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**Datasheet for the decision  
of 19 February 2008**

**Case Number:** T 1320/05 - 3.3.09

**Application Number:** 96914594.5

**Publication Number:** 0783254

**IPC:** A23L 3/36

**Language of the proceedings:** EN

**Title of invention:**

Method of making frozen compositions

**Patentee:**

The Pillsbury Company

**Opponent:**

Unilever PLC

**Headword:**

-

**Relevant legal provisions:**

EPC Art. 54(3), (4), 56

**Keyword:**

"Main request and auxiliary requests 1-3 - novelty (no)"

"Auxiliary request 4 - inventive step (yes)"

**Decisions cited:**

G 0001/83, G 0002/88, G 0006/88

**Catchword:**

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Case Number: T 1320/05 - 3.3.09

**DECISION**  
of the Technical Board of Appeal 3.3.09  
of 19 February 2008

**Appellant I:**  
(Opponent)

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**Decision under appeal:**

Interlocutory decision of the Opposition  
Division of the European Patent Office posted  
8 August 2005 concerning maintenance of  
European patent No. 0783254 in amended form.

**Composition of the Board:**

**Chairman:** P. Kitzmantel  
**Members:** J. Jardón Álvarez  
W. Sekretaruk

## Summary of Facts and Submissions

I. This decision concerns the appeals filed by the Opponent and the Patent Proprietor against the interlocutory decision of the Opposition Division which found that the European patent No. 0 783 254 in amended form satisfied the requirements of the EPC.

II. The patent was based on the European patent application No. 96914594.5 in the name of THE PILLSBURY COMPANY, which had been filed on 20 May 1996 as International application PCT/US96/06519 (WO 96/39878). The grant was announced on 29 August 2001 (Bulletin 2001/35) on the basis of 7 claims. Independent Claims 1 and 7 read as follows:

"1. A method for minimizing ice crystal size in a frozen composition without subjecting the dessert to a temperature lower than  $-28.9^{\circ}\text{C}$  ( $-20$  degrees Fahrenheit) prior to storage at a temperature greater than  $-28.9^{\circ}\text{C}$  ( $-20$  degrees Fahrenheit), the method comprising:

preparing a mixture of ingredients that include water; and

adding an anti-freeze protein to the mixture of ingredients.

7. A frozen composition product comprising an anti-freeze protein, wherein the anti-freeze protein is present in a concentration of not more than 100 parts per million."

Claims 2 to 6 were dependent claims.

III. A notice of opposition, requesting revocation of the patent in its entirety on the grounds of Article 100(a) and (b) EPC was filed against the patent by Unilever PLC on 29 May 2002.

During the opposition proceedings the following documents were cited:

D1: US - 5 118 792

D2: WO - 92/22581

D3: "Hardening of Ice Cream" G. Larsen, Scandinavian Dairy Information 1990, 4(4), 31 - 33

D4 "Ice Recrystallization in Ice Cream and Ice Milk" by D.P. Donhowe, D. Phil thesis, University of Wisconsin-Madison, 1993, page 126 and Abstract

D5: "Ice cream", 4th edition (1986), W.S. Arbuckle, Published by Van Nostrand Reinhold Company, New York, 1986, pages 202 - 203, 232 - 235, 238 - 239 and 262 - 267

D6: "Antifreeze Proteins: Properties, Mechanism of Action and Possible Applications" by R.E. Feeney *et al.*, Food Technology, 1993, pages 82 - 90

D7: WO - 96/11586

D8: "Ice Cream service Handbook", Arbuckle, 1976, The Avi Publishing Company, Inc., pages 14 - 15

D9: "How a fish protein may help preserve ice cream",  
Business Week, 15 December 1986, page 39, and

D10: "Keeping ice crystals out of ice cream" by  
R. Highfield, Daily Telegraph, 10 January 1987

IV. By its interlocutory decision announced orally on 11 May 2005 and issued in writing on 8 August 2005, the Opposition Division held that the grounds for opposition did not prejudice the maintenance of the patent in amended form on the basis of the claims according to auxiliary request 4.

The Opposition Division found that the subject-matter of Claim 1 of the then pending main and first auxiliary requests was not novel having regard to the disclosure of example 4 of D7, a document to be considered as state of the art in accordance with Article 54(3), (4) EPC 1973.

