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Datasheet for the decision of 6 September 2022

Case Number: T 0547/21 - 3.3.02

Application Number: 16795084.9

Publication Number: 3393632

IPC: B01D61/58, A23C9/142, B01D61/02, B01D61/14

Language of the proceedings: EN

Title of invention:
SYSTEM AND PROCESS FOR INCREASING SOLIDS CONTENT OF SKIM MILK OR WHEY

Applicant:
Tetra Laval Holdings & Finance S.A.

Headword:

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - (no)

Decisions cited:

Catchword:

Europäisches Patentamt
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Case Number: T 0547/21 - 3.3.02

D E C I S I O N
of Technical Board of Appeal 3.3.02
of 6 September 2022

Appellant: (Applicant)	Tetra Laval Holdings & Finance S.A. 70, Avenue Général-Guisan 1009 Pully (CH)
Representative:	Tetra Pak - Patent Attorneys SE AB Tetra Pak Patent Department Ruben Rausings gata 221 86 Lund (SE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 8 December 2020 refusing European patent application No. 16795084.9 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	M. O. Müller
Members:	M. Maremonti
	R. Romandini

Summary of Facts and Submissions

I. The appeal lodged by the applicant ("appellant") lies from the examining division's decision to refuse European patent application No. 16 795 084.9.

II. During examination proceedings, the appellant filed a set of claims according to auxiliary request 1. Independent claim 1 of this request reads as follows:

"*1. A process for production of a concentrate of skim milk or whey, comprising the steps of:*

providing a feed of skim milk or whey,

subjecting said feed to a reverse osmosis to obtain a reverse osmosis permeate and a concentrate of skim milk or whey, and

subjecting the concentrate of skim milk or whey to an ultra-filtration to obtain an ultra-filtration permeate and a retentate of skim milk or whey,

wherein the ultra-filtration permeate is returned to the feed of skim milk or whey before the reverse osmosis and/or as a feed before the reverse osmosis, and

wherein the outputs are reverse osmosis permeate and ultra-filtration retentate."

III. Document D2 was among the documents cited during the examination proceedings:

D2: Roualeyn I. Fenton-May et al., "*USE OF ULTRAFILTRATION/REVERSE OSMOSIS SYSTEMS FOR THE CONCENTRATION AND FRACTIONATION OF WHEY*", JOURNAL OF FOOD SCIENCE, vol. 36, No. 1, 1971, pages 14 to 21, XP055328658

The examining division came to the following conclusion, *inter alia*:

- The subject-matter of claim 1 of auxiliary request 1 did not involve an inventive step in view of document D2 taken as the closest prior art.

IV. In its statement of grounds of appeal, the appellant contested the examining division's reasoning as regards the above-mentioned auxiliary request 1 and submitted that the subject-matter of this request involved an inventive step. It corroborated its arguments by relying on the following new items of evidence (numbering introduced by the board):

A006: "*Sugars and carbohydrates*" at https://en.wikipedia.org/wiki/Milk

A007: "*Production*" at https://en.wikipedia.org/wiki/Whey

V. The appellant was summoned to oral proceedings according to its request. In preparation for oral proceedings, the board issued a communication under Article 15(1) RPBA 2020, in which it expressed, *inter alia*, the preliminary opinion that the claimed subject-matter did not involve an inventive step within the meaning of Article 56 EPC.

VI. By a subsequent letter, the appellant requested that the oral proceedings be held as a videoconference.

VII. By a further communication, the appellant was informed that the oral proceedings would be held by videoconference in accordance with its request.

VIII. The appellant replied to the board's preliminary opinion by letter dated 30 August 2022. With this letter, it filed a set of claims according to an auxiliary request. Moreover, it corroborated its

arguments on inventive step by referring to Figure 6.4.1 taken from the following document (numbering introduced by the board):

A008: "Dairy Processing Handbook", published by Tetra Pak Processing Systems AB, 1995

IX. Oral proceedings before the board were held on 6 September 2022 by videoconference.

X. Final requests

The appellant requested that the appealed decision on auxiliary request 1 (point II above) be set aside and a patent be granted on the basis of the claims of this request (main request in appeal proceedings). Alternatively, the appellant requested that the appealed decision be set aside and a patent be granted on the basis of the claims of the auxiliary request filed by letter dated 30 August 2022.

