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**Datasheet for the decision  
of 7 November 2012**

**Case Number:** T 1393/08 - 3.3.04

**Application Number:** 02000976.7

**Publication Number:** 1225230

**IPC:** C12P 13/22, C12R 1/19,  
C12P 13/00

**Language of the proceedings:** EN

**Title of invention:**  
Methods for producing L-amino acids

**Patentee:**  
Ajinomoto Co., Inc.

**Opponent:**  
Evonik Degussa GmbH

**Headword:**  
L-amino acid/AJINOMOTO

**Relevant legal provisions:**  
EPC Art. 54, 56, 83, 84, 123(3)

**Keyword:**  
"Main request - added subject-matter (no), sufficiency of disclosure, novelty, inventive step (yes)"

**Decisions cited:**  
-

**Catchword:**  
-



Case Number: T 1393/08 - 3.3.04

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.04  
of 7 November 2012

**Appellant:** Evonik Degussa GmbH  
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**Representative:** Feldmann, Martin  
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**Respondent:** Ajinomoto Co., Inc.  
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**Decision under appeal:** Interlocutory decision of the Opposition  
Division of the European Patent Office posted  
28 April 2008 concerning maintenance of  
European patent No. 1225230 in amended form.

**Composition of the Board:**

**Chairman:** C. Rennie-Smith  
**Members:** B. Claes  
M. Montrone

## Summary of Facts and Submissions

I. The appeal was lodged by the opponent (appellant) against the interlocutory decision of the opposition division according to which European patent No. 1 225 230 entitled "*Methods for producing L-amino acids*", which was granted for European patent application 02000976.72, could be maintained in amended form.

II. Claim 1 of the granted patent read:

"1. A method for producing an L-amino acid, which comprises culturing a bacterium belonging to the genus *Escherichia* having an ability to produce the L-amino acid in a medium to produce and accumulate the L-amino acid in the medium and collecting the L-amino acid from the medium, wherein the carbon source in the medium is a mixture consisting of **30 weight % or more of fructose** and 70 weight % or less of glucose." (emphasis added by the board)

Claims 2 and 3 were dependent on claim 1.

III. The claims of the request which the opposition division considered to comply with the requirements of the EPC were identical to the claims of the granted patent except for claim 1 wherein the final feature was amended to read "... wherein the carbon source in the medium is a mixture consisting of **30 to 70 weight % of fructose** and 70 weight % or less of glucose" (emphasis added by the board).

- IV. With the statement of grounds of appeal, the appellant submitted four further documents for consideration (referred to hereafter by the board as documents (D36) to (D38)) and re-submitted document (D31) which the opposition division had not admitted into the proceedings. The appellant argued that claim 1 as amended during the opposition proceedings related to added matter und was unclear. The subject-matter of the claim furthermore lacked novelty in view of the disclosure *inter alia* in documents (D31) and (D37), did not involve an inventive step and was not enabled.
- V. The respondent submitted with its reply of 19 January 2009 an auxiliary request and likewise four further documents (referred to here by the board as documents (D32) to (D35)). Its main request was the set of claims which the opposition division considered to comply with the requirements of the EPC (see section III, above).
- VI. The board summoned the parties to oral proceedings. In advance of these oral proceedings the appellant filed further arguments dated 5 October 2012.
- VII. The parties were heard in the matter during the oral proceedings before the board held on 7 November 2012.
- VIII. The appellant requested that the decision under appeal be set aside and that the European patent No. 1 225 230 be revoked. The appellant also requested that the board consider the objection of added subject-matter and, unless it decided to revoke the patent for other reasons, remit the case to the opposition division for consideration of that objection.

The respondent requested that the appeal be dismissed or, as auxiliary request, that the decision under appeal be set aside and that the patent be maintained on the basis of the claims filed with its reply of 19 January 2009. The respondent also requested that the four documents filed by the appellant with its statement of grounds of appeal be not admitted into the proceedings. Further, the respondent also requested that the appellant's case on the issues of added subject-matter, clarity, novelty and sufficiency of disclosure be held inadmissible.

