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Datasheet for the decision of 1 July 2008

Case Number: T 0492/07 - 3.3.09

Application Number: 01271151.1

Publication Number: 1351578

IPC: A23C 1/04

Language of the proceedings: EN

Title of invention:
Fat replacement material and method of manufacture thereof

Applicant:
Nandi Proteins Limited

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 54, 56

Relevant legal provisions (EPC 1973):
-

Keyword:
"Novelty - yes, after amendment"
"Inventive step - yes"

Decisions cited:
-

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0492/07 - 3.3.09

D E C I S I O N
of the Technical Board of Appeal 3.3.09
of 1 July 2008

Appellant: Nandi Proteins Limited
107 George Street
Edinburgh
Midlothian EH2 3ES (GB)

Representative: Chapman, Paul
Marks & Clerk Scotland
19 Royal Exchange Square
Glasgow G1 3AE
Scotland (GB)

Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 1 July 2008 refusing European application No. 01271151.1 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: P. Kitzmantel
Members: J. Jardón Álvarez
M-B. Tardo-Dino

Summary of Facts and Submissions

I. This appeal lies from the decision of the Examining Division, announced orally on 19 September 2006 and issued in writing on 16 October 2006, refusing European patent application No. 01 271 151.1, published as WO - 02/49442 (EP - 1 351 578).

II. The decision under appeal was based on a main request and a first auxiliary request filed with letter dated 9 August 2006 and on three further auxiliary requests (auxiliary requests 1a, 4a and 6) filed during the oral proceedings before the Examining Division.

Claim 1 of the main request read as follows:

"1. A fat and sodium caseinate replacement material suitable for use in the manufacture of food products, which material is soluble and non-coagulated and has emulsion stabilization properties, and which is obtainable by a method which comprises the steps of:
a) providing a substantially homogeneous aqueous fluid containing albumin and stabilizer wherein said fluid comprises from 50 to 97% w/v liquid albumin and from 3 to 50% w/v of at least one stabilizer comprising: a sugar,
b) subjecting said fluid to a controlled heat treatment at a temperature and for a period of time not less and not greater than that sufficient for obtaining from 50 to 100% denaturation of said albumin determined on the basis of the quantity of reactive -SH groups; and
c) spray drying of the heat treated fluid."

III. The Examining Division refused the application, as to the main request, for lack of compliance with the requirements of Article 123(2) EPC, as to the auxiliary request 1, for lack of clarity, as to the auxiliary request 1a, for lack of novelty and, as to the auxiliary requests 4a and 6, for lack of inventive step.

The novelty and inventive step objections were based on the following documents:

D2: EP - 1 042 960

D5: US - 5 494 696

The Examining Division denied the novelty of the product claims because it considered that the products resulting from the similar heat treatments disclosed in D2 and in D5 would have the same properties as the claimed products.

The Examining Division acknowledged the novelty of the method claims because the cited prior art did not disclose that the degree of denaturation of the albumin was determined on the basis of the quantity of reactive SH groups. It considered however that this feature was the result of an obvious choice of a known determination method not involving any unexpected technical effect or advantage.

IV. Notice of Appeal was filed on 13 December 2006 and the appeal fee was paid on 14 December 2006. The Statement setting out the Grounds of Appeal was filed on 16 February 2007.

With the Statement setting out the Grounds of Appeal filed on 16 February 2007, the Appellant filed sets of claims for seven requests, namely a main request, a main request (a) and five auxiliary requests. It also filed:

EX1: Experimental evidence and opinion from Professor Alan Cooper dated 26 January 2007 on the degree of denaturation as determined by Differential Scanning Calorimetry (DSC) of a product of the present application compared to a product according to D2.

V. By letter dated 23 February 2007 the Appellant filed:

EX2: Experimental evidence showing the different degrees of available -SH groups and properties of products of the application and products described in D2.

VI. On 27 February 2008 the Board dispatched the summons to attend oral proceedings. In the annexed communication pursuant to Article 15(1) of the Rules of Procedure of the Boards of Appeal, the Board expressed its preliminary opinion on the case.

