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**Datasheet for the decision  
of 18 June 2021**

**Case Number:** T 0505/17 - 3.3.09

**Application Number:** 10702017.4

**Publication Number:** 2391222

**IPC:** A23C9/142, A23C7/04, A23C3/037

**Language of the proceedings:** EN

**Title of invention:**  
LONG SHELF LIFE MILK AND MILK-RELATED PRODUCTS, AND A PROCESS  
AND MILK PROCESSING PLANT FOR THEIR MANUFACTURE

**Patent Proprietor:**  
Arla Foods Amba

**Opponent:**  
Valio Ltd

**Headword:**  
Process for preparing long shelf life milk/ARLA

**Relevant legal provisions:**  
EPC Art. 56

**Keyword:**  
Claims as granted: inventive step - (yes)



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Case Number: T 0505/17 - 3.3.09

**D E C I S I O N**  
**of Technical Board of Appeal 3.3.09**  
**of 18 June 2021**

**Appellant:** Arla Foods Amba  
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**Representative:** Guardian  
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**Respondent:** Valio Ltd  
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**Decision under appeal:** **Decision of the Opposition Division of the  
European Patent Office posted on 16 December  
2016 revoking European patent No. 2391222  
pursuant to Article 101(3) (b) EPC.**

**Composition of the Board:**

**Chairman** F. Rinaldi  
**Members:** A. Veronese  
E. Kossonakou

## Summary of Facts and Submissions

- I. The appeal was filed by the patent proprietor (appellant) against the opposition division's decision to revoke European patent No. 2 391 222 B1.
- II. With its notice of opposition the opponent had requested revocation of the patent in its entirety, *inter alia* on the ground under Article 100(a) EPC (lack of inventive step).
- III. The documents submitted during the opposition proceedings included:
- D1: G. Rysstad et al., International Journal of Dairy Technology, Vol. 59(2), 2006, pp. 85-96
- D2: WO 98/57549 A1
- D3: A.J. van Asselt et al., International Dairy Journal, Vol. 18, 2008, pp. 531-538
- IV. The opposition division's decision was based on a main request (the patent as granted) and auxiliary requests 1-3, filed during the oral proceedings before the opposition division. The opposition division held, *inter alia*, that the subject-matter of the claims as granted lacked inventive step over D2, the closest prior art, in combination with D1 or D3.
- V. Claim 1 of the patent as granted reads:
- "1. A method for producing a milk or milk-related product, which milk or milk-related product contains 0*

*colony forming units/mL, the method comprising the steps of:*

- a) providing a milk derivative,*
- b) physically separating microorganisms from said milk derivative, thus obtaining a partly sterilised milk derivative, and*
- c) exposing a first composition comprising said partly sterilised milk derivative to a High Temperature (HT)-treatment, wherein the first composition is heated to a temperature in the range of 140 - 180 degrees C, kept in that temperature range for a period of at most 200 msec, and then finally cooled."*

- VI. The appellant requested that the decision be set aside and that the patent be maintained on the basis of the claims as granted (main request) or, alternatively, on the basis of one of auxiliary requests 1-3, all filed with the statement setting out the grounds of appeal.
- VII. Two technical reports (D13 and D14) containing supplementary information relating to the experiments disclosed in the patent were enclosed with a letter filed by the appellant, dated 5 February 2018.
- VIII. The appellant's arguments which are relevant for the decision may be summarised as follows.
  - The claimed method differed from that described in D2, the closest prior art, in that the heating step was carried out at a higher temperature for a short period of time. The tests in the patent and in D13 and D14 showed that a micro-filtration step prevented the development of a cooked taste during a subsequent heating step; the effect of these

steps was synergistic. This finding was unprecedented.

- The problem addressed was to provide an alternative method for producing sterilised milk whose flavour was comparable with that of pasteurised milk.
- The skilled person was not prompted to replace the heating conditions of D2 with those of D1 or D3 because these caused a cooked taste to develop or resulted in a non-sterilised milk; therefore, the claimed solution involved an inventive step.
- The opponent's (respondent's) submissions questioning the significance of the results in D13 and D14 were late-filed and had to be disregarded.

IX. The respondent's arguments which are relevant for the decision may be summarised as follows.

- D2 was the closest prior art. The problem addressed was to provide an alternative method for producing sterile milk. D1 and D3 prompted the skilled person faced with this problem to heat the milk at the temperature and for the holding time indicated in claim 1.
- The tests in the patent and in D13 and D14 were not suitable to show that the claimed milk had an improved taste, let alone after 30 days, or that micro-filtration alone did not have any effect on taste.
- There was no reason not to apply the heating technology described in D1 and D3 to a process for producing milk involving micro-filtration, as in

D2; the heating steps disclosed in D1 and D3 minimised milk degradation.