IX. The following documents are of relevance for the present decision:

D1: GB 1,181,592

D2: Kase *et al.* (1971), *Agr. Biol. Chem.*, Vol. 35, No. 13, p. 2089-2096.

D9: *Nippon Nogeikagaku Kaishi*, Vol. 67, No. 6, p.949-954 (original document and translation into German)

D14: Aida *et al.* (*Eds.*) (1986) *Biotechnology of amino acid production, Progress in Industrial Microbiology*, Vol. 24, p. 52-55.

D36: Lin (1996), *Escherichia and Salmonella*, volume I, Ed.: F.C. Neidhardt, ASM Press, p. 307-308.

X. The appellant's arguments as far as they are relevant for the present decision can be summarised as follows:

*Main request - claim 1 - added matter*

- The passage on page 13, lines 11 to 21 of the description of the application as filed did not provide a basis for the wording of claim 1, but only for methods wherein the carbon source in the medium was a mixture of 30 to 70 weight % of fructose and further carbon sources (plural). The application as filed merely contained a "specific example" wherein the carbon source was "*a mixture of 30 weight % or more of fructose and 70 weight % or less of glucose*". There was furthermore no connection between the general and the specific disclosure.
  
- Although the opposition division had not allowed the issue of added matter during the oral proceedings before them, the board was capable and able to deal with the matter.

*Main request - claim 1 - clarity*

- The patent did not indicate that the sum of the weight % of fructose and glucose as the carbon source necessarily was 100 weight %, nor that the lower limit of the glucose content was 30 weight %.
  
- The skilled person also considered other compounds such as yeast extract (page 5, lines 3 to 4 of the patent in suit), organic acid substances (page 5, line 7 of the patent in suit) and sodium citrate (as used in the main culture), which were also used in the methods, as carbon sources. It was therefore unclear how claim 1 could be restricted

to the use of fructose and glucose as carbon sources solely.

*Admissibility of late filed documents*

- Document (D31) and documents (D36) to (D38) were *prima facie* relevant for the examination of the novelty and inventive step of the claimed subject-matter and not complex. The relevance of the documents had been highlighted during the first instance proceedings. In view of the findings in decisions T 156/84 and T 164/89 they should therefore be admitted into the appeal proceedings.
- The documents had been filed as a direct reaction to the submissions of the respondent made and/or to questions raised during the first instance proceedings and/or constituted a reflection of the common general knowledge (see documents (D36) and (D38)).
- Document (D31) should have been admitted into the proceedings by the opposition division because it was highly relevant for the examination of the present appeal.
- Document (D37) was *prima facie* relevant because it disclosed a 1:1 mixture of fructose and glucose used for the fermentation of *E. coli*, a preferred embodiment of the patent in suit and that during autoclaving of media containing fructose a partial conversion of fructose to glucose takes place.

*Main request - sufficiency of disclosure*

- The claimed method was not enabled in as far as claim 1 excluded the use of other compounds than fructose and glucose as carbon sources. Indeed, yeast extract, organic acid substances and/or sodium citrate were also used in the methods as disclosed in the patent in suit. These methods were thus not exemplary for the claimed method.

*Main request - claim 1 - novelty*

- Claim 1 lacked novelty over the disclosures in documents (D1) and (D14).
- The method in document (D1) used an aqueous nutrient medium containing as a main carbon source fructose, xylose, starch, cane sugar waste molasses, desalted soup waste liquors or mixtures thereof.

Example 1 in document (D1) disclosed a method wherein a seed culture was used containing glucose and a culture medium containing fructose. The glucose spill-over of the seed medium into the culture medium was said to be 1,9% glucose. Moreover, the culture medium was sterilised by autoclaving which would convert another 1,4% of the fructose in glucose (see document D10). Accordingly the culture medium in example 1 would comprise 96,7% fructose and 3,3% glucose.

