had an incentive to do so, he would not arrive at the subject-matter of the invention defined in claim 1 or 3, since D1 does not disclose the use of either methylene blue or sodium hypochlorite.

3.6.2 Document D5 is not concerned with the problem underlying the invention since it deals with the detection of micro-organism contamination in the food industry. Since D5 further does not disclose the use of methylene blue or of sodium hypochlorite, the skilled person cannot arrive at the invention defined in claim 1 or 3 from the disclosure of this document.

3.6.3 The board is satisfied that the remaining documents cited in the European search report do not contain further information which would point towards the claimed solution of the problem stated above.

3.6.4 It follows from the above considerations that the subject-matter of claims 1 and 3, and by the same token that of dependent claim 2, which includes all the features of claim 1, involves an inventive step.

Therefore, the requirements of Article 56 EPC are met.

4. Adaptation of the description

Although pages 2 and 3 of the description have been adapted to the new, claimed subject-matter, it appears that some further amendments are needed e.g on pages 4 to 6 of the description as originally filed.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the examining division with the order to grant a patent on the basis of claims 1 to 3 submitted on 5 August 2014, and a description to be adapted thereto.

The Registrar:

The Chairman:



C. Vodz

G. Rath

Decision electronically authenticated