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**Datasheet for the decision
of 17 July 2018**

Case Number: T 0212/17 - 3.3.09

Application Number: 09170938.6

Publication Number: 2165608

IPC: A23C19/032, A23C19/068,
A23C19/05

Language of the proceedings: EN

Title of invention:

Method for producing cheese using a nisin-producing direct vat set culture

Patent Proprietor:

CSK Food Enrichment B.V.

Opponent:

Chr. Hansen A/S

Headword:

Relevant legal provisions:

EPC Art. 100(c), 54, 56
RPBA Art. 12(2)

Keyword:

Grounds for opposition - added subject-matter (no)

Novelty - (yes)

Inventive step - (yes)

Decisions cited:

T 1329/04

Catchword:



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Case Number: T 0212/17 - 3.3.09

D E C I S I O N
of Technical Board of Appeal 3.3.09
of 17 July 2018

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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 23 November
2016 revoking European patent No. 2165608
pursuant to Article 101(3) (b) EPC.**

Composition of the Board:

Chairman W. Sieber
Members: F. Rinaldi
F. Blumer

Summary of Facts and Submissions

- I. This decision concerns the appeal filed by the patent proprietor against the decision of the opposition division to revoke European patent No. 2 165 608.
- II. With the notice of opposition the opponent had requested revocation of the patent based on Article 100(a) (lack of novelty and lack of inventive step), 100(b) and 100(c) EPC.

The documents submitted during the opposition proceedings included:

- D1: EP 1 915 911 A1
- D2: Affidavit of Martin Holst Petersen
- D2a: F-DVS BS-10 (Product information) "okt 2001"
- D2b: Email correspondence of Martin Holst Petersen
- D2c: F-DVS CR-540 (Product information) "Oct2006"
- D3: "Better for Cheddar" Dairy Industries International, August 2005
- D10: Experimental report: "Acidification of and nisin production in milk"
- D11: Experimental report: "Studying the nisin production in a co-fermentation, between a nisin producing adjunct- and three DL-starter cultures".

- III. The decision of the opposition division was based on a main request (claims as granted) and six auxiliary requests.

Claim 1 as granted reads as follows:

"A method to produce a shaped curd mass comprising a nisin content and a sodium chloride content from a cheese milk composition, the method comprising

*a. providing a nisin-intolerant bulk starter; and
b. mixing milk, a coagulant, the nisin-intolerant bulk starter, and a nisin-producing direct vat set culture in an amount of at least 1.0×10^5 cfu/ml of the milk, to provide the cheese milk composition;*

wherein the nisin-producing direct vat set culture still experiences a lag time after said mixing, and/or

wherein the nisin-producing direct vat set culture is supplied as a lyophilized or a frozen culture, and

wherein the nisin content comprised by the shaped curd mass is at least 10 IU/g.

Claims 2 to 12 were dependent claims.

The granted claims also included a product-by-process claim 13 which was eventually deleted on appeal, so that its wording is not relevant for the present decision.

As regards the main request, the opposition division decided that (i) claim 1 did not include added subject-matter, (ii) the invention was sufficiently disclosed, (iii) the subject-matter of claim 1 was novel over the cited prior art, but (iv) it lacked inventive step in view of D3 as the closest prior art in combination with D1.

The opposition division also rejected auxiliary requests 1 to 4 for lack of inventive step, and

auxiliary requests 5 and 6 for including added subject-matter.

As to the late-filed experimental reports D10 (by the proprietor) and D11 (by the opponent), the opposition division stated in point 2 of the reasons that "a conclusion concerning the admissibility of the contested experimental reports would be reached at the end of the proceedings, should it be required", a sentence apparently copied from the minutes of the oral proceedings. However, no conclusion was given.

IV. This decision was appealed by the patent proprietor (in the following: **the appellant**). It maintained the main request (claims as granted) and auxiliary requests 1 to 4 before the opposition division, submitted new auxiliary requests 5 and 6 with the statement setting out the grounds of appeal and requested that D10 be admitted into the proceedings. It also filed the following documents:

D12: W. Engels et al., Nizo-report E 2017-020
D13: Curriculum Vitae: W. Engels
D14: Witness statement of Professor Colin Hill
D15: EP 1 273 237 A1

V. In its reply the opponent (in the following: **the respondent**) raised objections to the main request and auxiliary requests 1 and 4 and requested that D10, D12 to D14 and auxiliary requests 5 and 6 not be admitted into the proceedings.