Example 2 in document (D1) disclosed the use of cane sugar waste molasses in the culture medium.



From document (D14) on page 35 in table 5-2 it was known that the sugar composition of cane molasses was 32% sucrose, 14% glucose and 16% fructose. It was known from document (D36) that about half of the natural *E. coli* stains could metabolise sucrose, whereas the other half can not. For the latter strains therefore sucrose was not a carbon source and the use of sugar cane molasses with these strains equates using a carbon source consisting of ca. 58% / 42% fructose and glucose, a medium also described in claim 1. Document (D14) was silent on the presence of further sugar compounds than the three listed in table 5-2.

*Main request - claim 1 - inventive step*

- Document (D1) represented the closest prior art and disclosed that for L-amino acid production either fructose or cane sugar molasses could be used as carbon source.
  
- The examples of the patent in suit did not demonstrate a surprising or advantageous effect of the carbon source claimed as compared to the prior art sources. The problem to be solved was therefore to find an alternative carbon source to the one consisting of fructose or cane sugar molasses.
  
- Both document (D1) and document (D14) disclosed the use of sugar cane molasses for the bacterial fermentation of L-amino acids. The primary compounds of molasses were fructose and glucose as could be taken from document (D14). Accordingly,

the claimed subject-matter was rendered obvious by the prior art.

- The poor efficiency as indicated in table V on page 2094 of document (D2) in L-Threonine production for glucose and cane sugar molasses as compared to fructose would not prevent the skilled person from formulating the claimed subject-matter when searching for an alternative for the media as disclosed in document (D1). Table V clearly demonstrated the applicability of fructose and glucose as carbon sources.
- The patent in suit only contained examples relating to L-Tryptophan production. It could therefore not be taken to demonstrate that the problem was solved over the whole range claimed.

XI. The respondent's arguments as far as they are relevant for the present decision can be summarised as follows:

*Main request - claim 1 - added matter*

- The objections as to added matter consisted of a new ground of opposition which could only be allowed into the proceedings with the consent of the respondent.
- On page 13, lines 11 to 21, the patent application as filed clearly described that the fructose content is preferably 30 to 70 weight %. Additionally, a specific example of the carbon source was described as a mixture of 30 weight %

or more of fructose and 70 weight % or less of glucose.

- Table 2 on page 24 of the description only mentioned fructose and/or glucose in the disclosed compositions of carbon sources used in the examples.

*Main request - claim 1 - clarity*

- The opponent had not, during the proceedings before the opposition division objected to the clarity of the claims, in particular not to the clarity of the amendment of claim 1 as compared to claim 1 as granted. The board should therefore not admit the objections related to Article 84 EPC into the proceedings.
- Claim 1 was clear in that it defined a mixture consisting of two specified components, namely fructose and glucose.
- With regard to organic acids used to regulate the pH, the minor amounts of acids could not be considered as a carbon source in the common meaning of the term as was confirmed by the opposition division in its decision.

*Admissibility of late filed documents*

- Documents (D31) and (D36) to (D38) were late filed. They either had not been admitted into the proceedings by the opposition division or were not relevant to the claimed subject-matter.

*Main request - sufficiency of disclosure*

- The appellant conceded during the oral proceedings before the opposition division that that the requirements of Article 83 were fulfilled. The objection should therefore be rejected by the board.

*Main request - claim 1 - novelty*

- The appellant had not maintained any novelty objections against the claims of the main request during the oral proceedings before the opposition division. Furthermore, the statement of the grounds for appeal did not raise any objections in relation to documents (D1) and (D14). The objections as to lack of novelty should therefore be rejected by the board.
- Example 1 of document (D1) did not fall within the ambit of claim 1. Also example 2 of document (D1) did not disclose the claimed method in view of the disclosure in document (D14)(see below). Furthermore, document (D1) did not refer to autoclaving the medium.
- The sum of the percentages of the sugars listed in Table 5-2 on page 53 of document (D14) was 62%. Accordingly, sugar cane molasses as disclosed in this document contained also further sugar compounds different from the ones listed. This was confirmed in document (D9) which on page 9, in Table 3, discloses the composition of cane sugar

molasses to contain a substantial amount of "Sonstiger Zucker". Accordingly, document (D14) could not be detrimental for the novelty of claim 1.

