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**Datasheet for the decision
of 28 October 2011**

Case Number: T 0811/10 - 3.3.09

Application Number: 06118220.0

Publication Number: 1752052

IPC: A23L 1/30

Language of the proceedings: EN

Title of invention:

Chemoprotectants from crucifer seeds and sprouts

Applicant:

Kraft Foods Global Brands LLC

Opponent:

-

Headword:

-

Relevant legal provisions:

EPC Art. 56, 84, 123(2)

Relevant legal provisions (EPC 1973):

-

Keyword:

"Clarity - yes"

"Inventive step - yes, new experimental results"

Decisions cited:

-

Catchword:

-



Case Number: T 0811/10 - 3.3.09

D E C I S I O N
of the Technical Board of Appeal 3.3.09
of 28 October 2011

Appellant: Kraft Foods Global Brands LLC
(Applicant) Three Lakes Drive
Northfield, IL 60093 (US)

Representative: Murray, Adrian D'Coligny
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 4 December 2009
refusing European patent application
No. 06118220.0 pursuant to Article 97(2) EPC.

Composition of the Board:

Chairman: W. Sieber
Members: J. Jardón Álvarez
R. Menapace

Summary of Facts and Submissions

- I. This appeal lies from the decision of the examining division dated 4 December 2009, refusing European patent application No. 06 118 220.0.
- II. The decision was based on two sets of claims, namely a main request and an auxiliary request 1, filed with letters dated 22 September 2009 and 21 October 2009 respectively. Claim 1 of the main request read as follows:

"1. A method for extracting chemoprotectant precursors comprising:

- forming an aqueous extract of crucifer seeds or sprouts;
- contacting the aqueous extract with about 8 to about 12 weight percent of an activated carbon adsorbent; and
- separating the adsorbent from the aqueous extract to provide a chemoprotectant precursor enhanced extract,

the method effective for providing a chemoprotectant precursor enhanced extract having a ratio of a number of alkyl glucosinolates to indole glucosinolates of at least about 30."

Claim 1 of auxiliary request 1 was based on claim 1 of the main request wherein the term "ratio of a number" was replaced by the term "ratio".

Claims 2-10 were directed to preferred embodiments of the method of claim 1 and were identical in both requests.

III. The examining division refused the application because the subject-matter of the claims was unclear in respect of the terms "ratio of a number" (main request)/"ratio" (auxiliary request 1) and because it was not possible to know how the amount of adsorbent used should be calculated (Article 84 EPC). Additionally, the subject-matter of the claims did not meet the requirements of inventive step (Article 56 EPC) having regard to the disclosure of the following document:

D1: J. W. Fahey *et al.*, "Separation and purification of glucosinolates from crude plant homogenates by high-speed counter-current chromatography";
Journal of Chromatography A, 996 (2003), 85-93.

IV. On 4 February 2010 the applicant (appellant) filed a notice of appeal, paying the appeal fee on the same day. The statement setting out the grounds of appeal was filed on 30 March 2010.

The appellant requested that the decision under appeal be set aside and that a patent be granted based on the claims of the main request or of auxiliary request 1 underlying the decision under appeal, both requests re-filed with the statement setting out the grounds of appeal.

V. On 12 July 2011 the board dispatched a summons to oral proceedings scheduled to take place on 28 October 2011. In the annexed communication pursuant to Article 15(1) of the Rules of Procedure of the Boards of Appeal, the board indicated the points to be discussed during the

oral proceedings and expressed its preliminary opinion on the case.

VI. With a letter dated 26 September 2011, the appellant filed a declaration made by one of the inventors and a further document in support of its arguments:

D2A: Declaration of Leslie West dated 4 February 2009;
and

D3A: "Vogel's Textbook of Practical Organic Chemistry", fifth edition, 1989, "Use of decolourising carbon", page 140.

VII. Oral proceedings were held before the board on 28 October 2010. During the oral proceedings the appellant withdrew its previous requests and filed an amended set of eight claims for a new main request (sole request) and an adapted description. Claim 1 of the sole request reads as follows:

"1. A method for extracting chemoprotectant precursors comprising:

a-1) forming an aqueous extract of crucifer seeds or sprouts; and

a-2) contacting the aqueous extract with 8 to 12 weight percent of activated carbon or

b) mixing crucifer seeds or sprouts directly with activated carbon before forming the aqueous extract, and

c) separating the activated carbon from the aqueous extract to provide a chemoprotectant precursor enhanced extract,

the method effective for providing a chemoprotectant precursor enhanced extract having a ratio of glucoraphanin to 4-hydroxyglucobrassicin of at least 30."