VI. In a communication dated 23 April 2018, the board indicated the points to be discussed at the oral proceedings scheduled for 17 July 2018.

VII. Both the respondent (letter dated 15 June 2018) and the appellant (letter dated 29 June 2018) filed further submissions, in particular regarding the use of D10 at the oral proceedings before the opposition division, and the following documents:

Respondent:

Curriculum Vitae: L. Essendrup Steffensen

Appellant:

Curriculum Vitae: W. Meijer

D16: Declaration of A. Meekel

D17: E. Johansen, Genetic and Molecular Research,
2(1), 2003, 112-116.

VIII. By letter dated 12 July 2018, the respondent requested that document D17 not be admitted and filed the following document:

D18: Declaration by E. Johansen

IX. Oral proceedings took place on 17 July 2018. In the course of the oral proceedings, the appellant replaced the main request (claims as granted) with a new main request (labelled "main request - amended") which corresponded to granted claims 1 to 12, i. e. granted product claim 13 had been deleted. The respondent requested that this request not be admitted into the proceedings since it was late filed.

X. The **respondent's arguments** which are relevant to the present decision may be summarised as follows:

Admission of D10

The appellant had filed the experimental report D10 late in the opposition proceedings. At the oral

proceedings before the opposition division, the respondent's representative had requested that D10 not be admitted into the proceedings. The opposition division had then informed the parties that it would decide on admissibility if required. At the oral proceedings, however, D10 had not been relied on, and so the representative had not reiterated his request for a formal decision on its admissibility at the end of the oral proceedings.

Article 100(c) EPC

The respondent considered that claim 1 of the main request included added subject-matter for the following reasons:

- The term "lag time" was used with a different meaning from what was disclosed in the application as filed.
- The term "and/or" between the first two subordinate clauses in claim 1 beginning with "wherein the nisin-producing ..." rendered the feature of the third subordinate clause (i.e. the nisin content in the shaped curd mass) optional.
- The term "supplied as a lyophilized or frozen culture" was used with a different meaning from what was disclosed in the application as filed.

The subject-matter of claims 2 to 12 contained added subject-matter due to the fact that they were dependent on unallowable claim 1.

Novelty

The subject-matter of claim 1 lacked novelty, in view of the disclosure of examples 1 and 3 of D1. Therein, Gouda cheese was produced using nisin-intolerant bulk starter FR 18 and nisin-producing direct vat set culture BS-10, added in deep-frozen form. When

reproducing the teaching of D1, the skilled person would buy the culture BS-10 and obtain it together with the product information sheet D2a, as explained in the affidavit D2. Therefore, in carrying out the process of D1, the skilled person would produce a shaped curd mass inherently having the required nisin content.

Inventive step

The closest prior art D3 disclosed a method for preparing cheese curd using a nisin-producing culture and a nisin-intolerant starter culture. D3 did not state in which form the starter culture was added, but there were only two possibilities: bulk starter or direct vat set starter. This was confirmed by D2b. Moreover, choosing the precise dosage of the nisin-producing culture to obtain a sufficient amount of nisin was straightforward for the person skilled in the art. Thus, starting from D3, the technical problem was to provide an alternative method for producing cheese curd and the solution was obvious.

The technical problem was not the provision of an improved method. An increased production of nisin was not a technical effect derivable from the opposed patent. Therefore, D10 could not be considered supporting evidence, in line with T 1329/04.

As for D10, the tests did not properly compare the two forms of starter, namely nisin-intolerant bulk and nisin-intolerant direct vat set, because the set-up of the tests was such that the acidification with both starters remained constant. Moreover, the tests demonstrated that, irrespective of which of the two starters was used, concentrations of nisin were obtained which were well above the claimed range. Finally, the respondent's own test report D11 in fact

demonstrated that a lower nisin concentration was obtained with bulk starters than when direct vat set starters were used.

In the reply to the statement setting out the grounds of appeal, D1 was also referred to as the closest prior art. The appropriate dosage of nisin-producing starter was obvious in view of the disclosure of D2a or D3.