The Opposition Division rejected auxiliary requests 2 and 3 because of a lack of compliance with the requirements of Article 123(2) EPC.

Finally, the Opposition Division acknowledged novelty and inventive step of the subject-matter of the claims according to auxiliary request 4. The Opposition Division started from document D5 as closest prior art. With regard to this document, which dealt with the control of ice-crystals during ice-cream preparation, the Opposition Division considered that there was no incentive for the skilled person to introduce an anti-freeze protein into the ice-cream composition. Rather, the skilled person would have considered lowering the

hardening temperature and/or increasing the rate of cooling. Moreover, even if the skilled person would turn to documents using anti-freeze protein such as D1, D9 or D10, he would still have no incentive to eliminate the blast freezing hardening step.

Claim 1 as maintained by the Opposition Division read as follows:

"1. A method for minimizing ice crystal size in a frozen composition which is a dessert, the method comprising:  
preparing a mixture of ingredients that include water;  
pasteurizing and homogenizing the mixture,  
optionally aging the mixture at 0 to 4.4°C (32 to 40°F),  
adding an anti-freeze protein to the mixture of ingredients, wherein the anti-freeze protein is added to the mixture before or after pasteurization,  
adding flavors,  
freezing and packaging the mixture at about -7.8 to -3.9°C (18 to 25°F), and  
storing the mixture at a temperature of about -23.3 to -28.9°C (-10 to -20°F),  
wherein the dessert is not subjected to a temperature lower than -28.9°C (-20°F) prior to storage at a temperature greater than -28.9°C (-20°F)."

V. On 7 October 2005 the Opponent (Appellant I) filed an appeal against the interlocutory decision of the Opposition Division and paid the appeal fee on the same day.

In the Statement of Grounds of Appeal filed on 8 December 2005, Appellant I requested that the

decision be set aside and the patent be revoked because the subject-matter of the claims allowed by the Opposition Division lacked inventive step and further contravened Articles 84 and 123(2) EPC.

Appellant I filed further submissions on 15 December 2005, 5 June 2006 and 31 January 2007. It also filed the following fresh documents:

D11: US - 5 345 781

D12: "The blast factor". R. Sutton *et al.*, Dairy Industries International, February 1996, 61(2) pages 31 and 33 and

D13: "The Effects of Antifreeze Proteins on Chilled and Frozen Meat". S.R. Payne *et al.*, Meat Science 37 (1994), pages 429 - 438

VI. On 18 October 2005 the Patent Proprietor (Appellant II) also filed an appeal against the decision and paid the appeal fee on the same day.

With the Statement setting out the Grounds of Appeal submitted on 16 December 2005, Appellant II requested that the decision be set aside and the patent be maintained on the basis of a main request or any of the auxiliary requests 1 to 5 filed with said Statement of Grounds of Appeal.

VII. On 16 October 2007 the Board dispatched a summons to attend oral proceedings on 19 February 2008. In the attached Communication the Board expressed its opinion that the main request on file was not allowable and

drew the attention of the parties to the points to be discussed during the oral proceedings.

VIII. With a letter dated 18 January 2008, Appellant II filed a new main request and six auxiliary requests.

Claim 1 of the main request reads as follows:

"1. A method for minimizing ice crystal size in a frozen composition which is a dessert without subjecting the dessert to a temperature lower than  $-28.9^{\circ}\text{C}$  ( $-20$  degrees Fahrenheit) prior to storage at a temperature greater than  $-28.9^{\circ}\text{C}$  ( $-20$  degrees Fahrenheit), the method comprising:

preparing a mixture of ingredients that include water; and  
adding an anti-freeze protein to the mixture of ingredients."

Claim 1 of auxiliary request 1 is based on Claim 1 of the main request but specifies that the anti-freeze protein is added to the mixture of ingredients "in protein form".

