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D E C I S I O N
of 23 November 1999

Case Number: T 0942/94 - 3.3.1

Application Number: 89301335.9

Publication Number: 0330352

IPC: C07C 31/26

Language of the proceedings: EN

Title of invention:

Process for production of solid sorbitol

Patentee:

Kabushiki Kaisha Ueno Seiyaku Oyo Kenkyujo

Opponent:

Roquette Frères, S.A.

Headword:

Sorbitol powder/UENO

Relevant legal provisions:

EPC Art. 54, 56

EPC R. 67

Keyword:

"Procedural violation (no)"

"Reimbursement of the appeal fee (no)"

"Novelty (yes) - proper interpretation of the claims"

"Inventive step (yes) - non-obvious alternative"

Decisions cited:

-

Catchword:

-



Case Number: T 0942/94 - 3.3.1

D E C I S I O N
of the Technical Board of Appeal 3.3.1
of 23 November 1999

Appellant: Roquette Frères, S.A.
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Respondent: Kabushiki Kaisha Ueno Seiyaku Oyo Kenkyujo
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Decision under appeal: Interlocutory decision of the Opposition Division
of the European Patent Office posted 19 October
1994 concerning maintenance of European patent
No. 0 330 352 in amended form.

Composition of the Board:

Chairman: A. J. Nuss
Members: J. M. Jonk
S. C. Perryman

Summary of Facts and Submissions

- I. The Appellant (Opponent) lodged an appeal against the interlocutory decision of the Opposition Division by which the European patent No. 0 330 352 (European patent application No. 89 301 335.9) was maintained in amended form.
- II. The opposition was supported by several documents including:
- (1) FR-A-2 353 234,
 - (2) GB-A-1 481 846, and
 - (3) JP-A-46/15646 (English translation).
- III. The decision was based on the Claims 1 to 9 filed on 22 September 1994, independent Claim 1 reading as follows:
- "A method of producing solid sorbitol which comprises stirring sorbitol seed crystals in melted sorbitol at a temperature at which the melted sorbitol does not solidify and the seed crystals do not melt, cooling the melted sorbitol-seed crystals mixture to 50°C to 85°C, ageing the solid sorbitol at said temperature of 50°C to 85°C, and cooling the aged sorbitol to ambient temperature characterised in that the stirring of the melted sorbitol with the seed crystals is effected in the presence of 0.5 to 30% by weight, based on the weight of the melted sorbitol, of at least one addition agent selected from the group consisting of fats, oils, and surface active agents."

IV. The Opposition Division held that, having regard to the cited documents, the subject-matter of said claims was novel and also involved an inventive step. Concerning inventive step, they held in particular that the closest prior art was represented by document (2) and that the technical problem underlying the patent in suit in view of this closest prior art was the provision of an improved process for the preparation of stable particulate solid sorbitol, in which the improvement consisted in a shortened ageing step. Moreover they held that the solution of this problem as claimed in the patent in suit, namely the use of an addition agent in an amount of 0.5% to 30% by weight, based on the melted sorbitol, was not obvious in the light of the cited prior art.

V. The Appellant firstly argued that he was not given opportunity to present comments on the amended claims during the oral proceedings before the Opposition Division contrary to the provision of Article 113(1) EPC, and that this constituted a procedural violation justifying the reimbursement of the appeal fee.

Furthermore, the Appellant argued that the subject-matter of the claims was not novel in view of document (1) and document

(4) JP-A-62/275671 (English translation)

submitted together with his statement of grounds of appeal. In this context, he emphasised that the process for preparing the solid sorbitol in accordance with the examples of said documents inevitably comprised the ageing step as defined in present Claim 1 of the patent

in suit.

Moreover, he argued that in view of the cited documents the claimed process did not involve an inventive step. In this context, he argued in particular that the process for the preparation of crystalline sorbitol having a reduced tendency for caking as disclosed in document (3) only differed from the process of present Claim 1 of the patent in suit in that sorbitan monolaurate and/or sorbitan monooleate was used in an amount of at most 250 ppm, instead of at least 0.5 wt%, based on the melted sorbitol, as claimed in the patent in suit. Having regard to this closest prior art, no improvement had been demonstrated. Moreover, even if in the light of this prior art document an improvement with respect to the duration of the ageing step would be acknowledged, such an improvement could only be considered as a so-called bonus-effect, because it was already obvious in the light of documents (1), (3) and (4) to apply amounts of an addition agent, such as sorbitan monolaurate and/or sorbitan monooleate, within the range as indicated in present Claim 1 of the patent in suit.