VII. With letters dated 30 May 2008, 25 June 2008 and 27 June 2008, the Appellant submitted further arguments and filed several sets of amended claims for the continuation of the proceedings. It also filed the following documents:

D11: N. Kitabatake et al., "Conformational Change of Hen Egg Ovalbumin during Foam Formation Detected

by 5,5'-Dithiobis(2-nitrobenzoic acid)" J. Agric. Food Chem. 1987, 35, pages 953 - 957, and

D12: Two internet articles relating to Coffee Creamers entitled: "Making a Better Coffee Creamer" and "Palm-based Non-dairy Creamer"

VIII. During the oral proceedings held on 1 July 2008, the Appellant withdrew all its previous requests and filed a new main request and a new auxiliary request.

The set of twelve claims of the main request includes two independent claims: Claim 1 directed to a method of producing a fat and sodium caseinate replacement material and Claim 12 directed to the fat and sodium caseinate replacement material obtainable by the method of Claim 1. Claims 2 to 11 are method claims dependent on Claim 1. Claim 12 reads as follows:

12. A fat and sodium caseinate replacement material obtainable by a method according to any of claims 1 to 11."

The set of claims of the auxiliary request comprises only the eleven method claims of the main request. Independent Claim 1 reads:

"1. A method of producing a fat and sodium caseinate replacement material suitable for use in the manufacture of food products, which method consists of the steps of:
a) providing a substantially homogeneous aqueous fluid containing liquid whey and stabilizer wherein said fluid comprises from 50 to 97% w/v liquid whey albumin

and from 3 to 50% w/v of at least one stabilizer comprising: a sugar in an amount of 0-30% w/v and/or a salt in an amount of 0-40% w/v and an oil in an amount of from 0 to 10% w/v;
b) subjecting said fluid to a controlled heat treatment at 55-85°C for a period of time not less and not greater than that sufficient for obtaining from 50 to 100% denaturation of said albumin determined on the basis of the quantity of reactive -SH groups wherein the reference level for 100% denaturation is the quantity of reactive -SH groups in a fluid sample heated at 75°C for 30 mins; and
c) spray drying of the heat treated fluid."

IX. The arguments put forward by the Appellant can be summarized as follows:

– The Appellant pointed out that there was no precise definition of the term "protein denaturation" and that the methods for determining its extent - the sulfhydryl level measurement used according to the invention and the differential scanning calorimetry method used in D2 - were not directly comparable. The experimental evidence filed, EX1 and EX2, showed that according to the invention the whey proteins were denatured to a far lesser extent. Furthermore the products of D2 were insoluble (gelled) while the "inventive" products possessed a significant degree of solubility. A further distinction lay in the fact that the products of D2, despite the disclosure therein of a possible fat content of below 10 wt%, in practice required a much higher fat content of above 10 wt% because otherwise the products of D2 could not be used as coffee creamers.

– Concerning D5 it pointed out that there was no information on the specific method to be used to determine denaturation. The process of D5 was carried out under higher temperatures and included a further homogenisation step which was an aggressive treatment. Moreover D5 did not recognize the importance of making (water) soluble fat replacement materials.

– The claimed process was a simple process, carried out with a "gentle" heat treatment compared with the prior art and using a stabilizer which reduces the heat induced denaturation of proteins providing an advantageous and more readily soluble fat replacement material.

X. The Appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of Claims 1 to 12 of the main request or, alternatively, of Claims 1 to 11 of the auxiliary request, both filed during the oral proceedings.

Reasons for the Decision

1. The appeal is admissible.

MAIN REQUEST

2. *Novelty (Article 54 EPC)*

2.1 Claim 12 of the main request is directed to a fat and sodium replacement material obtainable by the method

according to Claims 1 to 11. The claim is thus directed to a denatured albumin obtained by subjecting an aqueous fluid containing from 50 to 97% w/v liquid whey albumin and from 3 to 50% w/v stabilizer to a controlled heat treatment to achieve a certain degree of denaturation and then spray drying the heat treated product.

2.2 The novelty of such denatured albumin was denied by the Examining Division having regard to the disclosures of D2 and D5 which also disclose the preparation of partially denatured whey proteins by similar processes (cf. D2, Claims 1 and 18 and examples and D5, Claims 1, 11 and examples).

2.3 The Appellant admitted that the values of the degree of denaturation disclosed in D2 and D5 may to some extent overlap the claimed range of the denaturation degree (cf. page 3, second paragraph of the letter dated 30 May 2008) but argued that the different measurement methods in the application and in the prior art related to differently denatured proteins, even if the values of degree of denaturation overlapped.