*Main request - claim 1 - inventive step*

- Closest prior art was represented by document (D1). It merely disclosed the use of either fructose alone or cane sugar molasses in bacterial L-amino acid fermentation. The relevant question was therefore whether or not the skilled person would alter the prior art method and use as a carbon source fructose and glucose and avoid any other sugar compound.
- Document (D2) disclosed in table V on page 2094 the effect of carbon sources on L-Threonine production in *E.coli*. The table made clear that fructose used as carbon source gave the highest production (6.3 mg/ml) whereas the use of glucose as carbon source was the worst of the compounds tested (2.4 mg/ml). Cane sugar molasses was indicated to produce 2.8 mg/ml amino acid. The skilled person starting from document (D1) would therefore have been taught by document (D2) that fructose as carbon source was superior and that cane sugar molasses and glucose alone gave substantially inferior results.
- The subject-matter of claim 1 was therefore not rendered obvious to the skilled person.

- The patent showed the workability of the disclosed methods for L-Tryptophan fermentation. The skilled person could therefore expect the method to be applicable also to other L-amino acid fermentations.

## **Reasons for the Decision**

1. The appeal is admissible.

### *Main request - claim 1 - added matter*

2. During the appeal proceedings the parties have addressed the issue of added subject-matter in relation to claim 1 from various procedural angles including whether or not the ground of opposition under Article 100(c) EPC was at all assessable within the framework of the present appeal proceedings and whether the opposition division had exercised its discretion to not admit grounds of opposition in the proceedings properly or not.
3. The board considers however that, in view of its finding in the substance of the matter (see further), these procedural issues can be left unanswered as they have or would have no bearing on the outcome of the present decision.
4. The substantive objection of the appellant is that the subject-matter of claim 1 is not supported by the content of the application as originally filed. In particular, the feature "wherein the carbon source in the medium is a mixture consisting of 30 to 70 weight %

of fructose and 70 weight % or less of glucose" extended beyond the original disclosure.

5. The relevant passage for this feature in the original description is on page 13, lines 11 to 21, and reads:

*"The carbon source may substantially consist only of fructose or may also contain carbon sources other than fructose. The fructose content is preferably 30 weight % or more, preferably about 30-95 weight %, more preferably about 30-70 weight %, particularly preferably about 50%, with respect to the total carbon source. Other carbon sources include glucose, sucrose, maltose and so forth. Among these, glucose is preferred. A specific example of the carbon source used in the present invention is a mixture of 30 weight % or more of fructose and 70 weight % or less of glucose."*

6. The board is satisfied that this passage supports a carbon source mixture consisting of fructose and glucose in view of the general disclosure that besides fructose the carbon source may contain carbon sources "other than fructose" and that thereby "glucose is preferred". This finding is further confirmed by the disclosure of the composition of the carbon sources disclosed in Table 2 on page 24 of the description, which merely contain fructose and/or glucose. Furthermore, because of the disclosure of a carbon source consisting of a mixture consisting of 30 weight % or more fructose and 70 weight % or less of glucose and the disclosure of the specific preferable range of 30-70 weight % of fructose, the preferred fructose range endpoints can be combined in the

fructose and glucose ranges which are now defined in claim 1.

7. In view of the above considerations the content of claim 1 does not go beyond the content of the patent application as originally filed.