Claim 1 of auxiliary request 2 is a reformulation of Claim 1 of the main request as a use claim and reads as follows:

"1. Use of an anti-freeze protein for eliminating a step in which a dessert is subjected to a temperature lower than  $-28.9^{\circ}\text{C}$  ( $-20$  degrees Fahrenheit) prior to storage at a temperature greater than  $-28.9^{\circ}\text{C}$  ( $-20$  degrees Fahrenheit) in a method for minimizing ice



crystal size in a frozen composition which is a dessert,  
the method comprising:

preparing a mixture of ingredients that include  
water, and  
adding an anti-freeze protein to the mixture of  
ingredients."

Claim 1 of auxiliary request 3 is also based on Claim 1  
of the main request but specifies that the method is  
"an industrial scale" method.

Claim 1 of auxiliary request 4 is identical to Claim 1  
as maintained by the Opposition Division (see point IV  
above).

IX. The arguments presented by Appellant I in its written  
submissions and at the oral proceedings may be  
summarized as follows:

- Appellant I argued that the subject-matter of  
Claim 1 of the main request and auxiliary requests 1  
to 3 lacked novelty having regard to the disclosure  
of example 4 of D7, essentially because the soft  
frozen yogurt, the hard frozen yogurt and the mousse  
yogurt therein exemplified were not subjected to a  
temperature below -28.9°C. The blast freezer,  
contact plate freezer or vacuum freeze driers  
mentioned on page 10, lines 28 - 30 of D7 could not  
possibly be considered as the "normal ice cream  
freezer" used in example 4 for initial freezing and  
aeration. No hardening step was mentioned in example  
4 of D7 and such a step was not necessary/customary  
in the preparation of soft frozen yogurt.

- Appellant I pointed out that the amendment to Claim 1 to specify that the frozen composition was "a dessert" was not occasioned by a ground for opposition under Article 100 EPC and therefore contravened Rule 80 EPC 2000. It further argued that Claim 1 of auxiliary requests 2 and 3 did not fulfil the requirements of Articles 123(2) and 84 EPC.
  
- Concerning auxiliary request 4, Appellant I regarded the subject-matter of the claims of this request as lacking inventive step in view of D11 in combination with general common knowledge, or with any of D1, D2, D6, D9 or D10.
  
- Appellant I considered D11, which disclosed a process for the manufacture of ice cream realising many of the features of Claim 1, as the closest prior art document. It saw the main difference between the process set out in D11 and that according to Claim 1 as being that an antifreeze protein was not added. It considered that the skilled person would recognize that the screw extrusion process used in D11 still had some disadvantages and would then be motivated to seek an alternative solution. The skilled person would then use the anti-freeze proteins, as they were known for their ability to prevent crystal growth and recrystallization.

X. The arguments of Appellant II may be summarised as follows:

- Appellant II argued that D7 did not disclose clearly and unambiguously the claimed subject-matter, essentially because in order to arrive at it a double selection had to be made from the disclosure of D7: it was first necessary to choose a blast freezer from the list of freezers disclosed and then to select the adequate freezing temperature from the broader temperature range within which such freezers are operable.
  
- Appellant II argued that the novelty of the subject-matter of auxiliary requests 1 and 3 was given because in D7 the antifreeze protein was always incorporated via an antifreeze polypeptide-expressing microorganism and because the process of example 4 of D7 was a small-scale process and its adaptation to industrial scale would require a hardening step.
  
- Concerning auxiliary request 2, it argued that D7 did not recognize that an anti-freeze protein could be used to eliminate the step in which a dessert was subjected to a temperature lower than  $-28.9^{\circ}\text{C}$  and consequently novelty should be acknowledged. It pointed out that claims directed to a second non-medical use were allowable under the EPC.
  
- Concerning inventive step, Appellant II regarded D1 as the closest prior art. It defined the technical problem to be solved as to provide a method of preparing a frozen dessert which can produce a high quality product at low cost and applicable on an industrial scale. The claimed solution, eliminating the hardening step in the preparation of the frozen

dessert, could not be deduced from the available prior art. On the contrary, before the present invention there was a prejudice in the art that a high quality product could only be obtained if the product was rapidly cooled to very low temperatures. Moreover, taking into account that a large amount of water had to be frozen as quickly as possible and that anti-freeze proteins inhibit the concretion of further water molecules onto an existing ice crystal, the skilled person would have been motivated to retain the conventional hardening step and even lower the temperature used.

XI. Appellant I/Opponent requested that the decision under appeal be set aside and that the European patent No. 0 783 254 be revoked.