XI. The **appellant's arguments** which are relevant to the present decision may be summarised as follows:

Admission of document D10

D10 had been discussed at the oral proceedings in opposition. The appellant's professional representative at the oral proceedings in opposition confirmed in D16 that he had relied on D10 during the discussion of inventive step of the main request. This was even supported by the appealed decision.

Article 100(c) EPC

The subject-matter of claim 1 was directly and unambiguously derivable from the application as filed:

- The frozen or lyophilized nisin-producing direct vat set culture was added either directly or in a different form (mixed with an aqueous solution, melted or incubated with a growth medium). In any case, after addition to the milk, the nisin-producing direct vat set culture required some time before growing exponentially (page 14, lines 7 to 18).
- The expression "and/or", as normally interpreted, did not render the feature regarding the nisin content of the curd of claim 1 optional. The reading suggested by the respondent was not

technically meaningful and not supported by the application as filed.

- The nisin-producing direct vat set culture was supplied in lyophilized or frozen form for use in the claimed method (page 13, lines 30 and 31; page 14, lines 7 and 8).

Novelty

The content of D2a could not be read as being part of the disclosure of D1, because the latter document did not contain a specific reference to D2a. When reproducing example 3 of D1 the skilled person would use an adjunct blend such as the one described in D2c rather than the BS-10 of D2a. Furthermore, D1 disclosed neither the dosage level of BS-10 nor the nisin content of the shaped curd mass.

Inventive step

D1 was not the closest prior art, because it did not relate to biopreservation of cheese but rather to the improved ripening of foil-ripened cheese.

D3 was the closest prior. The subject-matter of claim 1 differed from the disclosure of D3 in that (i) the starter culture was nisin-intolerant, (ii) the starter was added as a bulk starter and (iii) the dosage of the nisin-producing direct vat set culture was 10^5 cfu/ml.

The technical problem was as disclosed in the opposed patent, namely the provision of an improved combination of nisin production and acidification of the curd mass. The solution to the technical problem was the combination of nisin-intolerant bulk starter and nisin-producing direct vat set culture. The example in the patent showed that the problem was indeed solved with the claimed composition.

The tests in D10 had been performed to demonstrate that the combination of cultures solved the technical problem and with the aim of providing a fair comparison between bulk starter and direct vat set starter. By contrast, the respondent's tests of D11 had been carried out with different starters: they did not compare like with like.

XII. The **appellant's final requests** were that:

- the decision under appeal be set aside;
- the patent be maintained on the basis of claims 1 to 12 filed as "main request - amended" during oral proceedings before the board on 17 July 2018 (main request), or according to any one of auxiliary requests 1 to 4 submitted before the opposition division and re-submitted with the statement setting out the grounds of appeal of 31 March 2017, or according to any one of auxiliary requests 5 and 6, both submitted with the statement setting out the grounds of appeal of 31 March 2017; and
- documents D12 to D17 be admitted into the proceedings.

XIII. The **respondent's final requests** were that:

- the appeal be dismissed;
- the "main request - amended" filed during oral proceedings before the board and auxiliary requests 5 and 6 not be admitted into the proceedings;
- documents D12 to D14 and D17 not be admitted into the proceedings; and
- if document D17 were admitted into the proceedings, document D18 also be admitted into the proceedings.

Reasons for the Decision

Admission of D10

1. One month prior to the oral proceedings before the opposition division the appellant had filed experimental report D10. However, it is not clear from the decision under appeal or the minutes whether or not the opposition division admitted this late-filed document into the proceedings. The parties had different views on this point. The appellant requested that D10 be admitted into the proceedings and the respondent that it not be admitted.
- 1.1 According to the minutes (point 1.3), the respondent (opponent) had requested at the beginning of the oral proceedings that D10 not be admitted into the proceedings. The opposition division had then announced (point 1.4) that "a conclusion concerning the admissibility of the contested experimental reports [*i.e. D10 and D11, added by the board*] would be reached at the end of the proceedings, should it be required". This statement was repeated in point 2 of the reasons of the appealed decision. It is a matter of fact that neither the minutes nor the appealed decision contain such a conclusion - let alone a decision - as to whether D10 and/or D11 were admitted into the proceedings.
- 1.2 However, it is apparent from the appealed decision (page 10, first paragraph) that the appellant (proprietor) had referred to D10 during the oral proceedings when discussing inventive step of the main request. Furthermore, the opposition division had

considered D10, albeit only to conclude that it "should not be relied on to assess the inventive step of claim 1 as the effect shown therein was not mentioned in the Application as filed and was not directly deducible therefrom" (page 11, first paragraph).

