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D E C I S I O N
of 12 June 2001

Case Number: T 0642/96 - 3.3.6

Application Number: 90200655.0

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IPC: C11B 3/10

Language of the proceedings: EN

Title of invention:

Process for refining glyceride oil using silica hydrogel

Patentee:

Ineos Silicas Limited

Opponent:

Süd-Chemie AG

Headword:

Silica hydrogel/INEOS

Relevant legal provisions:

EPC Art. 54, 56, 123(2)

Keyword:

"Novelty (main request - no) - technical teaching made available by a prior art disclosure as a whole"

"Inventive step (third auxiliary request - no) - reformulation of the technical problem"

Decisions cited:

T 0247/91

Catchword:

-



Case Number: T 0642/96 - 3.3.6

D E C I S I O N
of the Technical Board of Appeal 3.3.6
of 12 June 2001

Appellant: Ineos Silicas Limited
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 8 May 2001 revoking
European patent No. 0 398 057 pursuant to
Article 102(1) EPC.

Composition of the Board:

Chairman: P. Krasa
Members: L. Li Voti
C. Holtz

Summary of Facts and Submissions

I. The present appeal is from the decision of the Opposition Division to revoke the patent, Claim 1 of which reads:

"1. Process for refining glyceride oil comprising the steps of:

- (i) contacting the glyceride oil with a silica hydrogel;
- (ii) removing water from the mixture of glyceride oil and silica hydrogel; and
- (iii) separating the silica hydrogel from the mixture."

II. A notice of opposition had been filed against the granted patent, wherein the Opponent sought revocation of the patent on the grounds of Article 100(a) EPC, in particular because of an alleged lack of novelty and lack of an inventive step of the claimed subject-matter.

The opposition had been based *inter alia* upon the following document:

- (1) EP-A-0 185 182.

III. In its decision, the Opposition Division found that the patent in suit, as amended by the Appellant (Patent proprietor), did not fulfil the patentability requirements of the EPC either according to the claims of the main request or according to those of two

auxiliary requests.

With regard to the main request it held that

- document (1) disclosed a process for refining glyceride oil comprising the steps of contacting the glyceride oil with a silica hydrogel and separating the silica hydrogel from the mixture;
- such a process led necessarily to the removal of water from the mixture under the conditions applied e.g. in example II, wherein the mixture was maintained at 100°C with vigorous stirring for 0.5 hours;
- the wording of claim 1 did not exclude the possibility of water removal during the contacting step and therefore the subject-matter of claim 1 according to the main request lacked novelty in the light of document (1).

With regard to the further requests it held *inter alia* that

- claim 1 of the first auxiliary request contravened the requirements of Article 123(2) EPC;
- claim 1 of the second auxiliary request complied with the requirements of Article 123(2) EPC and was novel over document (1);
- the process disclosed in document (1) represented the closest prior art since it was similar to the claimed one and solved the same problem dealt with in the patent in suit, i.e. the removal of

phosphatides from a glyceride oil during its refining;

- claim 1 of the second auxiliary request differed from the main request only insofar as it required that water was not removed during the contacting step;
- according to the patent in suit the improved removal of phosphatides was caused by the drying step and, as shown by the Opponent by means of experiments, the distinguishing feature of claim 1, i.e. a contacting step without water removal, did not contribute to the solution of the above mentioned problem and thus could not support the presence of an inventive step;
- therefore the subject-matter of claim 1 according to the second auxiliary request lacked an inventive step.

IV. The Appellant filed an appeal against this decision.

At the oral proceedings held before the Board on 12 June 2001, it filed four sets of claims according to a main request and three auxiliary requests.

Claim 1 of the main request is identical with claim 1 as granted (see point I., above).

Claim 1 of the first auxiliary request differs from that of the main request insofar as step (i) comprises the proviso that "water is not removed from the mixture during contacting".

Claim 1 of the second auxiliary request differs from that of the main request in that in step (i) the contacting is specified to occur "for a period", step (ii) is specified to occur **subsequently** to step (i), step (iii) of the main request is renumbered as step (iv) and a step (iii), wherein the dried mixture is allowed to stand for a residence time, is added.