2.3.1 In order to demonstrate the novelty of the claimed products, the Appellant filed experimental evidence (EX1 and EX2) comparing the product of example 3 of the present application with Creamer C according to Example 1 of D2. When measured by differential scanning calorimetry the product of example 3 of the application is reported to have a degree of denaturation of 37% while the degree of denaturation of Creamer C of D2 is said to be 75% (Table 2 on page 12 of EX1); when measured by the quantity of free -SH groups the degree

of denaturation is 78% for the product of example 3 of the application and ›100% for Creamer C of D2 (Table 1 of EX2).

2.3.2 This evidence shows on the one hand that, independent of the method of measurement, the extent of denaturation in example 3 of the application is less than in Creamer C of D2, and on the other hand that the absolute values of the degree of denaturation depend on how it is measured, that is to say, on how the term 'denaturation' is defined. In consequence, the product of example 3 of the application, being only 37% denatured according to the DSC method, falls outside the product definition of Claim 1 of D2, which requires 40 to 90% denaturation. It is however clear that compounds of the present application having a higher degree of denaturation (up to 100% measured by the reactive -SH method) would necessarily show a degree of denaturation over 40% (measured by the DSC method).

The same applies for the further examples in D2 having a lower degree of denaturation when measured by DSC; they would fall within the range claimed by the application when measured by the reactive -SH group method.

In summary, the degree of denaturation of the claimed denatured proteins overlaps the degree of denaturation disclosed in D2 and it cannot be regarded as a distinguishing feature.

2.3.3 The Appellant has further argued that the lower limit of the range "5 to 50%" of lipid, based on the weight of the dry mix, as defined in paragraph [0026] of D2,

is not credible because creamers need to have a higher amount of fat (over 20%) to provide the desired foaming and mouth feel. The Appellant relied on its making, reported in EX2, of a creamer according to D2 but with only 10% fat, which did not display the appropriate creamer properties.

In the Board's judgment, these results, even if accepted *arguendo*, cannot eliminate the overlap in the lipid content of the products according to the present application and those according to D2 because the claimed invention allows for a lipid content of the dry powder obtained after spray drying of up to 20 % (by weight) (see page 12, lines 17 - 24) and is thus not limited to the lipid content of up to 10 % w/v (weight-volume percentage) in the aqueous fluid defined in Claim 1. This leads to a literal overlap of 5 to 20% with respect to the 5 to 50% range disclosed in [0026] for the creamers of D2, which cannot be dismissed as unrealistic and thus outside D2's effective disclosure, at least with regard to the upper part of the overlap.

Consequently the amount of fat cannot establish novelty over the products of D2.

2.3.4 Finally the Appellant pointed out that the claimed material has improved (water) solubility over the products of D2, which are said to be denatured to an extent sufficient to reduce its solubility.

In the absence of any quantification of this property in the present application the term "improved solubility" is vague and does not allow a proper comparison with the products of the prior art. This

relative term cannot therefore be used to establish novelty over the products of D2.

2.3.5 The same considerations apply to the fat replacement materials disclosed in D5. Although a direct comparison of the materials is not possible because in D5 another method is used to measure the degree of denaturation, it is noted that the temperature and time conditions used for the denaturation step overlap to a great extent and, consequently, both methods would result in products having similar degrees of denaturation. Moreover in regard to D5 the Appellant argued in relation with inventive step that the advantage of the present process was the absence of a homogenisation step, allowing a simpler preparation of a denatured protein with a minimum number of process steps. This implies that, at least to some extent, admittedly the same products are obtained by the process of D5 and the process of the application.

2.3.6 Consequently there is no feature present which can distinguish the materials disclosed in D2 and in D5 from those of Claim 12 of the current main request.

2.3.7 For these reasons the subject-matter of Claim 12 of the main request lacks novelty.

AUXILIARY REQUEST

3. *Amendments (Article 123(2) EPC)*

3.1 Claim 1 is directed to a method of producing a fat replacement material combining originally filed claims 1, 10, 11 and 14 and limited to the use of whey as

starting material (see, for instance, originally filed Claim 3). It further specifies:

- the method of determining the albumin denaturation degree (support: page 8, lines 19 - 24) and the reference level for 100% denaturation (support: page 15, lines 12 - 15), and
- that the product obtained is also a sodium caseinate replacement material (see page 4, line 20 to page 5, line 5 of the application as originally filed).

Additionally, the word "comprises" has been amended to read "consists of" in accordance with the whole disclosure of the specification, wherein no further steps are included (see in particular the working examples).