- 1.3 Under these circumstances, the board can only conclude that D10 was part of the proceedings before the opposition division. Since, furthermore, the appellant relied on D10 in its statement setting out the grounds of appeal, it forms part of the appeal proceedings (Article 12(2) RPBA). Therefore, the parties' requests to admit, or not to admit, D10 into the proceedings are irrelevant.

Admission of D12 to D17

2. Documents D12 to D14 and D17 were not used during the oral proceedings. Therefore, the board considered that a decision on the admission of these documents into the proceedings was not necessary. The parties had no objection to this approach.
3. As the respondent did not raise any objections to the admission of D15 and D16, the board saw no reason not to admit them.

Admission of the main request - amended

4. At the oral proceedings the appellant replaced the main request (patent as granted) with a new main request (labelled "main request - amended") which corresponded to granted claims 1 to 12, i.e. granted product-by-process claim 13 had been deleted. The respondent objected to the admission of this request, because it was late filed. However, the deletion of granted

claim 13 did not add any complexity to the case or give rise to new issues. In fact, the main issue in the present case, namely the patentability of the subject-matter of claim 1 as granted, was in no way affected by the deletion of the claim. Therefore, the board decided to admit this request.

The opposed patent

5. The claimed method relates in general terms to the production of a shaped curd mass having a specified nisin content. Nisin protects cheese against unwanted bacterial contamination (paragraph [0022]). The claimed method comprises the use of a nisin-intolerant bulk starter culture and a nisin-producing direct vat set culture (claim 1). The nisin-intolerant bulk starter culture is used to reduce the pH of milk, i.e. to acidify milk (paragraph [0024]), and is prepared by inoculating a suitable medium with a mother culture, and allowing the mother culture to grow in the medium (paragraph [0025]). The nisin-producing culture is provided as a direct vat set culture, which is added to the milk directly or only after a short incubation (paragraph [0044]).

Added subject-matter - Article 100(c) EPC

6. The respondent considered that claim 1 of the main request contained added subject-matter in view of the following:
 - (a) The term "lag time" had a different meaning from what was disclosed in the application as filed.
 - (b) The addition of the words "and/or" at the end of the feature group characterising the lag time

rendered the nisin content in the shaped curd mass (10 IU/g) an optional feature.

(c) The feature "supplied as a lyophilized or frozen culture" was used in a different context as compared with what was disclosed in the application as filed.

6.1 On objection (a), the respondent basically argued that "lag time" in claim 1 encompassed the complete lag time, whereas in the application as filed "lag time" referred only to a fraction of the lag time. The board does not agree. The term "still experiences a lag time" (claim 1) and "should not exceed the lag time" (application as filed, page 14, lines 15 and 16) do not mean or imply a different time range, especially in view of the sentence which immediately follows, on page 14, lines 16 to 18: "Accordingly, following its addition to the milk in step (b.), the nisin-producing direct vat set culture may still need some time before it may start to grow exponentially." The person skilled in the art would know that the time frame before the exponential growth of bacteria is called lag time. This was also discussed in the appealed decision (point 3.2.1). Thus, the time frame defined in the description encompasses not only part of the lag time but also the entire lag time, for example when a lyophilized or frozen culture is used.

6.2 On objection (b), the relevant passage of claim 1 reads as follows:

wherein the nisin-producing direct vat set culture still experiences a lag time after said mixing, and/or wherein the nisin-producing direct vat set culture is supplied as a lyophilized or a frozen culture, and wherein the nisin content comprised by the shaped curd mass is at least 10 IU/g.

6.2.1 According to the respondent everything after the "and/or", including the nisin content of at least 10 IU/g, was an optional feature. By contrast, the appellant argued that the only technically meaningful reading of the claim was that the requirement as to the nisin content in the shaped curd mass was a mandatory feature of the claimed method.