Claim 1 of the third auxiliary request differs from claim 1 of the second auxiliary request insofar as the wording "for a period" in step (i) is deleted and the residence time of step (iii) is specified to be of "5 to 60 minutes".

All requests are accompanied by the same dependent claims 2 to 11, which relate to specific embodiments of the claimed process.

V. The Appellant's arguments as to the novelty of the main request, submitted in writing and at the oral proceedings held on 12 June 2001, can be summarized as follows:

- according to the claimed invention glyceride oil and silica hydrogel were contacted for a certain time, after which water was removed from the mixture; therefore, step (i) and (ii) of claim 1 of the main request had to be understood to be separate sequential steps; as a consequence substantially no water would be removed during the first contacting step (i);
- since document (1) did not disclose any drying step, the claimed subject-matter was novel over this prior art. Moreover even if the process of

document (1) would have been considered to involve implicitly a drying step, this prior art document did not disclose a drying step after a certain contacting time.

With regard to inventive step the Appellant submitted that

- the treatment of different oils led to very different results, as also shown by the Respondent's (Opponent's) experimental data filed before the first instance; therefore the removal of phosphatides achieved in the examples of the patent in suit was not comparable with that achieved in document (1);
- the examples of the patent in suit showed that the drying step provided surprisingly further removal of phosphatides in addition to that achieved after a first contacting time; this improvement was not to be expected in the light of the teaching of the prior art.

Therefore the claimed subject-matter was novel and involved an inventive step.

With regard to the auxiliary requests the Appellant submitted further that

- the introduction of the proviso in Claim 1 of the first auxiliary request had not to be considered a disclaimer over document (1) but was an amendment which found support in the examples of the original specification of the application from which the patent in suit has been granted, e.g. in

examples 1, 6 and 7 (see page 5, lines 6 to 10; page 6, lines 25 to 34 and page 7, lines 7 to 12 of the application as filed);

- the wording of the second and third auxiliary requests found support in the examples and description of the original specification of the application from which the patent in suit has been granted, e.g. in examples 1 and 6 (see page 5, lines 5 to 12 and page 6, lines 28 to 37) and in the passage on page 4, lines 11 to 15 of the application as filed;
- the reasons brought forward in support of the novelty and inventive step of the main request were also applicable to these requests. Moreover, the additional step (iii) of the second and third auxiliary requests was not described in document (1).

VI. The Respondent's counter-arguments presented in writing and at the oral proceedings can be summarised as follows:

- the steps of "contacting" and "drying" in claim 1 of the main request could occur simultaneously;
- as also shown by the experimental evidence presented before the first instance, the process of example III of document (1) would necessarily result in the removal of water from the mixture of glyceride oil and silica hydrogel because of the applied process conditions; moreover, page 10 (here and in the following always the hand-written numbering is referred to), lines 1 to 5 of this

document clearly suggested that the described process could be carried out under such conditions that the silica water was substantially lost by evaporation;

- the subject-matter of claim 1 of the main request was thus not novel in the light of document(1);
- the amendments contained in claim 1 of the first and second auxiliary requests were not supported by the application as filed and, thus, violated Article 123(2) EPC;
- furthermore, the subject-matter of the respective Claims 1 of the second and of the third auxiliary request were not inventive over the cited prior art.

VII. The Appellant requested that the decision be set aside and the patent be maintained on the basis of the main request or of the first, second or third auxiliary request, all of them filed at the oral proceedings held on 12 June 2001.

The Respondent requested that the appeal be dismissed.

VIII. At the end of the oral proceedings, the chairman announced the decision of the Board.

Reasons for the Decision

1. Main request

1.1 Novelty

1.1.1 The subject-matter of claim 1 is a process for refining glyceride oil comprising the following three steps:

- (i) contacting the glyceride oil with a silica hydrogel;
- (ii) removing water from the mixture of glyceride oil and silica hydrogel;
- (iii) separating the silica hydrogel from the mixture.

As agreed by all parties, document (1) discloses a process for refining glyceride oils comprising the steps of contacting the glyceride oil with an amorphous silica in order to adsorb the oil contaminants, like phospholipids, and separating the glyceride oil and the silica gel with the adsorbed substances. The preferred amorphous silica used according to document (1) is a silica hydrogel which comprises in its pores preferably more than 30% by weight of water (see page 3, lines 23 to 34; page 9, lines 8 and 9; page 9, line 31 to page 10, line 1); therefore document (1) discloses steps (i) and (iii) according to claim 1 of the patent in suit.