Appellant II/Patent Proprietor requested that the decision under appeal be set aside and that the European patent No. 0 783 254 be maintained on the basis of the main request or of one of the auxiliary requests 1 to 6, filed with letter dated 18 January 2008.

## **Reasons for the Decision**

1. The appeals are admissible.
2. *Procedural matters*
  - 2.1 The Board in exercising its discretion under Article 114(2) EPC decided not to admit documents D12 and D13 into the proceedings.

2.1.1 D12 was published in February 1996, i.e. nearly 8 months after the valid priority date of the patent in suit and it is therefore not state of the art according to Article 54 EPC 1973. The Board cannot accept the argument of Appellant I that this document represented the general common knowledge of the skilled person before its actual publication date. The document contains neither references to any pre-published bibliography nor any indication that it had been submitted to the publisher before the priority date of the patent.

2.1.2 D13 concerns the effect of anti-freeze protein on frozen meat. It is therefore no more relevant than documents already on file dealing with the effect of anti-freeze proteins on desserts (D1, D2, etc.).

2.2 On the other hand the Board decided to admit D11 into the proceedings due to its relevance. The admittance of D11 into the proceedings was not contested by Appellant II.

### 3. *Interpretation of Claim 1*

3.1 The subject-matter of Claim 1 of all the requests includes a "negative feature", namely "without subjecting the dessert to a temperature lower than  $-28.9^{\circ}\text{C}$  ( $-20$  degrees Fahrenheit) prior to storage".

According to the patent in suit, this feature is to be understood as having the technical meaning that the claimed method does not include a hardening step (see, for instance, [0019]).

3.2 The known processes for the preparation of frozen desserts, e.g. ice creams, include a hardening step wherein the partly frozen dessert, such as aerated ice cream, is further frozen without agitation, i.e. hardened. This hardening step is carried out at temperatures which are low enough to achieve a quick freezing of the majority of the still unfrozen water and may be carried out using different devices: hardening room/cabinet, hardening tunnel, etc. (see D5, pages 265 - 267). While, depending on the kind of device used for the hardening step, the temperature used may vary and may - for some situations - be higher than the  $-28.9^{\circ}\text{C}$  recited in Claim 1 as upper temperature limit, the parties agreed at the oral proceedings that for the manufacture of ice cream on an industrial scale, as referred to in paragraph [0002] of the patent in suit, i.e. in commercial quantities and for retail purposes, only devices where the dessert/ice cream is subjected to a temperature lower than  $-28.9^{\circ}\text{C}$  are used. Since Claim 1 is implicitly directed to a commercial manufacturing method, the feature "without subjecting the dessert to a temperature lower than  $-28.9^{\circ}\text{C}$  prior to storage" is to be understood as being directed to avoiding such a hardening step. The Board sees no reason to disagree with this interpretation.

#### MAIN REQUEST

4. *Novelty (Article 54(3),(4) EPC 1973).*

4.1 Claim 1 of the patent is essentially directed to a method for minimizing ice crystal size in a dessert, the method comprising:

- (i) preparing a mixture of ingredients that includes water,
  - (ii) adding an anti-freeze protein to the mixture of ingredients, and then
  - (iii) storing the mixture at a temperature greater than  $-28.9^{\circ}\text{C}$ , wherein
  - (iv) prior to storage, the frozen composition is not subjected to a temperature lower than  $-28.9^{\circ}\text{C}$ .
- 4.2 The novelty of this claim was contested by Appellant I having regard to the disclosure of D7, a document to be considered as state of the art in accordance with Article 54(3), (4), EPC 1973.
- 4.2.1 Document D7 discloses the preparation of frozen fermented foods using antifreeze polypeptides-expressing microorganisms (see Claim 1). The method uses a microorganism capable of secreting a fish antifreeze polypeptide (anti-freeze protein in the language of the patent in suit), the microorganism being also capable of fermenting milk to produce yogurt (see Claim 13; see also example 3).
- 4.2.2 In example 4 of D7 soft frozen yogurt is made by adding fruit syrup, stabilizers and emulsifiers to a cold fermented milk base (containing anti-freeze protein, cf. example 3) and then filling it into containers with a 50-60% overrun (i.e. aeration) using a normal ice cream freezer. The product is stored at  $0-6^{\circ}\text{C}$ . Hard frozen yogurt and mousse yogurt are also prepared by the same

method and stored respectively at below  $-25^{\circ}\text{C}$  and at below  $0^{\circ}\text{C}$ .