Claims 2 to 8 are dependent claims.

VIII. The relevant arguments presented by the appellant in its written submissions and at the oral proceedings may be summarised as follows:

- The skilled person would understand from the teaching of the description that the ratio of glucoraphanin to 4-hydroxyglucobrassicin was a weight ratio. The reason for that was that in examples 4 and 5 the glucoraphanin content of the extract was provided as a percentage by weight and this percentage was to be used to calculate the ratio. In its opinion it would be counter-intuitive for the proportion of glucoraphanin to be given as a weight percentage and the ratio of glucoraphanin/4-hydroxyglucobrassicin to be given as a molar ratio.
- Concerning the amount of adsorbent, the skilled person would understand that the reaction facilitated in the claimed method occurred between the crucifer seeds/sprouts and the adsorbent and the relative proportions of these two materials would determine the final proportions and ratio of alkyl glucosinolates to indole glucosinolates. This interpretation was also supported by the newly filed document D3A.

- Concerning inventive step, the appellant saw the disclosure of D1, relating to the separation and purification of glucosinolates by high-speed counter-current chromatography, as representing the closest prior-art document. The technical problem to be solved with respect to D1 was to provide a simple method for reliably obtaining a high content of alkyl glucosinolates. The skilled person would not find the solution to this problem in D1 itself, as many variables could be modified in the method of D1. Moreover, the selective separation of alkyl glucosinolates was unexpected due to the close structure of the compounds to be separated. The further experimental evidence, D2A, indicated that an unexpected enhancement in the ratio was achieved when working within the claimed range.

IX. The appellant requested that the decision under appeal be set aside and that a patent be granted in the following version:

Claims 1-8 and (amended) description (pages 1-8), all filed during the oral proceedings.

Reasons for the Decision

1. The appeal is admissible.
2. *Amendments (Article 123(2) EPC)*
 - 2.1 Claim 1 is based on claim 1 as originally filed with the following amendments:

- the adsorbent used is limited to activated carbon in accordance with claim 11 as filed. Furthermore, it is used in an amount of 8 to 12 weight percent as disclosed on page 3, last two lines of the application as filed;
- the alkyl glucosinolate is glucoraphanin as in claim 2 as originally filed;
- the indole glucosinolate is 4-hydroxyglucobrassicin as in claim 3 as originally filed; and
- the term "ratio of a number" has been amended to read "ratio" as disclosed on page 4, line 3 of the application as filed.

Additionally, it includes the alternative of mixing crucifer seeds or sprouts directly with activated carbon before forming the aqueous extract (feature b)). This amendment is supported by the disclosure on page 6, lines 16-17 of the application as filed (see also example 3 as filed).

2.2 Claims 2 to 8 correspond to originally filed claims 4 to 9 and 14, renumbered.

2.3 The amended claims therefore comply with the requirements of Article 123(2) EPC.

3. *Clarity (Article 84 EPC)*

3.1 Claim 1 requires contacting the aqueous extract of crucifer seeds or sprouts with "8 to 12 weight percent of activated carbon". The examining division objected that it was not clear from the wording of the claim whether the amount of adsorbent should be calculated as a percentage of the amount of crucifer seeds and

sprouts or as a percentage of the overall weight of the aqueous extract.

- 3.1.1 The board cannot follow this objection. As indicated by the appellant, the skilled person knows that the activated carbon is used to purify the seeds or sprouts and consequently that the relative proportions of these two components are the relevant ones for the purification. The weight of the aqueous extract plays a less important role, if any, for the outcome of the method. Accordingly, the skilled person understands directly and without ambiguity that the percentage of activated carbon relates to the amount of seeds or sprouts, even if this is not explicitly stated in the claim.

There is nothing in the specification contradicting this finding. On the contrary, it is confirmed by the working examples in the application which would all fall outside the claimed range if the amount of adsorbent were calculated as a percentage of the overall weight of the aqueous extract. It is further confirmed by D3A, wherein the amount of decolourising carbon is given as percent of the crude solid. If, on the other hand, a reference to the amount of aqueous extract was intended, one would expect a reference in terms of grams per unit of volume as, for example, in g/l.

- 3.1.2 Thus, the alternative interpretation, namely a percentage of the overall weight of the aqueous extract as suggested by the examining division, would be discarded by the skilled person for the claimed method.

- 3.2 Claim 1 further requires that the method provides an extract having a ratio of glucoraphanin to 4-hydroxyglucobrassicin of at least 30. Although not specified in the claim, this ratio has to be the amount by weight of glucoraphanin to 4-hydroxyglucobrassicin.