In addition, he noted that the use of an ageing step as defined in present Claim 1 was not only known from document (3), but also from document (2).

- VI. The Respondent (Proprietor of the patent) denied that the subject-matter of the present claims lacked novelty arguing that none of the cited documents disclosed a process for preparing of sorbitol powder comprising the ageing step and the use of an addition agent as indicated in present Claim 1 of the patent in suit.

He also argued that none of the cited documents, alone or in combination, rendered the subject-matter of the patent in suit obvious. In this respect, he submitted that in the light of the closest state of the art, namely document (2), it was surprisingly found that the use of the additives substantially reduced the time necessary for the forming of stable crystalline sorbitol. Moreover, he argued that documents (1) and (4) concerned a totally different technical problem to be solved, and that document (3) did not give any incentive to the skilled person that by using additives such as sorbitan monolaurate and/or sorbitan monooleate the crystallisation time could be shortened, let alone that amounts of 0.5 to 30 wt% of such additives would be necessary.

VII. Oral proceedings, at which both parties as announced were not represented, took place before the Board on 23 November 1999 in conformity with Rule 71(2) EPC.

VIII. The Appellant had requested in writing that the decision under appeal be set aside, and that the appeal fee be reimbursed, and as main request that the matter be remitted to the first instance, and as auxiliary request that the patent be revoked.

The Respondent had requested in writing as main request that the appeal be dismissed, or as auxiliary requests that the patent be maintained on the basis of one of auxiliary requests No. 1 to No. 6 filed on 22 October 1999.

Moreover, the Respondent informed the Board on 19 November 1999 by telefax that if the patent were

only to be maintained on the basis of one or other of said auxiliary requests then, should the Board deem it to be appropriate, he would be prepared to amend the wording "so as to obtain fully crystalline sorbitol" to read "so as to obtain stable crystals".

IX. At the conclusion of the oral proceedings the Board's decision was pronounced.

Reasons for the Decision

1. The appeal is admissible.

Submissions concerning procedural violation and reimbursement of the appeal fee

2. According to Rule 67 EPC the reimbursement of the appeal fee can be ordered only if such reimbursement is equitable by reason of a substantial procedural violation.

2.1 In the present case, the Appellant submitted that he was not given opportunity to present comments on the amended claims during the oral proceedings before the Opposition Division contrary to the provision of Article 113(1) EPC. However, this was contested by the Respondent.

2.2 In this context, the Board firstly notes that the set of claims considered allowable by the Opposition Division was already faxed to the EPO and to the Appellant on 22 September 1994, so that the Appellant

was informed about the amendments in the claims before the oral proceedings held on 4 October 1994 before the Opposition Division took place. Moreover, as consistently follows from the minutes of these oral proceedings and the written decision of the Opposition Division, the then filed amended Claim 1 was discussed during these oral proceedings with respect to the effect of the addition agent on the ageing time needed for the forming of stable crystals (see point VII, in conjunction with point 4, in particular the last paragraph, and point 5 of the decision of the Opposition Division). Therefore, in the Board's judgment, the Appellant had sufficient opportunity during the oral proceedings to make any comments on the amended claim.

It is true that in view of the written submissions of both the Appellant and the Respondent in this respect, it appears to the Board that, after the oral proceedings before the Opposition Division had been closed, some informal discussion did take place concerning the need of specifying the function of the addition agent in Claim 1. However, this does not alter the fact that the Appellant had sufficient opportunity to present his case.

- 2.3 Thus, in the present circumstances, the Board concludes that there has been no substantial procedural violation, so that there is no reason to reimburse the appeal fee and to remit the case to the Opposition Division.

Main request

3. *Support of the claims under Article 123 EPC*

3.1 Present Claim 1 is supported by Claims 1, 3, 7, 8, 9 and 10, and page 5, second and third paragraph, of the application as filed.