4.2.3 It is not disputed that features (i) and (ii) of Claim 1 (see above 4.1) are not distinguishing features of the claimed method. It is also clear that feature (iii) cannot establish novelty because all the products in D7 are stored at a temperature greater than  $-28.9^{\circ}\text{C}$ .

4.2.4 Concerning feature (iv), Appellant I pointed out that the use of a "normal ice cream freezer" to obtain a product with a 50-60 % overrun in example 4 necessarily implied that the freezing step had been made at temperatures around  $-8^{\circ}\text{C}$ . In particular none of the "conventional freezers" mentioned on page 10, lines 28 - 30 of D7 could have been used because aeration was not possible in these freezers.

Consequently, the preparation of soft frozen yogurt in example 4 did not include a step of subjecting the dessert to a temperature lower than  $-28.9^{\circ}\text{C}$  (feature(iv)).

4.2.5 On the contrary, Appellant II, although recognizing that there was no explicit disclosure of a hardening step in example 4, argued that the information given on page 10, lines 28 - 30 of D7 implied that a hardening step using the conventional freezers there identified was an integral part of the method of D7. However, in its opinion in order to come to the temperature conditions of present Claim 1 the skilled person would have first to choose a blast freezer (because this was the only listed freezer which possibly operated above  $-28.9^{\circ}\text{C}$ ) and then to select a freezing temperature of



at least  $-28.9^{\circ}\text{C}$  from the broader operating temperature range of this freezer. Such a two-fold selection would justify acknowledging the novelty of the subject-matter of Claim 1.

- 4.3 The Board agrees with Appellant I in that no hardening step is carried out in example 4 of D7. The skilled person reading example 4 of D7 would have no reason to think that an extra step (the hardening step), which was not disclosed therein, should be included.

The standard processes for the preparation of soft frozen yogurts do not include a hardening step, as was acknowledged by Appellant II during the proceedings. The aeration provided by the overrun during the freezing operation implies that in example 4 none of the freezers mentioned on page 10 can be used. Moreover, there is no indication in the example or in any other part of D7 that a hardening step should be carried out in any case. Under these circumstances the issue of a possible "two-fold selection" does not arise, simply because no hardening is carried out.

- 4.4 For these reasons the Board concludes that the disclosure of D7 anticipates the subject-matter of Claim 1 of the main request, which is therefore not novel.

AUXILIARY REQUESTS 1 - 3.

5. *Novelty (Article 54(3),(4) EPC 1973).*

- 5.1 The disclosure of D7 is also novelty destroying for the subject-matter of Claim 1 of auxiliary requests 1 to 3.

5.2 Compared to Claim 1 of the main request, the subject-matter of Claim 1 of auxiliary request 1 specifies that the anti-freeze protein is added "in protein form" to the mixture of ingredients.

5.2.1 In example 4 of D7, fruit syrup, stabilizers and emulsifier are added to cold fermented milk. The cold fermented milk is prepared using genetically engineered bacteria until the protein reaches the required concentration (1 - 100 mg/liter milk).

5.2.2 Thus, while the microorganisms are used for the preparation of the cold fermented milk, during the preparation of the yogurt the anti-freeze protein is already "in protein form" when the soft frozen yogurt is prepared.

5.3 Claim 1 of auxiliary request 2 is a reformulation of Claim 1 of the main request as a "use claim". The subject-matter is now directed to the use of an anti-freeze protein "for eliminating a step in which a dessert is subjected to a temperature lower than  $-28.9^{\circ}\text{C}$  prior to storage at a temperature greater than  $-28.9^{\circ}\text{C}$ " in a method for minimizing ice crystal size in a dessert, that is to say for eliminating the hardening step.

5.3.1 As stated in G 1/83 (OJ EPO 1985, 60; Reasons 11) the EPC allows both method and use claims, but whether any activity is claimed as a method of carrying out the activity (setting out a sequence of steps) or as the use of a thing for a stated purpose (the sequence of steps being implied) is a matter of preference. So far

as the EPC is concerned, there is no difference of substance.