6.2.2 The first two of the above-cited subordinate clauses start with "wherein the nisin-producing direct vat set culture" and specify the two basic alternative forms in which the nisin-producing direct vat set culture can be added to the milk in step (b.) of the method. In the first alternative, the nisin-producing direct vat set culture may be pre-treated in some way (e.g. in solution, in melted form or in an incubated form) but still experiences a lag time as explained on page 14, lines 8 to 18, of the application as filed. Alternatively, as set out in the second subordinate clause, the nisin-producing direct vat set culture may be supplied as a lyophilized or a frozen culture (page 13, lines 30 and 31), i.e. the alternative which requires the complete lag time. Yet the two alternatives are not connected by a simple "or"; instead, the expression "and/or" is used. But the conjunction "and" is technically meaningful too, as the skilled person would know that a lyophilized or frozen nisin-producing direct vat set culture still experiences a lag time, namely the complete lag time. This is an inherent feature of a lyophilized or frozen nisin-producing direct vat set culture.

6.2.3 As to the third subordinate clause, it would be immediately apparent to the skilled reader that this clause relates to a conceptually different feature, namely a nisin content of at least 10 IU/g in the

shaped curd mass, a feature which is not linked to one of the two alternative forms in which the nisin-producing direct vat set culture can be added to the milk in step (b.) of the claimed method. Thus, there can be no doubt for the skilled reader that not everything that follows the conjunction "and/or" is optional. In fact, the (sole) conjunction "and" at the end of the second subordinate clause introduces a new, independent, essential requirement of the claimed method.

- 6.2.4 As already pointed out by the opposition division, this reading of the claim is also supported by the application as filed, which leaves no doubt whatsoever that a nisin content of at least 10 IU/g in the shaped curd mass is an essential feature of the claimed method, irrespective of the form in which the nisin-producing direct vat set culture is added.
- 6.3 As to objection (c), there is first of all a literal basis for this amendment in the application as filed (page 13, lines 30 and 31). It is therefore difficult to see any issue of added subject-matter. Besides, it is clear from the application as filed as a whole that the expression "the nisin-producing direct vat set culture is **supplied** as a lyophilized or a frozen culture" appearing in claim 1 and in the sentence on page 13 is used in the sense that the culture is **added** to the milk in step (b.) of the claimed method. This is especially apparent from the passage on page 14, line 7 onwards. Again, no added subject-matter can be identified in this amendment either.
- 6.4 As concerns claims 2 to 12, the respondent did not raise any objection other than that they were allegedly based on an unallowable claim 1. However, as claim 1 is

allowable, there is no outstanding objection to the subject-matter of claims 2 to 12.

- 6.5 Thus, the ground of Article 100(c) EPC does not prejudice the maintenance of the patent.

Novelty

7. The respondent objected that the subject-matter of claim 1 lacked novelty over the disclosure of D1, which relates to a method for producing foil-ripened cheese of the Gouda or Edam type. In particular, reference was made to example 3, where a Gouda cheese was produced using the starter FR 18 (from CSK Food Enrichment B.V.) and an adjunct starter consisting of *Lactobacillus paracasei*, CR-culture and BS-10 (all from Chr. Hansen), added in deep-frozen form. It was undisputed that FR 18 is a nisin-intolerant bulk starter and BS-10 a nisin-producing direct vat set culture. Although the amount of BS-10 and the nisin content in the shaped curd mass were not indicated in example 3, the respondent argued that a person reproducing the teaching of example 3 of D1 would buy the culture BS-10 from the company Chr. Hansen and obtain it together with the product information sheet D2a. In carrying out the process of example 3 and using the instructions detailed in D2a, they would carry out the claimed process and obtain a shaped curd mass having the required nisin content.

- 7.1 The board disagrees. There is simply no instruction whatsoever in D1, the "primary document", to turn precisely to D2a, the "secondary document". Thus, the strict conditions set in section I.C.5.1 of the Case Law of the Boards of Appeal, 8th edition, 2016, for combining references in a novelty attack are not fulfilled in the present case. Also the affidavit D2

can have no bearing on how the straightforward disclosure of D1 has to be interpreted. Hence, for this reason alone, the respondent's argument cannot succeed.