X. The final requests

The appellant's final requests are those mentioned in point VI above.

The respondent requested that the appeal be dismissed.

## **Reasons for the Decision**

### **Main request - inventive step**

1. *Inventive step*

1.1 The claimed invention relates to a method for producing a sterilised milk or a milk-related product having an improved taste. The method aims at reducing the development of a cooked taste, thereby preserving the taste of a pasteurised fresh product. The method involves combining a first step, in which micro-organisms are removed by physical separation, with a second step, involving a heat treatment: see paragraphs [0001], [0011]-[0016] and [0171], and Figure 3 of the patent.

1.2 It was common ground between the parties that, as decided by the opposition division, D2 was the closest prior art. The board sees no reason to diverge from this choice. Like the opposed patent, D2 relates to a method for producing sterile milk that does not have a cooked taste and whose flavour was comparable with pasteurised milk: see page 1, lines 19-20, page 2, lines 14-28 and page 5, lines 3-7 and 31-34.

- 1.3 The method described in D2 involves the steps of:
- providing a skimmed milk,
  - subjecting the skimmed milk to a micro-filtration step to obtain a permeate having a reduced micro-organism load, and
  - exposing the permeate to a heating step at a temperature between 72°C and 134°C, to obtain a sterile product which is packaged and stored at room temperature.
- 1.4 The method defined in claim 1 as granted differs from that in D2 in that the heating step is carried out at a higher temperature, in the range of 140-180°C, for at most 200 msec. D2 specifies a lower temperature and does not indicate the duration of the heating step.
- 1.5 Starting from D2, the technical problem addressed is thus to provide an alternative method for producing a sterile milk product during which a cooked taste does not develop, thus preserving a flavour comparable with that of pasteurised milk.
- 1.6 In the context of the claimed invention, "comparable" does not mean that the milk's taste or flavour is identical to that of pasteurised milk or that no trace of cooked taste can be detected at all. Rather, it means that the taste resembles pasteurised milk as much as possible, and is closer to that taste than to the taste of UHT milk.
- 1.7 The properties of the product obtained by the claimed method were not directly compared with those of the

product according to D2. The board agrees with the appellant that this comparison cannot be made because D2 does not specify the duration of the heating step. Although a direct comparison is missing, the following evidence has to be taken into consideration.

- 1.8 The tests in example 4 and Figure 3 of the patent and in the experimental report D14 show that:
- the cooked taste of a milk that undergoes a heat treatment step at 150°C for 0.09 seconds is considerably less pronounced than that of a milk that undergoes a standard UHT step;
  - the cooked taste can be further reduced if the bacteria are physically separated from the milk by micro-filtration before the heating step.
- 1.9 The tests in D13 show that physically separating micro-organisms by micro-filtration does not alone have any influence on the cooked taste of a milk fraction that undergoes a pasteurisation step under conditions corresponding to those in D2.
- 1.10 The details relating to the experimental setting used for carrying out the tests, including the response scale for the sensory profiling, the number of assessors and the standard deviation of the observed results, are described in D13 and D14.
- 1.11 The respondent argued that the observed results were not significant because the milk was analysed after 3 days of storage rather than after 30 days, as would be required for analysing a sterilised long-shelf-life milk. Furthermore, it asserted that a pore size of 0.5-1.5 micrometres, like that mentioned in the patent,



should have been used for the micro-filtration in the tests shown in D13 rather than a pore size of 1.8 micrometres. It also submitted that the results obtained by separating micro-organisms using micro-filtration could not be generalised to other methods of bacterial separation.

- 1.12 These arguments are not convincing. D14 explicitly states that no significant difference in cooked taste was observed when the samples were stored for 30 days. The respondent has not submitted any evidence or technical reasons showing that this finding is incorrect and/or that the same results cannot be obtained if micro-organisms are separated by other methods. Nor has any evidence been provided that a pore size of 1.8 micrometres is unsuitable to separate micro-organisms or is likely to have a different effect on the taste of the milk.
- 1.13 For these reasons, taking into account the available results, the board concludes that the technical problem formulated above has been solved.
- 1.14 In view of the above considerations, there is no reason to deal with the issue of whether the respondent's submissions relating to D13 and D14 are to be admitted into the appeal proceedings.
- 1.15 The relevant question is whether, when faced with the aforementioned problem, the skilled person would have considered replacing the heating step foreseen in D2 (at 72°C-134°C) with one in which the temperature is raised to 140°C or more. It also needs to be decided whether the skilled person would have done so taking into account the teaching of D1 and D3.