*Main request - claim 1 - clarity*

8. The board considers that in view of its finding in the substance of the matter (see further) the procedural issue of whether or not the objections of the appellant under Article 84 EPC should or should not be held admissible by the board can be left unanswered as they have or would have no bearing on the outcome of the present decision.
9. As a matter of principle, the board notes that examination in respect of the requirements of Article 84 EPC is still permitted during opposition proceedings however limited to those cases where there has been an amendment. Indeed Article 101(3) EPC does not allow objections to be based upon Article 84 EPC if they do not arise out of the amendments made.
10. The board considers that the amendment of granted claim 1, which referred to a range of fructose of "30 weight % or more" in the mixture which consisted of fructose and glucose, to a range of fructose of "30 to 70 weight %" in the same mixture does not result in a wording which would not be technically understood by the skilled person or which would cause the skilled person to doubt the technical meaning of the subject-matter of the amended claim. Therefore, the argument



that in the amended claim the totality of the fructose and glucose was not necessarily 100 weight % can not be upheld.

11. The appellant has further argued that the skilled person would also consider other compounds which were used in the methods as described in the patent in suit (e.g. yeast extract, organic acid substances and sodium citrate), could actually serve as carbon sources. The board notes however that this objection does not relate to subject-matter of the claim in an aspect resulting from the amendment of the claim as compared to claim 1 as granted. Accordingly, this objection is not open to consideration by the board.
  
12. Moreover, the board considers that when reading paragraph [0038] of the patent in suit (which in wording corresponds to the wording of the passage on page 13, lines 11 to 21 of the application, see point 5, above) it is clear to the skilled person that the compounds as referred to by the appellant should not be interpreted by the skilled person as "carbon sources" in the context of the patent in suit.
  
13. In view of the above considerations the claims are clear and in accordance with Article 84 EPC.

*Admissibility of late filed documents*

14. Document (D31) was already submitted late by the appellant in the first instance proceedings in the context of novelty of the subject-matter of claim 1. The opposition division did not admit the document into the proceedings "*since it was not prima facie relevant*"

and did "*not mention the method of sterilization used in the preparation of the media*" (see decision under appeal item 2.3 vi)). The consequence of this was that there was no valid argument that the document disclosed a method as claimed in which fructose and glucose were used as carbon source.

15. The board cannot see any reason why the finding of the opposition division not, in its discretion, to admit the document into the proceedings was erroneous or wrong. Moreover, the appellant has not so argued either. Furthermore, the finding that document (D31) does not mention the method of sterilisation used in the preparation of the medium is a matter of fact. The board accordingly endorses the opposition's decision in this respect and considers document (D31) should be disregarded in the present appeal proceedings.
16. Documents (D36) to (D38) were filed by the appellant together with its statement of grounds of appeal. Document (D37) was filed in support of further objections of lack of novelty whereas documents (D36) and (D38) were filed to document the common general knowledge of the skilled person.
17. Concerning document (D37) the appellant argued that it was *prima facie* relevant and even detrimental to the novelty of the subject-matter of claim 1, because it disclosed the fermentation of *E. coli* using a 50:50 mixture of fructose and glucose carbon source and disclosed that during autoclaving of media containing fructose a partial conversion of fructose to glucose takes place.

18. The appellant has not advanced any particular reason for filing the document late in the context of novelty of the invention. The boards of appeal are empowered to hold inadmissible facts and evidence (or requests) which could have been presented in the first instance proceedings (see Article 12(4) RPBA). The board considers that document (D37) falls within this category and that, if only for this reason, it should apply its discretion to disregard the document. The board also notes that, in the context of autoclaving of media, document (D37) does not go beyond the technical information already available to the board from the various other disclosures on file. Therefore in this context also the board sees no need to admit the document into the proceedings. Accordingly, the board, exercising its discretion, decided not to admit document (D37) into the proceedings.
19. The board does not agree with the respondent's request not to admit documents (D36) and (D38) into the proceedings as they merely reflect the common general knowledge of the skilled person.