7.2 But even if it were accepted that the person trying to reproduce example 3 was aware of D2a, there would be no compelling reason for that person to have used the general indications given in D2a when carrying out the process of example 3. As is apparent from D1 itself and as discussed during the oral proceedings, BS-10 was used in example 3 in combination with other bacterial cultures as an adjunct starter (of the type disclosed in D2c) and was not used for its antimicrobial activity described in D2a. In view of this, example 3 of D1 (and also, for the same reasons, example 1 of D1) cannot be regarded as disclosing mixing milk and BS-10 in an amount as set out in D2a, let alone in an amount of at least $1.0 \cdot 10^5$ cfu/ml of the milk. As the concentration of BS-10 is unknown, it is self-evident that there is no direct and unambiguous disclosure of the amount of nisin in the shaped curd in example 3 (and example 1).

7.3 In view of this, the subject-matter of claim 1 and of depending claims 2 to 12 is novel over D1 (Article 54 EPC).

Inventive step

8. The respondent raised objections of lack of inventive step to the subject-matter of claim 1, using two documents, D1 and D3, as the closest prior art.

The closest prior art:

8.1 In the reply to the statement setting out the grounds of appeal, the respondent referred to D1 as a possible

closest prior-art document. However, D1 relates to the improved ripening of foil-ripened cheese (paragraph [0007]). The adjunct culture used in D1 provides lysis of starter bacteria, which release enzymes including ripening enzymes (paragraph [0016]). Therefore, the adjunct culture - which includes the nisin-producing culture - is not used for providing a specific nisin content.

8.2 D3 is a promotional article by Chr. Hansen and relates to the production of cheese, in particular Cheddar. It advertises the use of BS-10, a nisin-producing culture, to inhibit spoilage in cheese. D3 does not include detailed steps of a method of producing a shaped curd mass. Nevertheless, it states that BS-10 is sold in the form of concentrated frozen pellets and that it can be added directly to the cheese milk without prior inoculation. Levels of up to 10 ppm nisin (which corresponds to 400 IU/g) can be detected in the cheese curd, which is enough to retard/inhibit the growth of the spoilage organisms.

8.3 Thus, D3 is more closely related to the problem addressed in the patent in suit and therefore it is considered to be the closest prior art. Indeed, it was used in the appealed decision, by the appellant and, in its alternative inventive-step attack, by the respondent as the closest prior art.

Distinguishing features:

8.4 The parties disagreed as to which features of claim 1 of the main request D3 did not disclose.

8.4.1 The respondent argued that the penultimate sentence in D3, which reads "[d]uring the early stages of ripening

the released nisin has been reported to affect lysis of the bacterial cell that would increase proteolysis and thereby enhance flavour", indicated that a nisin-intolerant starter was used in combination with BS-10. In its view, "lysis of the bacterial cell" could only occur in nisin-intolerant starters. However, D3 explicitly mentions that the cheese-making process involves two different types of bacteria, the starter culture and also the non-starter lactic acid bacteria during ripening (left column, lines 15 to 19). Thus, there is no unambiguous disclosure as to whether the cell of the starter bacteria or that of the non-starter lactic acid bacteria is lysed. Moreover, since the above-cited sentence of D3 explicitly relates to the ripening process, the board cannot identify a direct and unambiguous disclosure of nisin-intolerant starter cultures in D3.

8.4.2 D3 is silent on the form in which the starter is added. Furthermore, although D3 describes levels of up to 10 ppm nisin which have been detected in cheese curd, there is no disclosure of any dosage rate for the nisin-producing direct vat set culture.

8.4.3 Consequently, the subject-matter of claim 1 differs from the closest prior art D3, because the latter does not disclose the following three features:

- (i) the starter culture is nisin-intolerant;
- (ii) the starter is added as a bulk starter;
- (iii) the dosage of the nisin-producing direct vat set culture (10^5 cfu/ml).

The objective technical problem:

8.5 The appellant relied on the technical problem stated in the opposed patent, namely the provision of an improved culture system which provides for a reproducible production of sufficient acidification (lactic acid) and nisin in curds, paragraph [0009] and [0010]. The solution proposed in the patent is a method for producing a shaped curd mass which comprises the use of a nisin-intolerant bulk-starter and a nisin-producing direct vat set-culture (paragraph [0011]). A corresponding disclosure is found in the application as filed, page 2, line 27, to page 3, line 11.

8.6 By contrast, the respondent considered that the technical problem solved by the claimed subject-matter could only be seen in the provision of an alternative method for producing cheese.