Present Claim 2 is supported by Claim 3 of the application as filed.

Present Claim 3 corresponds to Claim 8 of the application as filed.

Present Claim 4 is supported by Claims 3 and 10 of the application as filed.

Present Claims 5, 6, 7, 8 and 9 correspond to Claims 11, 4, 5, 2 and 6 of the application as filed respectively.

Thus, all the present claims meet the requirements of Article 123(2) EPC.

3.2 Furthermore, the Board observes that the amendment of the only independent Claim 1 of the patent in suit by incorporating the subject-matter of Claim 8 of the application as filed clearly limits the scope of the claims as granted, so that the present claims do not contravene Article 123(3) EPC either.

4. *Novelty*

4.1 The issue to be dealt with concerning novelty is whether the subject-matter of the present claims is novel in view of documents (1) and (4).

4.2 Document (1) relates to a process for the production of food additive compositions in the form of hydrophilic powders comprising a food-grade surface-active agent and optionally an edible oil or fat colloiddally dispersed in a dispersing medium consisting of a sugar alcohol and/or sugar (see claim 1; page 1, first paragraph; and page 2, lines 12 to 16). The colloidal dispersion of the surface-active agent, and optional oil and/or fat components makes it possible to render these slightly water-soluble or water-insoluble substances readily dispersable in water, and therefore to broaden the area of the utilisation of surfactants for food production (see page 2, lines 16 to 21; page 4, lines 26 to 37; and page 5, line 31 to page 6, line 15). As a suitable sugar alcohol it suggests the use of e.g. sorbitol (see page 2, third paragraph). Furthermore, the surface-active component and optional oil and/or fat ingredients can be used in amounts of 1% to 15% by weight and 0% to 20% by weight, based on the food additive product (see page 3, first paragraph).

Concerning the process for producing such a powdery food additive composition document (1) discloses in particular that it may, for instance, be carried out by (i) heat-melting sorbitol powder, (ii) separately mixing and heating the surface-active agent with the oil or fat component, (iii) adding this mixture to the molten sorbitol, (iv) stirring this mixture to form a dispersion, (v) **adding and mixing sorbitol powder as seed crystals**, (vi) **cooling the obtained mixture to room temperature** to form a solid, (vii) **stabilising the solid by crystallising**, and (viii) pulverising the stabilised crystalline solid to a powder having the desired particle size (see page 3, line 18 to page 4,

line 18, Claims 4 and 5, and in particular Example 1). According to the majority of the preparation examples the stabilising/crystallising step (vii) is performed by leaving the cooled solid product to stand for one day at room temperature.

On the other hand, the process in accordance with present Claim 1 of the patent in suit comprises **as an essential feature** that **after the preparation of the melted sorbitol-seed crystals mixture**, which is carried out at a temperature at which the melted sorbitol does not solidify and the seed crystals do not melt, **an ageing step is performed** at a temperature of 50°C to 85°C, and that **then the aged sorbitol is cooled to ambient temperature**.

In this context, the Board observes that, according to the description of the patent in suit, the ageing step can be carried out by holding the half-solidified sorbitol, wherein the seed crystals are dispersed, at a given temperature within the claimed temperature range for a certain time which is sufficient to obtain a complete crystallisation, and that this period of time, which can be determined by thermoanalysis, depends on the temperature and the amount of seed crystals (see page 3, lines 8 to 12 and 16 to 18, Example 1, and Table 1). Moreover, it is also clearly indicated in the patent in suit that, if the melted sorbitol is directly cooled after the seed crystals are added without the ageing step, the cooled powdered or granulated sorbitol naturally and gradually rises in temperature again and cakes with time (see page 3, lines 28 to 31, and Example 2). **Therefore, in the light of the description**

of the patent in suit, the function of the ageing step is to achieve a solid sorbitol which is completely crystallised.

Thus, in view of the fact that document (1) does not give any pointer to the claimed ageing step, which is carried out at a temperature of 50°C to 85°C and gives a completely crystallised solid product, but instead discloses a stabilising/crystallising step (vii) at room temperature, this document does not destroy the novelty of the process of present Claim 1 of the patent in suit.