1.1.2 In this respect, the Appellant submits that document (1) cannot detract from the novelty of the claimed subject-matter since

- this document does not contain any explicit indication that water should be removed from the mixture of glyceride oil and silica hydrogel or that the process disclosed therein can be carried

out under such conditions that water is necessarily removed from the mixture of glyceride oil and silica hydrogel;

- the three steps outlined in claim 1 have to be interpreted to occur sequentially, i.e. that the drying step follows a contacting step;
- therefore, even though some water would have been removed in a process as disclosed in document (1) by operating at elevated temperatures, e.g. at 100°C, like in example III, the drying of the mixture would occur according to the teaching of document (1) simultaneously with the contacting of the glyceride oil and silica hydrogel and thus not after a contacting time as required by claim 1.

1.1.3 In the Board's judgement, however, the wording of claim 1 does not exclude a process wherein the drying of the mixture occurs simultaneously with the contacting step.

The simple word "contacting" does not imply in fact any limitation with regard to the length of the contact time, which may thus possibly last even through and after the drying step. Moreover, since water is removed from the **mixture** of glyceride oil and silica hydrogel, these compounds must necessarily "contact" each other also during drying.

Under these circumstances the simple list of steps (i) and (ii) of claim 1 cannot be interpreted to indicate only sequential steps, i.e. that drying only starts after the contacting step is finished, in the absence of a specific indication therefor in the claim.

Therefore, as correctly found by the first instance, the wording of claim 1 encompasses a process wherein step (i) contacting and step (ii) drying will occur simultaneously.

- 1.1.4 According to the established jurisprudence of the Boards of Appeal of the EPO a prior art disclosure is novelty destroying, if it discloses directly and unambiguously the questioned subject-matter (see Case Law of the Boards of Appeal of the EPO, 3rd edition 1998, page 74, point 4.).

In the examples of document (1), e.g. in example III, the contacting step between glyceride oil and silica hydrogel is carried out under vigorous stirring at a temperature of 100 EC. Even though it is well known that at such a temperature water would tend to evaporate, the examples do not clarify whether the process is carried out in an open or in a closed system and thus whether water is effectively removed from the mixture of oil and silica as required by step (ii) of claim 1 of the patent in suit.

However, in deciding the question of novelty for an invention consideration has not only to be given to the examples of a prior art document but also to the disclosure of this document as a whole and whether it makes available to the skilled person as a technical teaching the subject-matter for which protection is sought (see in this respect T 0247/91, point 3.1 of the decision, not published in the OJ EPO).

It remains thus to be assessed whether or not the description of document (1) contains a clear and unambiguous teaching to carry out the contacting step

under such conditions that water is removed from the mixture of glyceride oil and silica hydrogel.

- 1.1.5 The description of document (1) teaches in the passage from page 9, line 28 to page 10, line 1 that the used silica contains preferably more than 30% water for improved filterability, i.e. separation from the oil. The following passage on page 10, lines 1 to 5, teaches that the improvement in filterability is also maintained by operating at elevated oil temperatures which "would tend to cause the water content of the silica to be substantially lost by evaporation during the treatment step".

According to the Appellant's interpretation, the above mentioned passage would be just hypothetical and would not teach that water would be effectively removed in the process disclosed, e.g., in example III of document (1).

However, this passage states that if during the treatment step, i.e. **during the contacting of the oil with the silica**, the oil temperature is high, then the water contained in the silica would tend to be **substantially lost** by evaporation, i.e. removed by evaporation from the mixture without possibility of being recondensed.

Therefore, the Board finds that this passage amounts to an unambiguous teaching that the process disclosed in document (1) should be carried out under such conditions that water can be lost by evaporation. Therefore, these conditions must also be those used in the illustrative examples.

Consequently, also in the process of example III of document (1), wherein the contacting step is carried out at 100°C under vigorous stirring for 0.5 hours, i.e. under conditions under which water can be lost by evaporation, water would be substantially removed from the mixture of glyceride oil and silica hydrogel.