5.3.2 Consequently, the Board sees no difference between the subject-matter of Claim 1 of the main request directed to a method for minimizing ice crystal size in a frozen composition using an anti-freeze protein, wherein the method is carried out without a hardening step, and the subject-matter of Claim 1 of auxiliary request 2 reformulated as the use of an anti-freeze protein for eliminating the hardening step in a method for minimizing ice crystal size in a frozen composition.

5.3.3 Appellant II argued that Claim 1 of auxiliary request 2 was directed to a new use of the anti-freeze protein, such use being not disclosed in D7. It compared the claim with claims directed to a new non-medical use, as allowed in G 2/88 and G 6/88 (OJ EPO 1990, 93, 114).

5.3.4 The Board cannot accept this argument. A claim directed to a new use of a known substance requires that a new technical effect be attained by such new use. The two G-decisions relate to use of a direct effect of a substance, while Claim 1 of auxiliary request 2 is directed to the quite different use of an effect of a substance in a manufacturing process, but even if for the sake of argument these G-decisions were applicable they could not support the case of Appellant II. The reason is that in the present case no new technical effect is attained by "eliminating" something (here the hardening step) from the method disclosed in D7 that was already not done. Insofar as the claims embrace the embodiment of the example 4 of D7 wherein a hardening step was already not done, recognizing that such a

hardening step was not necessary is not a novel technical feature which could justify the acknowledgement of novelty.

5.4 Claim 1 of the auxiliary request 3 corresponds to Claim 1 of the main request but specifies that the claimed method is carried out on "industrial scale".

5.4.1 This feature cannot establish novelty over the disclosure of D7.

5.4.2 It is true that example 4 of D7 is merely a small scale example which cannot, in principle, anticipate the industrial scale method now claimed. The teaching of D7 is however not limited to the working examples. It is within the nature of D7, a patent application, that the process therein exemplified and claimed is susceptible of industrial application because this is one of the requirements to be met by a patent application. That the disclosure of D7 is intended to be applied industrially may be seen in several passages, for instances in the sections entitled "Field of the invention" or "Background of the invention", where reference is made to the storage of frozen food, a measure relating to large scale production not intended for immediate consumption.

5.4.3 It would thus be evident to the skilled person that the teaching of D7 also implies its use on industrial scale. The skilled person would then understand that the method of example 4 is a model intended for amplification/adaptation to industrial scale. There is no reason to assume that this would require the addition of a hardening step because such a hardening

step is not carried out in the preparation of soft frozen yogurt on industrial scale.

- 5.5 The subject-matter of Claim 1 of auxiliary requests 1 - 3 is for these reasons not novel.

#### AUXILIARY REQUEST 4

#### 6. *Amendments*

- 6.1 Claim 1 of auxiliary request 4 is a combination of Claims 1, 3 and 4 as originally filed. It further specifies several steps of the claimed method in accordance with the description as originally filed (cf. page 5, lines 25 - 29 and 30 - 33; page 6, line 8 and lines 10 - 12).

Moreover it has been clarified that the frozen composition mentioned on line 1 of Claim 1 is a dessert, in order to correct an (obvious) error in Claim 1 as originally filed.

Claims 2 and 4 correspond to Claims 2 and 6 as originally filed and Claim 3 is supported, for instance, by page 6, line 14 and Example 1.

- 6.2 The Board is therefore satisfied that the amendments do not introduce subject-matter which extends beyond the content of the application as originally filed (Article 123(2) EPC).
- 6.3 Amended Claim 1 is clearly limited over granted Claim 1 and therefore also fulfils the requirements of Article 123(3) EPC.

7. *Novelty (Article 54 EPC 1973)*

7.1 Claim 1 of auxiliary request 4 requires that the dessert is stored at a temperature of -23.3 to -28.9°C, clearly excluding the preparation of the soft frozen yogurt of Example 4 of D7. It includes further process steps and conditions, such as the freezing and packaging temperature range, which are not specifically disclosed in D7 or in any other of the cited documents.