8.7 Test report D10 is relevant in deciding whether the more ambitious technical problem described in the opposed patent or the provision of a mere alternative method is the objective technical problem. The appellant had filed it during the opposition proceedings to demonstrate that the combination of a nisin-intolerant bulk starter and a nisin-producing direct vat set culture provides an improved nisin production and acidification.

8.7.1 According to the test set-up in D10, milk is incubated with two different starter combinations:

(A) nisin-intolerant **bulk starter** + nisin-producing direct vat set culture (BS-10) and

(B) nisin-intolerant **direct vat set starter** +
nisin-producing direct vat set culture (BS-10).

The culture Bos was used as the nisin-intolerant bulk starter and also as the nisin-intolerant direct vat set starter. To ensure that the results were comparable, the amounts of the bulk starter and the direct vat set starter were adjusted to provide a similar acidity within six hours (D10, page 3). The tests were carried out for two different concentrations of bulk starter and corresponding concentrations of direct vat set starter. The results show that the concentration of nisin obtained in milk (and consequently also in curd) was higher when the nisin-intolerant bulk starter was used in combination with BS-10, i.e. claimed combination (A), than when the combination of nisin-intolerant direct vat set starter and BS-10, i.e. combination (B), was used (figure 1 and 2).

8.7.2 The respondent criticised the set-up of D10. However, the board considers that D10 represents a fair attempt to demonstrate the claimed advantages of the combination of a nisin-intolerant bulk starter + BS-10 over the combination of a nisin-intolerant direct vat set starter + BS-10. Firstly, the same starter culture (i.e. Bos) was used for testing the performance of bulk starter vs. direct vat set starter. Secondly, the concentration of Bos bulk starter and Bos direct vat set starter was adapted so as to provide the same acidification within 6 hours in the cheese-making process. For a meaningful comparison of the acidification rate and the nisin production, it is reasonable to keep a first aspect constant (in this case the acidification) in order to monitor differences in a second aspect (nisin production). Therefore, in the board's view, the results obtained in D10 credibly

demonstrate the superiority of combination (A): nisin-intolerant bulk starter + nisin-producing direct vat set culture (BS-10).

8.7.3 The respondent argued that the technical problem stated by the appellant was not derivable from the opposed patent. Therefore, the experimental results from D10 could not be used to prove the presence of an inventive step. In this context, it referred to T 1329/04.

8.7.4 In T 1329/04 (point 12 of the reasons) it was stated that "[t]he definition of an invention as being a contribution to the art, i.e. as solving a technical problem and not merely putting forward one, requires that it is at least made plausible by the disclosure in the application that its teaching solves indeed the problem it purports to solve. Therefore, even if supplementary post-published evidence may in the proper circumstances also be taken into consideration, it may not serve as the sole basis to establish that the application solves indeed the problem it purports to solve". In the case before it, the board decided that the post-published evidence could not be regarded as supporting other evidence that had been provided in the application as filed because there was no evidence at all in that application. In fact, the post-published evidence was considered to be the first disclosure going beyond speculation.

8.7.5 However, in the present case the solution to the technical problem stated in the application as filed (improved culture system which provides for a reproducible production of sufficient lactic acid and nisin in curds during cheese manufacture) has been made plausible by the disclosure in the application as filed. Firstly, the focus of the application as filed

was, from the outset, the combination of a nisin-intolerant bulk starter and a nisin-producing direct vat set culture. Secondly, such a combination of culture systems was used in the example of the application as filed, and it was shown that this combination worked well, i.e. it yielded good acidification and good nisin production. These aspects are discussed from page 27, line 22, of the application as filed, and it is explicitly stated on page 28, lines 4 onwards that "[i]n the present Example, optimal results regarding nisin production in and acidification of the shaped curd mass were obtained for ...". In view of this, it is plausible from the disclosure in the application as filed that its teaching solves the technical problem it purports to solve. Thus, the supporting technical evidence of D10 is not the sole basis for establishing that the application does indeed solve the problem it purports to solve and can be taken into consideration.

- 8.7.6 The respondent objected to the test set-up in D10 because the invention regarding the increased production of nisin was not derivable from the application documents as filed, for instance from the example. However, the production of nisin as such is not the issue. As discussed above, the combination of nisin-intolerant bulk starter with a nisin-intolerant direct vat set culture is the solution to the technical problem, which is the provision of an improved culture system providing sufficient acidification and nisin in curds during cheese manufacture. The board is satisfied that D10 only backs up the teaching already directly and unambiguously described in the application as filed.