XI. The appellant's submissions relevant for the present decision are summarised as follows. For further details, reference is made to the reasons for the decision here below.

- Document D2 could be regarded as representing the closest prior art.
- The objective technical problem in view of D2 had to be seen in how to further increase the solids content in the retentate of the ultra-filtration (UF) step.
- The solution proposed in claim 1 of returning the permeate of the UF step to the reverse osmosis (RO) step was neither disclosed nor suggested in the prior art.
- It had to be concluded that the claimed subject-matter involved an inventive step.

Reasons for the Decision

Main request - claim 1 - inventive step under Article 56 EPC

1. The closest prior art

1.1 Both the examining division (decision under appeal, page 6) and the appellant considered document D2 to represent the closest prior art.

1.2 In view of the issues addressed in D2, the board has no reason to take another stance. Document D2 (summary; page 14, right-hand column; page 15, left-hand column and table 2, procedure A; page 19 under *Production of a concentrated "skim milk equivalent"*) discloses a process for concentrating and fractionating skim milk or whey, comprising the steps of subjecting a feed of skim milk or whey to an RO step and subsequently subjecting the retentate resulting from the RO step to a UF step so as to obtain a UF permeate and a UF retentate. According to D2 (*loc. cit.*), the aim of the disclosed process is, *inter alia*, to increase the concentration of solids in skim milk or whey. This aim is shared by the application at issue (see e.g. page 2, lines 6 to 9 and page 3, lines 21 to 24).

2. Distinguishing feature

According to the decision under appeal (page 6, last paragraph), the subject-matter of claim 1 differs from the process of D2 only in that the UF permeate is returned to the RO step. The appellant did not dispute this finding. The recirculation of UF permeate is shown in figure 1 of the application as filed, reproduced below (dotted line):

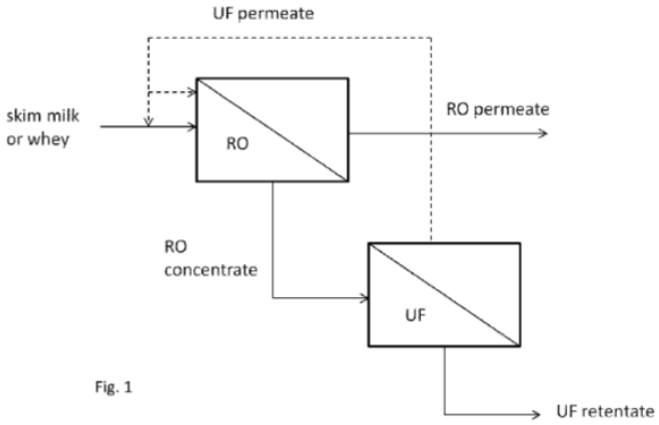

Fig. 1

3. Objective technical problem

3.1 The appellant referred to figure 6.4.1 of A008 reproduced below:

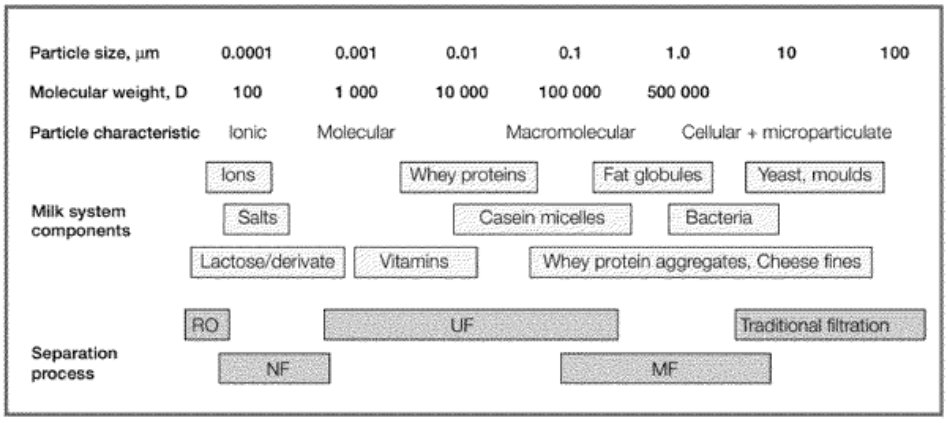

Fig. 6.4.1 *Spectrum of application of membrane separation processes in the dairy industry.*