*Main request - sufficiency of disclosure*

20. From the minutes of the oral proceedings before the opposition division it can be taken that, with respect to the claims of the main request before the board, the appellant did not formulate any objections related to sufficiency of disclosure.
21. It was only in the statement of grounds of appeal that the appellant raised again a case against the claimed

subject-matter on the ground of lack of sufficiency of disclosure, albeit in a minimal form.

22. Again, as for previous items, the board considers that in view of its finding in the substance of the matter (see further) the procedural issue of whether or not the objections of the appellant under Article 83 EPC should or should not be held admissible by the board can be left unanswered as they have or would have no bearing on the outcome of the present decision.
23. In the present context the opposition division decided that the claimed invention was sufficiently disclosed in the patent in suit. The objection of the appellant was based on the fact that claim 1, by providing that the carbon source consisted of a mixture of fructose and glucose, it in fact necessarily excluded other compounds, which the skilled person would also have considered as a carbon source, but which were used in the methods as described in the patent in suit.
24. The board considers however, that in view of the findings referred to in point 12, above, the skilled person would interpret the word "consisting" in the wording of claim 1 as relating to the carbon source compounds in paragraph [0038] of the patent in suit. Accordingly, the appellant's argument is without merit and the board cannot conclude that a case has been made by the appellant that the claimed subject matter is not sufficiently disclosed.

*Main request - claim 1 - novelty*

25. The board considers that in view of its finding in the substance of the matter (see further) the procedural issue of whether or not the objections of the appellant under Article 54 EPC should or should not be held admissible by the board can be left unanswered as they have or would have no bearing on the outcome of the present decision.
26. The board refers to points 16 to 19 above and notes that in view of the fact that documents (D31) and (D37) are disregarded in substance in the present appeal proceedings, any arguments based on these documents raised by the appellant is likewise regarded as late filed and not considered by the board in the present appeal.
27. The opposition division, in its decision, came to the conclusion that claim 1 was novel pursuant to Article 54 EPC, in particular also with a view to the disclosures in documents (D1) and (D14), two documents considered by the appellant to be detrimental to novelty during the oral proceedings before the board. The board therefore considers it necessary to assess the matter of novelty.
28. Document (D1) discloses a fermentation process for producing L-Threonine which comprises culturing *Escherichia* in an aqueous nutrient medium containing as a main carbon source fructose, xylose, starch, cane sugar waste molasses, desalted soup waste liquors or mixtures thereof and recovering the L-Threonine from this medium (see page 1, right-hand column, lines 53

to 68; claim 1). Document (D1) does not disclose a culture medium which exists of fructose and glucose solely. Moreover, the board notes that even if it agreed with the argument of the appellant that there is a spill-over of the glucose present in the seed culture to the culture medium containing fructose, it has not been contended that the extend of this is such as to obtain a culture medium with the composition as described in the claim. Accordingly, document (D1) does not disclose the claimed method.

29. The appellant has furthermore argued that prior art *E.coli* fermentation methods (see document (D1), example 2 and document (D14)) for the production of L-amino acids using as carbon source cane sugar molasses were detrimental to the novelty of the claimed subject-matter in view of the disclosure in document (D14) that cane sugar molasses consisted of sucrose, fructose and glucose and that only about half of the *E.coli* strains could metabolise sucrose at all. The board notes however that this argument is not tenable in view of the disclosure in document (D9) on page 9 in Table 3 that cane sugar molasses contain not only sucrose, fructose and glucose but also a substantial further amount of other sugars. Accordingly, sugar cane molasses containing culture media are not considered to read onto the culture media as defined in the claims.
30. In view of the above considerations the board concludes that the subject-matter of claim 1 is novel.