8.7.7 The respondent further reasoned that no meaningful effect regarding the nisin production had been demonstrated, because sufficiently high concentrations of nisin were also obtained when nisin-intolerant direct vat set cultures had been used. However, the amount of nisin produced as such is also not the issue. In D10, two different forms of nisin-intolerant cultures were compared (bulk starter and direct vat set culture), and an advantageous effect was identified when the nisin-intolerant starter was used in the form of bulk starter. In other words, an improvement in the process is achieved when a nisin-intolerant bulk starter (instead of a nisin-intolerant direct vat set starter) is used together with the nisin-producing direct vat set culture. This is what D10 demonstrates.

8.7.8 The respondent referred to its own test report D11, which allegedly demonstrated that a bulk starter provided a lower nisin concentration than a direct vat set culture. However, it is not clear what bacterial cultures were used in the tests of D11. In fact, it appears that all three tests were carried out with different cultures. Therefore, no meaningful information can be obtained from this report.

8.8 In view of these considerations, the objective technical problem is in fact the provision of an improved culture system which provides for a reproducible production of sufficient acidification and nisin in curds. It is self-evident from the above discussion that the problem is solved.

Obviousness:

8.9 As mentioned above, D3 does not disclose detailed process steps for producing a shaped curd mass or the

dosage of the nisin-producing direct vat set culture. Thus, the skilled person starting from D3 and trying to solve the technical problem would turn to D2a, a product information leaflet relating to BS-10, the nisin-producing direct vat set culture described in D3. D2a recommends possible dosages for and uses of BS-10.

- 8.10 As for the dosage required by claim 1 (distinguishing feature (iii), point 8.4.3 above), the board considers that selecting the appropriate dosage of the nisin-producing culture to arrive at the target nisin concentration already disclosed in D3 (10 ppm nisin, i.e. 400 IU/g) is a trivial measure for the skilled person, especially after consulting D2a. The appellant has not argued that the dosage given in claim 1 provided any surprising effect.
- 8.11 As regards the use of nisin-intolerant cultures in claim 1 (distinguishing feature (i)), the respondent argued that D2a already described a nisin-intolerant culture because "[t]oo high inoculation level of BS-10 might delay the growth of primary starter culture, due to early production of nisin." (D2a, section titled: "Dosage"). The board considers that this statement does not mean that nisin-intolerant cultures were *necessarily* used. A possible option for improving the process of D3 that is already suggested in D2a would be to optimise the level of inoculation of BS-10. If there was any delay in growth of the primary starter culture, the use of a nisin-resistant starter would be a valid option for improving the acidification and the nisin production (as done in D15, claim 1). In other words, the disclosure of D3 leaves it open whether a nisin-intolerant starter or a nisin-resistant starter should be chosen.

8.12 Furthermore, there is nothing in D3 or any other document to suggest using a nisin-intolerant bulk starter (distinguishing feature (ii)) in combination with a nisin-producing direct vat set culture to solve the objective technical problem of improving the combination of sufficient nisin production and acidification. As shown in D10, the use of a nisin-intolerant bulk starter is superior to the use of a nisin-intolerant direct vat set starter. In other words, there was no teaching in the art directing the person skilled in the art to this combination.

8.13 The respondent also argued that the skilled person would combine the teaching of D3 with the teaching of D1, which suggests using nisin-intolerant bulk starter. The board is not convinced. As already discussed in the context of novelty, D1 is not concerned with biopreservation in cheese and is silent on any target amount of nisin. Thus, the person skilled in the art had no reason to combine the teaching of D3 with that of D1. This approach appears to be based on hindsight with the knowledge of the invention in mind.

8.14 In summary, the subject-matter of claim 1 and of depending claims 2 to 12 involves an inventive step (Article 56 EPC).

Auxiliary requests

9. The main request being allowable, there is no need to discuss the auxiliary requests.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the opposition division with the order to maintain the patent on the basis of claims 1 to 12, filed as "main request - amended" during oral proceedings before the Board on 17 July 2018, and a description to be adapted thereto.

The Registrar:

The Chairman:



M. Cañueto Carbajo

W. Sieber

Decision electronically authenticated