- 4.3 Document (4) discloses, like document (1), food additive compositions in the form of hydrophilic powders comprising a polyglycerol fatty acid ester as a food-grade surface-active agent, and optionally an edible oil or fat, homogeneously dispersed in a dispersing medium consisting of a solidified sugar alcohol, such as sorbitol, as well as methods for their preparation (see page 4, lines 15 to 19; page 10, line 7 to page 11, second paragraph, and e.g. Example 1). It also discloses that such food additive compositions, compared to conventional compositions, have improved properties in generating and maintaining resilience and/or brightness of frozen ground meat (see page 13, last paragraph to page 14, first paragraph, the Test Examples 2 and 3, and the Tables 2, 3 and 4).

With respect to this document, the Appellant referred in particular to Example 2, in which (a) at a temperature of 95°C a homogeneous dispersion of hexaglycerol monostearate and cotton seed oil monoglyceride in melted sorbitol was prepared, (b) the

obtained dispersion was transferred to a kneader with a jacket and mixed with added sorbitol powder for ten minutes while keeping the temperature at approximately 80°C, (c) the obtained mixture was left to cool, and (d) then the solid product was pulverised. Moreover, he argued that in view of this example the subject-matter of present Claim 1 of the patent in suit lacked novelty, since the amounts of the addition agents used in said step (a) fell under the scope of present Claim 1, and because said step (b), in which the melted sorbitol-seed crystals mixture was kept at 80°C during 10 minutes, corresponded to the ageing step as defined in present Claim 1 of the patent in suit.

However, in the Board's judgment, said step (b) actually concerns the preparation of a melted sorbitol-seed crystals mixture as has been specified in the description of document (4) (see page 11, second paragraph). Furthermore, document (4) clearly teaches that the so prepared melted sorbitol-seed crystals mixture is cooled (or left to cool) to solidify (see page 11, second paragraph, last sentence), whereas according to the process of present Claim 1 of the patent in suit - as indicated above under point 4.2 - **the melted sorbitol-seed crystals mixture is cooled to a certain temperature of 50°C to 85°C, subsequently the solid sorbitol is aged at said temperature of 50°C to 85°C to achieve a completely crystallised solid product, and then the aged sorbitol is cooled to ambient temperature.**

Thus, in the light of these considerations, it is the Board's position that document (4) does not destroy the novelty of the subject-matter of present Claim 1

either, because - like document (1) - it does not disclose the ageing step as applied according to the claimed process of the patent in suit.

5. *Inventive step*

5.1 Article 56 EPC sets forth that an invention involves an inventive step if, having regard to the state of the art (in the sense of Article 54(2) EPC), it is not obvious to a person skilled in the art.

For deciding whether or not a claimed invention meets this criterion, the Boards of Appeal consistently apply the problem and solution approach, which consists essentially in (a) identifying the closest prior art, (b) assessing the technical results (or effects) achieved by the claimed invention when compared with the closest state of the art established, (c) defining the technical problem to be solved as the object of the invention to achieve these results, and (d) examining whether or not a skilled person starting from the closest prior art **would** arrive at something falling within Claim 1 by following the suggestions made in the prior art in the sense of Article 54(2) EPC.

In this context, the Boards of Appeal have developed certain criteria that should be adhered to, and according to their consistent jurisprudence the "closest prior art" for assessing inventive step is normally a prior art document disclosing subject-matter conceived for the same purpose as the claimed invention, and having the most technical features in common.

5.2 In the present case, the Board concurs with the point of view of the Appellant that document (3) represents the closest state of the art, and not document (2) as was held by the Opposition Division and by the Respondent.