Therefore, document (1) discloses directly and unambiguously all the features of claim 1 in combination and, as correctly decided by the opposition division, the subject-matter of claim 1 lacks novelty.

2. *First auxiliary request*

Claim 1 of the first auxiliary request differs from the main request insofar as step (i) comprises the proviso that water is not removed from the mixture during contacting.

As stated by the Appellant in writing and at the oral proceedings before the Board this proviso is not an amendment finding its sole justification in the description of document (1); to the contrary, even though the original specification of the application from which the patent in suit has been granted does not explicitly disclose in its generic part the retention of water in the mixture of oil and silica during the contacting step (i), this feature finds support in the examples of the application as filed, e.g. in examples 1, 6 and 7.

In examples 1 and 7 water is removed from the mixture of glyceride oil and silica hydrogel after a residence time of 30 minutes, whilst e.g. in comparative example 2 of the application as filed the drying step

after the contacting period of 30 minutes is omitted.

The Board finds, however, that these examples, wherein the contacting step is carried out at 90EC, do not specify whether this step is carried out with means for retaining water in the mixture, since water would tend to evaporate because of the high temperature used. Therefore they do not disclose a process as claimed in the patent in suit.

In the first part of example 6 of the application as filed, the oil is refined at 90EC by the addition of silica hydrogel. The water content of this mixture is 0.88%, which results from the sum of the water content of the treated oil and of the silica hydrogel. This part of the example does not specify whether water is removed or not from the mixture and whether the indicated water content is that of the original mixture or after refining.

Alternatively, the so-called **original mixture** is subjected to a drying step to a water content of 0.08%.

In this respect it is the Board's judgement that the mixture subjected to drying was (as indicated) the original mixture, i.e. the one obtained just after adding the silica to the oil, and not that obtained after the refining step of the first part of the example, as submitted by the Appellant.

Therefore also this example does not contain a disclosure of a process as claimed.

Therefore, the amended process step (i) of claim 1 does not find support in the original document of the patent

application and the amendment therefore contravenes the requirements of Article 123(2) EPC.

3. *Second auxiliary request*

Claim 1 of the second auxiliary request differs from the main request insofar as

- in step (i) the contacting is specified to occur "for a period",
- step (ii) is specified to occur "subsequently" to step (i),
- step (iii) is renumbered as step (iv) and
- a step (iii) is added, wherein the dried mixture is allowed to stand for a non-specified residence time.

However, whilst step (iii) according to the amended claim does not specify the length of the residence time, the original disclosure only mentioned that "after...the removal of water ..., the mixture is allowed to stand for a residence time of 5-60 min..." (see page 4, lines 11 to 15 of the application as filed). Therefore this modification, which encompasses also residence times shorter than 5 minutes or longer than 60 minutes is not supported by the original description and, therefore, does not comply with the requirements of Article 123(2) EPC.

Therefore this request must also be dismissed.

4. *Third auxiliary request*

4.1 Article 123(2) and Novelty

Claim 1 of the third auxiliary request differs from claim 1 of the second auxiliary request insofar as the wording "for a period" in step (i) is deleted and the residence time of step (iii) is specified to be of 5 to 60 minutes.

The Board is satisfied that this claim complies with the requirements of Article 123(2) EPC since it finds support in the original description. This claim is also novel, since document (1) does not disclose the required step (iii). Since this request fails for other grounds, there is no necessity to give a detailed reasoning.

4.2 Closest prior art

The patent in suit and in particular the subject-matter of the claims of this auxiliary request relates to a process for refining glyceride oils by means of silica hydrogel.

Crude glyceride oils in fact contain significant amounts of contaminants, such as phosphatides, which affect their quality and thus render a refining process necessary.

According to the patent in suit, glyceride oils are contacted with silica hydrogel in order to remove the phosphatides and other contaminants, water is subsequently removed from the mixture, the dried mixture is allowed to stand for a residence time of 5 to 60 minutes and thereafter the silica hydrogel loaded with said contaminants is separated from the mixture

(see e.g. page 2, lines 9 to 14 and 39 to 45; page 3, lines 8 to 12).