7.2 As the novelty of this subject-matter was also not contested by Appellant I, no further comments are needed.

8. *Inventive step (Article 56 EPC 1973).*

8.1 Closest prior art.

8.1.1 The standard processes for the preparation of a frozen composition, such as an ice cream, comprise essentially three separate steps:

(a) a first freezing step wherein the liquid composition is frozen at a temperature allowing the formation of a semi-frozen mass wherein about 50% of the water contained in the composition is frozen. In this step crystal nuclei are formed;

(b) a hardening step wherein the semi-frozen mass is converted into an essentially completely frozen mass by exposing the semi-frozen mass to very low temperatures. In this step the yet unfrozen water crystallizes out

onto existing ice nuclei, but no new ice crystals are formed in this step; and

(c) storage wherein the hardened composition is stored at a temperature below 0°C.

8.1.2 The prior art on file may be divided into two groups:

- Documents dealing with the technology of the manufacture of ice-creams and particularly with the step of hardening (D3 - D5, D8 and D11). These documents mainly examine the ice-cream hardening process and study the parameters that affect it. None of these documents mentions the possible use of anti-freeze proteins during the manufacture of ice-cream, and
- Documents relating to the use of anti-freeze proteins to preserve foods (D1, D2, D6, D9, and D10). These documents concentrate mainly on the properties and mechanism of action of the anti-freeze proteins and their possible use in controlling the way ice crystals grow (see in particular D6). The possible use in foods including ice-creams is suggested in these documents (see D1, paragraph bridging columns 11 and 12; see also D9 and D10).

8.1.3 The Board agrees with Appellant II that the second group of documents, for instance D1, represents the closest prior art. Although no specific embodiment describing the manufacture of an ice-cream is given in these documents, their teaching is to be understood as relating to the use of anti-freeze proteins in the standard manufacture processes of ice-creams, that is

to say those processes as summarized above under 8.1.1 and including a hardening step. This interpretation of the teaching of D1 was also agreed on by the parties during the oral proceedings.

8.1.4 Contrary to this, Appellant I relied on D11 as the closest prior art, essentially because it teaches that hardening is conventionally required to avoid ice-crystals becoming too large (column 3, lines 60 - 68) and addresses the problem of remedying the deficiencies associated with hardening, namely reducing the large costs associated with hardening tunnels (column 4, lines 5 - 15).

8.1.5 In the Board's judgment the disclosure of D11 does not represent a suitable starting point for the assessment of inventive step.

Although D11 recognizes the high costs of the hardening tunnel, it proposes as a solution to this problem the use of a double screw system with two screws positioned parallel to each other with their rotational axes, a system which is not used in the now-claimed method (see D11, Claim 1; paragraph bridging columns 4 and 5).

Since D11 does not mention the use of anti-freeze proteins and proposes a completely different solution in order to avoid the high costs of conventional hardening devices it is more remote from the essential characteristics of the claimed method than eg D1.



8.2 Problem to be solved and its solution.

8.2.1 The main distinguishing feature of the claimed method with respect to the closest prior art (see 8.1.3) lies in the suppression of the hardening step.

The hardening step is considered as an essential step in the production of frozen compositions in order to obtain a high quality product having an adequate mouth feel. The rapid freezing of the compositions during hardening results in smaller ice crystals and smoother mouth feel. On the other hand, the hardening step is responsible for a high proportion of the costs for constructing and running an ice cream plant.

8.2.2 The technical problem to be solved by the patent can thus be formulated as the provision of a simplified method for preparing a high quality frozen dessert.

8.2.3 This problem is solved by the claimed method and is based on the finding that by using an anti-freeze protein, it is not necessary to harden the frozen composition at temperatures below  $-28.9^{\circ}\text{C}$ .

8.2.4 The results of the examples in the specification credibly demonstrate that frozen compositions containing anti-freeze protein, but manufactured without the hardening step, have ice crystals of a size comparable to ice crystals in similar products without anti-freeze protein, but manufactured with a hardening step (see example 1, [0033]). Thus high quality frozen compositions are obtained.

By obviating the need for a hardening step, a simplified method resulting in substantial savings in the costs for constructing and running ice cream plants is achieved. As pointed out by Appellant II, half of the initial costs of construction and half of the space requirements are saved if a hardening step is not necessary. Moreover the running costs are also considerably reduced.