With respect to document (3), the Board observes that this document discloses a method for producing sorbitol powder having - as in the case of the patent in suit - an improved resistance to lumping or caking, which comprises mixing sorbitol syrup with sorbitan monolaurate and/or sorbitan monooleate in a minor amount up to 250 ppm based on the solid material, concentrating said mixture under vacuum at a temperature of e.g. 100°C, adding seed crystals, holding the seed crystals containing concentrate at 40-70°C, allowing it to solidify, and grinding the so obtained solid sorbitol product (see page 2, second paragraph; and the Examples, in particular the paragraph bridging pages 3 and 4, and the Table on page 5). Thus, document (3) discloses a process for preparing powdery sorbitol conceived for the same purpose as the claimed invention, comprising **both the use of a surface-active agent and a process step in which the melted sorbitol-seed crystals mixture is held within a temperature range of from 40°C to 70°C**, which overlaps with the range of 50°C to 85°C indicated in Claim 1 of the patent in suit with respect to the ageing step.

On the other hand, both parties agreed that document (2) discloses a process for preparing stable particulate solid sorbitol, which comprises mixing molten sorbitol with powdered sorbitol, crystallising

the molten sorbitol by ageing at a temperature of 50 to 95°C in order to obtain crystalline sorbitol particles in a stable form, and pulverising the crystallised particles (see page 1, lines 60 to 81; and page 3, lines 19 to 29, in combination with page 3, lines 3 to 11), but that it does not give any pointer to the use of an addition agent.

Thus, although documents (2) and (3) both concern processes conceived for the same purpose, namely the preparation of stable particulate sorbitol, the process as described in document (2) has less technical features in common with the claimed invention as it does not make use of an addition agent.

5.3 In the light of the closest prior art represented by document (3), and having regard to the fact that the Respondent did not provide any evidence that the claimed process of the patent in suit compared to this prior art showed an improvement, the technical problem underlying the patent in suit can only be seen in the provision of an **alternative process** for preparing particulate solid sorbitol having substantially no tendency to form cake with time (see in this context also page 2, lines 33 and 34, of the patent in suit).

5.4 This technical problem is solved by the process as defined in present Claim 1 of the patent in suit, which is characterised in that the addition agent as specified in the claim is used in an amount of 0.5 to 30% by weight, based on the weight of the melted glycerol, and in that the melted sorbitol-seed crystals mixture is subjected to an ageing step at a temperature of 50°C to 85°C, which step - in the light of the

specification of the patent in suit - has to be carried out in such a way that a completely crystallised solid sorbitol product is achieved (see in this context point 4.2 above, penultimate paragraph).

5.5 Having regard to the Examples 3 and 4 of the patent in suit, the Board considers it plausible that the technical problem as defined above has been solved. Actually, the Appellant did not contest the validity of the results of these Examples.

5.6 In assessing inventive step, the next question thus is whether a skilled person starting from document (3) would arrive at something falling within Claim 1 by following the suggestions made in the cited prior art.

5.7 It is true that in the examples of document (3) a process for preparing stable powdery sorbitol is disclosed, which comprises both the use of a particular surface-active agent and a process step in which the melted sorbitol-seed crystals mixture is held within a temperature range of from 40°C to 70°C. However, this document not only clearly teaches that it is sufficient to use the surface-active agent in a minor amount of 10 to 250 ppm of the solids, but also that the introduction of the minor amount of the surface-active agent is the only relevant factor for achieving the improved resistance to lumping or caking due to its inhibiting effect on the crystal growth (see page 2, second paragraph; the part of the English translation filed by the Respondent on 22 September 1994; page 3, the last five lines of the first paragraph; and the control examples without the surface-active agent).

In this context, the Board observes that it is true that, as indicated above, the examples describe the use of a process step in which the melted sorbitol-seed crystals mixture is held within a temperature range of from 40°C to 70°C. However, in view of the fact that document (3) as a whole does not provide any information of the purpose of this process step, and having regard to the fact that this process step is in fact not reproducible as such, since the duration of the step has not been indicated, in the Board's judgment, the ageing step as claimed in Claim 1 of the patent in suit, which involves a complete crystallisation of the sorbitol, cannot be derived from this document. In this connection, the Board observes that in view of the mechanism of stabilising the particulate solid sorbitol product by the applied minor amount of surface-active agent as set out in document (3) (see the preceding paragraph above), this document rather suggests that in said process step a complete crystallisation does not occur.