1.16 The board takes the view that this is not the case, for the following reasons.

1.16.1 The gist of the invention disclosed in D2 is to reduce a milk's micro-organism load so that a temperature below that typically used to prepare UHT milk can be used for sterilisation. This prevents the development of the cooked taste characteristic of UHT milk because the milk is exposed to a lower temperature: at most 134°C and preferably from 72-98°C; see page 1, lines 19-20, page 2, lines 18-20 and page 5, lines 3-7 and 31-34. In other words, to prevent the development of a cooked taste D2 strongly advocates keeping the temperature below 134°C. There is no teaching in D2 to suggest that physically separating micro-organisms from milk can prevent the development of the cooked taste caused by a subsequent heating step. Therefore, D2 does not provide any hint towards the claimed solution.

1.16.2 The respondent contended that a prompt in this regard was found in D1 and D3.

D3 describes a process for producing a shelf-stable milk including a short heating step at a temperature of from 150-180°C for 0.2 seconds. The passage bridging pages 531 and 532 states that the authors' aim was to produce a "fresh-tasting" and microbiologically and enzymatically stable milk product. The respondent contended that this statement would have prompted the skilled person to replace the heating conditions used in D2 with those described in D3.

1.16.3 This argument is not persuasive. As noted by the appellant, the authors of D3 concede that the described method does not result in the desired "fresh-tasting" milk they were aiming at. With regard to the sensory

properties, the authors consider the milk to be "a good-quality UHT-milk but not as good as freshly pasteurized milk" (page 537, section 3.4 and section 4 "Conclusion"). Indeed, as shown in Figures 6 and 7, the "fresh taste" of the treated milk is inferior to that of pasteurised milk after 30 days and inferior to that of both pasteurised and UHT-milk after 90 days. In particular, the "cooked taste" is stronger than that of pasteurised milk after 30 days and is even stronger than that of UHT-milk after 90 days. Hence, D3 teaches that the fast heating step described results, at least to some extent, in the development of a cooked taste, negatively influencing the final taste of the milk.

- 1.16.4 It is also readily apparent that the taste of the milk in D3 is not as good as that in D2, which is said to have a flavour comparable "with the flavour of pasteurised milk" (page 5, lines 32-34). The skilled person wishing to preserve that comparable flavour would not carry out the heating step described in D3.
- 1.16.5 Moreover, nothing in D3 hinted that the development of the cooked taste could be prevented by physically separating the micro-organisms before a heating step. If anything, D3 proposes carrying out a pre-heating or a post-heating step in addition to the main high-temperature heating step.
- 1.16.6 For these reasons, when looking for a solution to the problem addressed, the skilled person would not have considered raising the temperature to that mentioned in D3, even for a short period of time. They would also not have expected physically separating micro-organisms from milk to prevent the development of the cooked taste during a subsequent heating step, let alone one involving high temperatures, as shown in the patent.

The respondent's argument that a skilled person would have looked into any heat treatment aimed at reducing the cooked taste is not persuasive, all the more so since the teaching of D3 clashes with that of D2.

- 1.16.7 D1 does not provide any prompt to the claimed solution either. This document discloses a process for producing extended shelf life milk (ESL), the milk being heated at a temperature of from 130-145°C for less than 1 second in a "Pure-Lac system". This treatment reduces the microbial count and prolongs the shelf-life under refrigerated conditions (page 85, right-hand column, and page 87, right-hand column, third full paragraph). The expected shelf life is over 45 days at max. 6°C and up to 45 days at max. 10°C (page 89, Figure 3).
- 1.16.8 The respondent argued that the skilled person reading D1 would have recognised that the heating step results in a sterilised product. This is not true. The fact that D1 requires refrigeration indicates that the milk is not sterile or, in the words of claim 1, that it does not contain "0 colony forming units/ml". Consequently, the skilled person would not refer to D1 when aiming at a sterile product.
- 1.16.9 The respondent noted that D1 recommends a high temperature and a short holding time in order to minimise sensorial degradation. However, the best kill rate and the lowest chemical degradation is obtained by a heating step at 135°C for 0.5 seconds, as compared with 127°C for 1 second (Figure 5 and page 90, left-hand column). These conditions are outside those claimed in claim 1. Furthermore, the wording "lowest chemical degradation" used on page 90 indicates that some degradation was observed at these conditions. For these reasons, even in view of the teaching of D1, the

skilled person would not have been prompted to modify the method of D2 and raise the temperature above 134°C. The argument that the skilled person would have selected the claimed heating conditions through routine experimentation is tainted by hindsight and is therefore not persuasive.

- 1.17 For these reasons the subject-matter of claim 1 as granted, and of the dependent claims, which are narrower in scope, involves an inventive step.

## Order

### For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The patent is maintained as granted.

The Registrar:

The Chairman:



G. Magouliotis

F. Rinaldi

Decision electronically authenticated