3.2 Claims 2 and 3 are supported by page 7, lines 18 - 20 of the description and further include the correction of an obvious error ("water content" corrected to "solids content"). Claims 4 to 9 have their basis in the original Claims 4, 5, 9, 16, 17 and 18 respectively, Claim 10 is supported by page 9, lines 5 - 6 of the description and Claim 11 is supported by page 11, lines 9 - 11 and the working examples.

3.3 The subject-matter of the claims meets the requirements of Article 123(2) EPC.

4. *Novelty (Article 54 EPC)*

4.1 The subject-matter of Claim 1 of the auxiliary request is directed to a method of producing a fat and sodium caseinate replacement material from an aqueous fluid containing liquid whey and stabilizer (sugar and/or

salt), which process consists in providing a homogeneous aqueous fluid containing liquid whey and stabilizer (step (a)), subjecting this fluid to controlled heat treatment to partially denature the albumin (step (b)) and spray drying the heat treated fluid (step (c)). It follows that the claimed method does not allow for further/different steps to be performed.

4.2 Neither D2 nor D5 disclose a process as now claimed. Both documents disclose the preparation of partially denatured whey protein including a heat treatment followed by a further homogenization step (see D2, working examples and D5, Claim 11, step (c) and working examples).

4.3 The subject-matter of Claim 1 is therefore novel.

5. *Inventive step (Article 56 EPC)*

5.1 Closest prior art

5.1.1 The present application provides a method for the manufacture of an albumin based material, suitable for use in the food industry. This material is intended to be used to replace at least some of the fat found in a food product, for instance in mayonnaise.

5.1.2 Documents D2 and D5 describe processes for the preparation of partially denatured whey proteins which are also suitable for use in food materials.

Document D2 describes the preparation of a partially denatured whey protein which is intended to be used in

creamers in place of liquid cream/milk. The products of D2 are not intended as fat replacement materials - they may comprise up to 50% fat - and consequently D2 cannot be regarded as the closest prior art document.

Document D5, which in the Board's judgment represents the closest prior art document, describes the preparation of a partially denatured whey protein for use as a food additive (see Claims 1, 11 and 14). The partially denatured protein is used as a fat substitute as it allows replacing a part of the fat normally contained in the mayonnaise with water (see Column 12, lines 1 - 6). The denaturation process of D5 requires introducing diluted protein-enriched whey retentate and steam into a homogenizer in order to ensure that small particles with a mean particle diameter in the range from 30 to 60 μm are generated (see Claims 1; 11, step c); column 4, lines 38 - 52).

5.2 Problem and solution

5.2.1 The problem to be solved by the present application can be seen as being to provide an alternative, simplified, method for the preparation of a fat replacement product.

This problem is credibly solved by the claimed process wherein, by selecting the amount of stabilizer used (Claim 1, step (a)) and by carefully controlling the heat treatment in order to obtain a certain degree of denaturation (Claim 1, step (b)), the homogenization treatment can be left out.

The thus-obtained fat replacement materials are said to have comparable or superior physical and processing

qualities compared to the known materials (see page 3, line 23 to page 4, line 18). Mayonnaise prepared with the materials obtained by the process of Claim 1, while having a reduced fat and cholesterol content, exhibits similar viscosity, texture and storage stability to standard mayonnaise (see example 4).

5.3 Inventive step

5.3.1 There is no hint to this solution in the available prior art. As discussed above the homogenization step is an essential feature of the process of D5 in order to avoid the gritty taste sensation of the prior art denatured whey proteins and this process step cannot be omitted without prejudicing the desired improved organoleptic properties. There would be no reason therefore for the skilled person to omit such an essential step of the method of D5.

Notwithstanding that D2 is not considered by the Board to represent an appropriate starting point for the assessment of inventive step it is noted that also according to this document a homogenization is effectively carried out and that nothing in D2 would suggest that carrying out the denaturation without such step would lead to products useful as fat replacement materials.

5.3.2 For these reasons the subject-matter of Claim 1, and in view of their dependency also the subject-matter of dependent claims 2 to 11, involves an inventive step.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the department of first instance with the order to grant a patent on the basis of Claims 1 to 11 of the auxiliary request filed during the oral proceedings, after any necessary consequential amendments of the description.

The Registrar: The Chairman:

G. Röhn P. Kitzmantel