The reason for that is that the weight of glucoraphanin has been used in the examples to calculate the ratio. The skilled person would then assume that this weight is used to calculate the ratio. Moreover, the skilled person would be aware that the weight ratio has already been used in the literature for referring to the ratio of alkyl glucosinolates to indole glucosinolates (see for instance table 2 of US-6 521 818 B1, a document cited on page 2, line 8 of the application as originally filed), thus confirming that the ratio referred to in claim 1 can only be the weight ratio of glucoraphanin to 4-hydroxyglucobrassicin.

- 3.3 The board is therefore satisfied that the subject-matter of claim 1 fulfils the requirements of Article 84 EPC.

4. *Inventive step (Article 56 EPC)*

- 4.1 The present invention relates to a method for extracting chemoprotectant precursors, in particular alkyl glucosinolates, from an aqueous extract of crucifer seeds or sprouts. The decision under appeal and the appellant considered D1 as representing the closest prior-art and the board sees no reason to differ.

- 4.2 Document D1 describes the separation and purification of glucosinolates from a variety of plant sources such as seeds of broccoli (abstract). In paragraph 2.3 of D1 (page 87, right column) a crude broccoli seed extract is prepared by boiling and stirring broccoli seed for 2 hours in a 6.3 fold (w/v) excess of water, agitated for 2 hours in the presence of 10 g/l activated charcoal and filtered. The composition of this filtered product is not given in D1. The filtered product is then further treated and used to purify specific glucosinolates, in particular the predominant alkyl glucosinolate, glucoraphanin, which was prepared at >95% purity and reduced to powdered form by high-speed counter-current chromatography.
- 4.3 According to the appellant, the technical problem underlying the present application is the provision of a simple method for reliably obtaining chemoprotectant precursor compositions having a high content of alkyl glucosinolates. In particular, the method should provide a product having a very low amount of undesired indole glucosinolates, as these compounds are said to be problematic for maintaining good health (see paragraph bridging pages 1 and 2 of the application as filed).
- 4.4 As a solution to this problem the application proposes the claimed extraction method which is essentially characterised by the use of 8 to 12 weight percent of activated carbon as adsorbent.
- 4.5 The board is satisfied that this problem has been credibly solved by the claimed method. Example 1 in the specification shows that an initial ratio of

glucoraphanin/4-hydroxyglucobrassicin of approximately 11 is increased to 70 when using 10 percent per weight of activated carbon.

Moreover, the further experimental evidence filed during the appeal proceedings, D2A, indicates that a high ratio of alkyl glucosinolates to indole glucosinolates is not obtained when using a lower amount of activated carbon. Thus, when the amount of activated carbon is lowered from 8.0 weight percent to 7.5 or to 5.0, the ratio rapidly decreases from 30 to 20 and to 15 (see table on page 2 of D2A).

- 4.6 It remains to be decided whether, in view of the available prior-art documents, it would have been obvious for the skilled person to solve the technical problem identified above by the means claimed, namely by the use of 8 to 12 weight percent of activated carbon.
- 4.7 There is no hint to this solution in the available prior art. In document D1 the amount of activated carbon used is ca. 6 weight percent and the document is silent about the purity of the product obtained. For the further purification of the alkyl glucosinolates, document D1 uses high-speed counter-current chromatography on an acidic alumina column. There is no information in D1 indicating that the amount of activated carbon could have any effect on the ratio of alkyl glucosinolates to indole glucosinolates. In fact, having regard to the close structural relationship between both types of glucosinolates the skilled person would not actually have expected that the amount of

activated carbon would have a significant influence to the ratio.

4.8 The examining division did not acknowledge an inventive step essentially because there was no special effect linked to the increased amount of adsorbent used. This argument no longer applies in view of the further experimental evidence submitted by the appellant during the appeal proceedings showing an unexpected rapid decline in the ratio when lowering the amount of adsorbent (see 4.5 above).

4.9 Hence the board considers that, in the light of the available prior art, it would not have been obvious to a skilled person to modify the method of D1 and use 8 to 12 weight percent of activated carbon in order to provide a method for extracting chemoprotectants with a high content of alkyl glucosinolates.

4.10 Consequently, the subject-matter of claim 1 and, by the same token, of dependent claims 2 to 8 involves an inventive step within the meaning of Article 56 EPC.

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 with:
 - claims 1-8
 - description pages 1-8all filed during the oral proceedings before the board.

The Registrar:

The Chairman:

G. Röhn

W. Sieber