However, as already explained in point 1.1.3 hereinabove, the contacting step between the glyceride oil and the silica hydrogel cannot be finished before drying, since during drying both components are necessarily still in contact.

Therefore, the wording "subsequently removing water" in claim 1 can only be interpreted as relating to a process wherein glyceride oil and silica hydrogel are contacted for a certain time, which is not specified in the claim and thus can also be of the order of seconds, before the water removal is started, whilst the contact is maintained during drying.

A similar method for the refining of glyceride oils by means of silica hydrogel is known from document (1).

The Board accepts this citation as the starting point for evaluating inventive step as suggested by the parties.

This document, as already explained in point 1.1.5 hereinabove, discloses a process for refining glyceride oils comprising the steps of contacting the glyceride oil with a silica hydrogel in order to adsorb the oil contaminants, like phospholipids, removing water from the mixture during contacting and separating the silica hydrogel loaded with the adsorbed substances from the mixture.

In the Board's judgement the water removal occurring e.g. in example III of document (1) can only start when

the water contained in the silica gel has reached the temperature necessary for evaporating from the mixture. Therefore, in this example III the glyceride oil, preheated to 100EC, and the silica hydrogel added thereto must have been in contact with each other for a certain period of time before the effective water removal would start.

This means that example III of document (1) already discloses a process wherein the water removal is carried out subsequently to a contacting step.

Therefore, this process of the prior art differs from the subject-matter of claim 1 of the third auxiliary request only insofar as it does not disclose step (iii) wherein the dried mixture is allowed to stand for a residence time of 5 to 60 minutes.

4.3 Technical problem

The advantage of the method of the patent in suit, as disclosed in the specification of the patent, is allegedly an improved removal of phosphatides from the glyceride oil. In particular the removal of phosphatides is reported to be superior to a refining under "wet" conditions, i.e. wherein no removal of water occurs (see page 2, lines 39 to 41 and page 6, lines 1 to 5). As argued by the Appellant in writing and at the oral proceedings before the Board the drying step is responsible for the alleged improvement. This statement is reflected in the cited passage of page 6 of the patent in suit, which reads "These examples according to the invention show that by drying the mixture of glyceride oil and silica hydrogel, a relatively large additional amount of phosphorus compounds is removed."

However, document (1) already dealt with the problem of a better removal of the phosphatides and other contaminants, so that even a further treatment with bleaching earth was rendered unnecessary (see page 3, lines 1 to 15).

Even though the Board accepts that the degree of phosphatides removal depends *inter alia* on the treated oil, as argued by the Appellant and confirmed by the teaching of document (1)(page 10, lines 28, 29) and therefore the Figures of the phosphatides removal in the examples of the patent in suit are not comparable with those achieved in the examples of document (1), it is undeniable that the process disclosed in document (1), which also comprises the drying of the mixture of glyceride oil and silica hydrogel as

explained in point 1.1.5 above, led to an excellent removal of the phosphatides.

Therefore, document (1) already solved the same technical problem as described in the patent in suit.

In the light of these considerations the technical problem solved by the process of the patent in suit has to be reformulated as the provision of a further process, which provides a similar phosphatides removal.

The Board has no reason to doubt that a process as specified in claim 1 solved this existing technical problem.

4.4 Evaluation of inventive step

As already put forward hereinabove, the process known from document (1) differs from the claimed subject-matter only insofar as it does not disclose step (iii) wherein the dried mixture is allowed to stand for a residence time of 5 to 60 minutes.

However, it was known to the skilled person in the light of document (1) that the contact time between glyceride oil and silica gel, as well as the applied temperature and the amount of silica and the type of process used are all factors affecting the removal of phosphatides (see page 10, lines 6 to 30).

In the Board's finding, these features and thus also a prolonged contact time after drying were variables which could have been adopted by a skilled person by simple routine operation in the attempt to optimize the results of the process disclosed in example III of

document (1).

In the absence of any evidence as to an unexpected effect based on the maintenance of the dried mixture for a residence time of 5 to 60 minutes before separation of the silica, no inventive step can thus be seen in the addition of this process step to those already disclosed in document (1).

Therefore the subject-matter of claim 1 lacks an inventive step in the light of this document.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

G. Rauh

P. Krasa