It argued that in view of the commonly known application spectrums for filters used in dairy processing, generically shown in the above figure, it could be realised that the RO concentrate had a higher content of solids, including lactose, compared to skim milk or whey in the feed. When the RO concentrate was fed to the UF step, the UF step concentrated proteins and particles of a similar or bigger size. However, lactose was not retained and passed through the UF membrane. Thus, it could be assumed that the lactose concentration was the same in both the UF retentate and the UF permeate and that this concentration was higher

than in the feed of skim milk or whey. Compared with inputting only skim milk or whey in the RO step, as in D2, recirculating the UF permeate would therefore provide an RO concentrate with a higher lactose content. As mentioned previously, this higher lactose content did not affect the UF step, which still filtered out all the proteins. Thus, recirculating the UF permeate led to an overall increase in the total solids present in the UF retentate, including lactose, as compared with D2. It followed that the objective technical problem had to be seen in how to increase the solids content in the UF retentate.

3.2 The board notes that the application discloses, e.g. on page 3, line 30 to page 4, line 2, that the "*UF provides a UF permeate and a retentate of skim milk or whey. The solids content at this stage of the retentate may be at least 36 wt% TS; e.g. 36-50 wt%, 38-50 wt%, or 40-50 wt%. In one embodiment the ultra-filtration permeate is returned to the feed of skim milk or whey before the reverse osmosis*". Moreover, on page 5, lines 21 to 25, the application states that by "*providing the combination of RO followed by UF there is surprisingly provided a way to concentrate skim milk or whey [...]. Thus, a considerably more concentrated product may be obtained [...]*". Therefore, according to the teaching provided in the application, the high solids content of the UF retentate is associated with the combination of RO followed by UF. The application does not disclose any additional technical effect associated with recirculating the UF permeate to the RO step, let alone a further increase in the solids content as asserted by the appellant. Furthermore, neither the application as filed nor any subsequent submission from the appellant contains any experimental proof of a further increase in the solids content, let alone proof that any such

further increase results from recirculating the UF permeate.

3.3 Therefore, it can only be acknowledged that recirculating the UF permeate leads to a further increase in the solids content if the skilled person would have implicitly inferred this effect on the basis of common general knowledge.

3.4 In the appellant's favour, the board accepts this assumption and deems the objective technical problem to be the technical problem suggested by the appellant, i.e. providing a process that leads to a further increase in the solids content.

3.5 The appellant argued that this effect was known to the skilled person only "*when seeing the invention*". The board agrees. According to the problem-solution approach, the objective technical problem is established on the basis of the technical effect, if any, associated with the distinguishing feature. Any such technical effect must be disclosed in the application as filed or at least derivable from information contained in it. Hence, knowledge of the claimed invention and of how it differs from the closest prior art are necessary prerequisites for defining the effect achieved over that closest prior art. In the case at hand, and as stated above, the application does not mention any effect related to the feature distinguishing the subject-matter of claim 1 from D2. Therefore, the asserted effect can only be accepted if it is part of common general knowledge.

4. Obviousness of the claimed solution

4.1 As set out above, the definition of the objective technical problem as the provision of a process that leads to a further increase in the solids content, as suggested by the appellant and accepted by the board,

presupposes that it belonged to the skilled person's common general knowledge at the priority date of the application as filed that recirculating the UF permeate to the RO step in the process of D2 would have led to an overall increase in the solids content in the UF retentate.

4.2 In this respect, the board concurs with the examining division (decision under appeal, page 9, last paragraph) that "*the skilled person would be aware that a valuable product* [e.g. lactose] *still present in the UF permeate can be recovered by a second pass through the system. Indeed, recirculation loops are known in the art particularly for the purpose of recouping useful products from a first pass through a membrane system*" (text in square brackets added by the board).