Thus, in view of these considerations, it is the Board's position that document (3) as a whole does not give any incentive to the skilled person that the technical problem underlying the patent in suit as defined above could be solved by the process as defined in present Claim 1 involving the mandatory combination of an ageing step leading to a complete crystallisation and the use of an addition agent in an amount of at least 0.5% by weight, i.e. a minimum amount which is about 20 times higher than the maximum amount of 250 ppm indicated in document (3).

5.8 Document (2) discloses a process for preparing

particulate solid sorbitol, which is characterised by subsequently (i) continuously mixing molten sorbitol with powdered sorbitol by simultaneously dispersing the molten and powdered sorbitol into a particular open rotating receptacle containing granules of conglomerated molten sorbitol and sorbitol powder whereby the molten sorbitol and the sorbitol powder are mixed at the surface of the sorbitol contained in the receptacle, (ii) collecting sorbitol granules from the receptacle, (iii) crystallising molten sorbitol contained in said granules, and (iv) pulverising the crystallised granulate (see page 1, lines 60 to 81; page 3, lines 44 to 69; page 3, line 111 to page 4, line 12; and Figure 1). Moreover, it discloses that the crystallisation step (iii) is carried out by maturing, i.e. by keeping the granules moving at a temperature of 50 to 95°C, preferably during 4 to 6 hours, in order to obtain particulate crystalline sorbitol in a stable form, so that the particles do not show a tendency to stick to one another (see page 3, lines 19 to 29, in combination with page 3, lines 3 to 11). However, as indicated above, this document does not give any pointer to the use of an addition agent, and consequently - as in the case of document (3) - it does not give an incentive to the skilled person to the solution of the above defined technical problem.

5.9 Furthermore, having regard to the disclosures of the above discussed documents (2) and (3), in the Board's judgment, the skilled person would not have any reason to combine their technical teachings. On the one hand, the skilled person would immediately understand that it would make no sense to cover completely crystallised stable sorbitol powder obtained in accordance with

document (2) with an additive as described in document (3), which additive was meant to prevent a further crystallisation on storage. On the other hand, the skilled person would also understand that in case of the preparation of stable sorbitol powder in accordance with document (3), in which the stabilisation is achieved by covering the incompletely crystallised sorbitol particles with the particular surface-active agent so that a further crystallisation is prevented, a complete crystallisation by way of a lengthy ageing step as disclosed in document (2) would not be necessary.

5.10 As indicated above under points 4.2 and 4.3, documents (1) and (4) both relate to a process for the production of food additive compositions in the form of hydrophilic powders comprising a food-grade surface-active agent and optionally an edible oil or fat **colloidally dispersed** in a dispersing medium consisting of a sugar alcohol and/or sugar. However, the purpose of these known processes was to achieve a colloidal dispersion of the surface-active agent, and optional oil and/or fat components making it possible to render the slightly water-soluble or water-insoluble substances readily dispersable in water, and to broaden the area of the utilisation of surfactants for food production. Therefore, the technical problem underlying these documents does not have any relationship with the above defined technical problem underlying the patent in suit, so that the skilled person faced with that problem would not have any reason to consider these documents.

5.11 In this context, the Board observes that a skilled

person in view of the disclosures of documents (1) and (4) **could** have used an addition agent as specified in present Claim 1 in amounts of 0.5% to 30% by weight of the melted sorbitol. However, according to the established case law of the boards of appeal for determining lack of inventive step, it is necessary to show that considering the teaching of the relevant prior art as a whole, without using hindsight based on the knowledge of the claimed invention, the skilled person **would** have arrived at the **claimed solution of the technical problem to be solved**. However, as indicated above, a skilled person, when trying to solve the technical problem underlying the patent in suit, would not have any reason to apply the **mandatory combination** of an **ageing step** (leading to a complete crystallisation) and **the use of an addition agent in an amount of at least 0.5% by weight** based on the weight of the melted sorbitol.

5.12 In conclusion, the Board finds that the process according to Claim 1 of the main request involves an inventive step in the sense of Article 56 EPC.

Since Claims 2 to 9 relate to particular embodiments of the process claimed in Claim 1, they are also allowable.

Auxiliary requests

6. In the light of the above findings, it is neither necessary to consider the Respondent's auxiliary requests, nor his submission received by telefax on 19 November 1999.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

E. Görgmaier

A. Nuss