*Main request - claim 1 - inventive step*

31. The board considers that in view of its finding in the substance of the matter (see further) the procedural issue of whether or not the objections of the appellant under Article 56 EPC should or should not be held admissible by the board can be left unanswered as they have or would have no bearing on the outcome of the present decision.
32. Claim 1 relates to L-amino acid fermentation by *Escherichia* wherein the carbon source in the medium is a mixture consisting of 30 to 70 weight % of fructose and 70 weight % or less of glucose.
33. For assessing whether or not a claimed invention meets the requirements of Article 56 EPC, the boards of appeal apply the "problem and solution" approach, which requires as a first step the identification of the closest prior art. In accordance with the established case law of the boards of appeal, the closest prior art is a teaching in a document conceived for the same purpose or aiming at the same objective as the claimed invention and having the most relevant technical features in common, i.e. requiring the minimum of structural modifications to arrive at the claimed invention.

*The closest prior art*

34. The parties considered document (D1) to represent the closest prior art disclosing similar fermentation processes using sugars in the culture medium. The board can agree with this choice. The prior art methods

essentially differ from the subject-matter of claim 1 in that in the former either a carbon source is used which consists only of fructose (see example 1) or a carbon source is used which is cane sugar molasses (see example 2) whereas claim 1 relates to a method in which the carbon source consists of fructose and glucose.

*The problem to be solved*

35. The parties were not in dispute whether or not the examples of the patent suit demonstrated that the problem was solved by the claimed subject-matter in general, but rather whether or not these examples supported an advantageous and/or surprising effect as compared to the prior art methods.
36. Depending on whether or not an advantageous and/or surprising effect ought to be taken into account when formulating the technical problem to be solved by the claimed invention, this problem can be considered either to be the provision of a *superior* L-amino acid fermentation method in *Escherichia* to the prior art method or to be the provision of an *alternative* L-amino acid fermentation method in *Escherichia* to the prior art method. It is obvious that if the board came to the conclusion that the claimed subject-matter was not rendered obvious to the skilled person when attempting to solve the latter problem the first problem would no longer need to be examined. The board accordingly examines first the less ambitious problem.
37. On the question whether or not the formulated technical problem has been solved by the claimed invention, the board notes that the appellant has not formulated and



the board is not aware of any substantiated arguments beyond the contention that the demonstrated production of L-Tryptophan in the patent in suit can be generalised to methods as claimed which are applicable to all L-amino acids. Therefore the board can in this respect agree with the respondent that the experimental detail of the patent in suit is sufficient to accept that the technical problem is solved by the patent in suit.

*Obviousness*

38. Document (D1) discloses L-Threonine fermentation by either using fructose or cane sugar molasses as sole carbon source. The board is also satisfied, and can in this respect also agree with the respondent, that no other prior art document cited during the proceedings discloses the sole use of fructose and glucose as carbon source in such processes. For this reason alone the board is satisfied that the prior art appears not to render the claimed subject-matter obvious to the skilled person.
  
39. Moreover, the board also considers that, when finding a solution for the relevant problem, the skilled person would also take into account the disclosure in document (D2), which similarly to document (D1) relates to the technical field of bacterial L-amino acid fermentation. Document (D2) discloses in table V, on page 2094, that fructose, when used as sole carbon source in L-Threonine fermentation in *E.coli*, produces more than double the amount of L-Threonine as compared to when glucose or cane sugar molasses are used. Therefore the board concludes that, rather than finding in the prior

art clear hints to use the carbon source as defined in claim 1 (i.e. in a mixture consisting of fructose and glucose), the skilled person was taught by document (D2) that the use of glucose was not conducive to optimal L-amino acid fermentation yield. From this point of view therefore the prior art cannot be interpreted as containing a clear pointer for the skilled person to the claimed invention.

40. In view of the above outcome, the board sees no need to address the issue whether or not the patent in suit demonstrates an advantageous and/or surprising effect as compared to the prior art methods. Accordingly, the board concludes that the subject-matter of claim 1 involves an inventive step.

## **Order**

### **For these reasons it is decided that:**

The appeal is dismissed.

The Registrar

The Chairman

P. Cremona

C. Rennie-Smith