8.2.5 The Board is thus satisfied that the technical problem defined above is solved by the claimed method. This finding was not contested by Appellant I.

8.3 Obviousness.

8.3.1 It remains to be decided whether or not the claimed solution is obvious over the cited prior art. The relevant question is whether, in view of the state of the art, the skilled person would have been directed to suppress the hardening step.

8.3.2 There can be no hint to this solution in the documents dealing with the manufacture of ice creams (D3 - D5, D8 or D11) because there the use of anti-freeze proteins is not mentioned at all and the hardening step is considered an essential step of the manufacture process.

8.3.3 There is also no hint to this solution in the prior art documents dealing with the use of anti-freeze proteins to preserve food materials (D1, D2, D6, D9 or D10).

According to this state of the art, freezing proteins are said to be used in order to improve the storage life of frozen products:

Thus D1 aims to provide methods and compositions for improving frozen storage life by using antifreeze proteins (column 2, lines 14 - 18). With respect to ice creams it discloses that the ice crystal growth process which occurs in most home frost-freezers upon sustained storage in the frozen state may be prevented or at least minimized by the addition of antifreeze proteins (column 11, line 58 - column 12, line 1). There is however no suggestion in D1 that it would be possible to modify the manufacturing process of frozen desserts by avoiding the conventional hardening step.

The same applies to D2, D6, D9 and D10, which refer to the ability of anti-freeze proteins to prevent recrystallization on frozen storage and do not suggest any suppression of the hardening step (see D2, page 14, lines 23 - 28; D6, page 82, left column, first paragraph and page 86, right column, third paragraph; see also D9 and D10).

From the above it becomes clear that the cited prior art gives no hint to the possibility of eliminating the hardening step when preparing frozen compositions in the presence of anti-freeze proteins.

- 8.3.4 Appellant II relied essentially on the disclosures in D11 (column 3, lines 60 - 6) and D3 (see last four lines of the Abstract), according to which ice cream which has not been appropriately hardened as well as (properly hardened) ice-cream exposed to heat shock exhibit large water-ice crystals having an undesirable flavour. It stated that the skilled person would be aware that this effect, which is caused by the increase

in the size of already large crystals at the expense of smaller ones, was the same as the effect underlying the known ability of anti-freeze proteins to suppress recrystallization, which phenomenon was produced by the same mechanism. In its opinion it would therefore be clear to the skilled person that the screw extrusion process used in D11 to eliminate the hardening step could be replaced by anti-freeze proteins to the same effect.

8.3.5 The Board finds this argument unconvincing.

Although it is correct that quick hardening of ice-cream prevents the formation of too-large ice crystals, it must be kept in mind that the main objective of the hardening step is the freezing of about 50% of the water which remains in an unfrozen state after the initial freezing, i.e. a liquid/solid-phase conversion, and not the prevention of the solid/solid-phase conversion occurring during recrystallization.

Owing to these different phase conversion mechanisms, which involve quite different kinetics, the skilled person would not be motivated to eliminate the hardening step in the manufacture of ice cream merely by the fact that it was known that antifreeze proteins prevent recrystallization. In other words, it could not be predicted that the presence of anti-freeze proteins would result in this step becoming unnecessary.

Moreover there is no motivation for the skilled person to modify the teaching of D11 in such a way that its essential feature, the use of a screw extrusion system, would not be used.

8.3.6 The finding that by using an anti-freeze protein the manufacture of frozen compositions can be simplified such that a hardening step is not necessary cannot be deduced from the cited prior art.

8.3.7 Hence, the Board concludes that the person skilled in the art having in mind the technical problem to be solved and having all the prior art related to this technical field at his disposal would not have arrived in an obvious manner at the claimed invention in the form of Claim 1 of auxiliary request 4. The same applies to dependent Claims 2 to 4, which represent particular embodiments of the subject-matter of Claim 1.

9. As auxiliary request 4 of Appellant II is allowed, there is no need for the Board to deal with the further auxiliary requests.

## **Order**

### **For these reasons it is decided that:**

The appeals are dismissed.

The Registrar

The Chairman

G. Röhn

P. Kitzmantel