4.3 Therefore, in view of the objective technical problem posed, the claimed recirculation would have represented an obvious technical measure that the skilled person starting from D2 would have selected on the basis of common general knowledge. It follows that the subject-matter of claim 1 of the main request would have been obtained without exercising any inventive skill.

4.4 The appellant argued that recirculating the UF permeate to the RO step was not disclosed in either D2 or any of the other documents referred to in the decision under appeal, which, according to the appellant, were instead aimed at fractionating the skim milk or whey, i.e. obtaining a UF retentate rich in proteins and a UF permeate rich in lactose. As regards D2, it referred to page 19, left-hand column, first paragraph, disclosing the further concentration of the UF permeate. Therefore, the skilled person would not have contemplated returning the UF permeate to the RO in the system since doing so would have deprived the prior-art

processes of one of their purposes, i.e. producing a UF permeate rich in lactose.

4.5 This argument is not convincing. As stated above, the fact that recirculating the UF permeate leads to an increase in the solids content of the UF retentate has to be regarded as belonging to common general knowledge. Therefore, no secondary document disclosing this feature is needed. The fact that documents referred to in the decision under appeal may be aimed at producing a UF permeate rich in lactose has no bearing on this conclusion.

4.6 The passage on page 19 of D2, as referred to by the appellant, merely concerns a procedure to be possibly followed in the event that lactose recovery is desired. This disclosure is irrelevant when it comes to the obviousness of the claimed solution. What is relevant for the assessment of inventive step is the general teaching in D2 to increase the concentration of solids in skim milk or whey by using the combination of RO and UF. Moreover, as set out above, the objective technical problem starting from D2 is providing a process that leads to a further increase in the solids content. Hence, starting from D2, the skilled person aims at further increasing the solids content rather than obtaining a UF permeate rich in lactose. The appellant's argument is an attempt to replace the objective technical problem with the one allegedly aimed at in the closest prior art. However, the objective technical problem is the problem solved by the distinguishing feature of the claimed invention over the closest prior art, not a problem allegedly aimed at in that closest prior art.

4.7 The appellant also argued that other solutions would have been available to the skilled person to concentrate skim milk or whey, e.g. evaporation.

4.8 However, the fact that other possibilities would have been known to the skilled person has no bearing on the conclusion that the claimed solution is obvious to the skilled person on the basis of common general knowledge for the reasons set out above.

5. As a consequence, the board concludes that, starting from D2, the subject-matter of claim 1 of the main request does not involve an inventive step within the meaning of Article 56 EPC in view of common general knowledge. Therefore, the main request is not allowable.

Auxiliary request - claim 1 - inventive step under Article 56 EPC

6. Claim 1 of the auxiliary request reads as follows, the board having highlighted any amendments compared with claim 1 of the main request:

"*1. A process for production of a concentrate of skim milk or whey, comprising the steps of:*

providing a feed of skim milk or whey,

subjecting said feed to a reverse osmosis to obtain a reverse osmosis permeate and a concentrate of skim milk or whey, and

subjecting the concentrate of skim milk or whey to an ultra-filtration to obtain an ultra-filtration permeate and a retentate of skim milk or whey,

*wherein the ultra-filtration permeate is returned to the feed of skim milk or whey before the reverse osmosis and/or as a feed ~~before~~ **to** the reverse osmosis~~, and~~*

~~wherein the outputs are reverse osmosis permeate and ultra-filtration retentate~~."

6.1 The appellant confirmed at the oral proceedings that the process as defined in claim 1 of the auxiliary request had not been restricted as compared with claim 1 of the main request. The amendments had been made only for clarity purposes.

6.2 It follows that the same observations by the board regarding the lack of inventive step of the subject-matter of claim 1 of the main request apply *mutatis mutandis* to the subject-matter of claim 1 of the auxiliary request. The appellant did not dispute this at the oral proceedings.

6.3 Therefore, the board concludes that, starting from D2, the subject-matter of claim 1 of the auxiliary request does not involve an inventive step within the meaning of Article 56 EPC in view of common general knowledge. As a consequence, the auxiliary request is not allowable.

Conclusion

7. None of the appellant's requests is allowable.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

N. Maslin M. O. Müller

Decision electronically authenticated