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**Datasheet for the decision  
of 11 March 2008**

**Case Number:** T 0079/06 - 3.3.04

**Application Number:** 99971027.0

**Publication Number:** 1133551

**IPC:** C12C 1/18

**Language of the proceedings:** EN

**Title of invention:**

Preparation of wort and beer of high nutritional value, and corresponding products

**Applicant:**

Triantafyllou Öste, Angeliki, Dr.

**Headword:**

Preparation of wort and beer/TRIANTAFYLLOU

**Relevant legal provisions:**

EPC Art. 123(2)

**Relevant legal provisions (EPC 1973):**

EPC Art. 54(1)(2), 56

**Keyword:**

"Product-by-process feature not distinguishing"  
"Main request - novelty (no)"  
"Auxiliary request - allowable amendments, novelty, inventive step (yes)"

**Decisions cited:**

T 0205/83, T 0464/94, T 0728/98

**Catchword:**

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Case Number: T 0079/06 - 3.3.04

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.04  
of 11 March 2008

**Appellant:** Triantafyllou Öste, Angeliki, Dr.  
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**Representative:** Thiel, Christian  
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**Decision under appeal:** Decision of the Examining Division of the  
European Patent Office posted 9 August 2005  
refusing European patent application  
No. 99971027.0 pursuant to Article 97(1) EPC  
1973.

**Composition of the Board:**

**Chairman:** U. Kinkeldey  
**Members:** B. Claes  
G. Weiss

## Summary of Facts and Submissions

I. The appellant (applicant) lodged an appeal against the decision of the examining division refusing European patent application 99971027.0 having the title "Preparation of wort and beer of high nutritional value, and corresponding products". The application is based on international application PCT/SE99/01914 and was published as WO 00/24864.

II. The examining division refused the application for the reason that the subject-matter of product claims 10 and 11 of the request, submitted with letter of 23 January 2005, lacked novelty over the disclosure in document (1) (see section VIII, *supra*). In addition the examining division remarked however that the subject-matter of process claims 1 and 9 did not involve an inventive step (Article 56 EPC 1973).

III. Claims 1, 10 and 11 of this request read:

"1. A process for the production of a boiled cereal wort having a content of more than 0.2% by weight of soluble  $\beta$ -glucan from a cereal or a mixture of cereals, in which a cereal employed in the process lacks  $\beta$ -glucanase activity, comprising the following steps:

- forming an aqueous cereal slurry containing from 10% by weight to 30% by weight of at least one wet or dry milled cereal which essentially lacks  $\beta$ -glucanase activity;
- mashing the slurry at a temperature above 50°C in the presence of starch degrading enzymes;
- cooling to a temperature below 50°C;

- removing insoluble material to form a wort,
- boiling the cereal wort with hops at conditions sufficient to destroy all enzymatic activity, thereby forming a boiled wort.

10. A cereal wort containing more than 0.5% by weight of soluble  $\beta$ -glucan prepared by the process of any of claims 1-8.

11. A cereal beer containing more than 0.5% of soluble  $\beta$ -glucan prepared by the process of claim 9."

- IV. With the statement of the grounds of appeal the appellant filed arguments in favour of patentability and a new main request and 2 auxiliary requests.
- V. The board issued an invitation to oral proceedings accompanied by a communication.
- VI. With a letter dated 26 February 2008, the appellant filed two further auxiliary requests.
- VII. Oral proceedings before the board took place on 11 March 2008. During these oral proceedings the appellant filed a new main request with 10 claims and an auxiliary request with 7 claims and withdrew all requests previously filed.

Claims 1, 7, 8 and 9 of the main request filed during the oral proceedings read:

"1. A process for the production of a boiled cereal wort having a content of more than 0.2% by weight of soluble  $\beta$ -glucan from **oats** or a mixture of **oats and**

barley selected from one or several of rolled oats, rolled barley, oats flour, barley flour, fractions of such flours rich in  $\beta$ -glucan, incompletely germinated oats, incompletely germinated barley, said materials employed in the process **lacking**  $\beta$ -glucanase activity, comprising the following steps:

- forming an aqueous cereal slurry containing from 10% by weight to 30% by weight of at least one wet or dry milled cereal which [...] **(deleted)** lacks  $\beta$ -glucanase activity;
- mashing the slurry at a temperature above 50°C in the presence of starch degrading enzymes;
- cooling to a temperature below 50°C;
- removing insoluble material to form a wort,
- boiling the cereal wort with hops at conditions sufficient to destroy all enzymatic activity, thereby forming a boiled wort.

(emphasis added by the board to illustrate the differences with claim 1 of the request before the examining division)

7. A process for the production of a cereal bear [sic] having a content of more than 0.2% by weight of soluble  $\beta$ -glucan from the wort of any of claims 1-6, comprising the following steps:

- providing a boiled wort at room temperature or lower;
- adding yeast to the boiled wort;
- fermenting the mixture to produce a cereal beer having a high content of soluble  $\beta$ -glucan.

8. A cereal wort containing more than 0.5% by weight of soluble  $\beta$ -glucan prepared by the process of any of claims 1-6, containing more than 0.2% by weight of soluble  $\beta$ -glucan from oats or a mixture of oats and barley selected from one or several of rolled oats, rolled barley, oats flour, barley flour, fractions of such flours rich in  $\beta$ -glucan, incompletely germinated oats, incompletely germinated barley.

9. A cereal beer containing more than 0.5% by weight of soluble  $\beta$ -glucan prepared by the process of claim 7, containing more than 0.2% by weight of soluble  $\beta$ -glucan from oats or a mixture of oats and barley selected from one or several of rolled oats, rolled barley, oats flour, barley flour, fractions of such flours rich in  $\beta$ -glucan, incompletely germinated oats, incompletely germinated barley."

Claims 2 to 6 of the main request were dependent on claim 1.

The seven claims of the auxiliary request were identical to process claims 1 to 7 of the main request.

VIII. The following documents are mentioned in the present decision:

(1) Bourne & Pierce (1972), Technical Quarterly, Vol. 9, No. 3, pages 151-157;

(4) WO 95/07628.

IX. The arguments of the appellant can be summarised as follows:

*Main request, claims 8 and 9, novelty*

- The subject-matter of claims 8 and 9 was novel over the disclosure of a wort and beer made of barley in document (1) on page 154, left-hand column, lines 6 to 9.
  
- The property distinguishing the wort and the beer of claims 8 and 9 from the wort and the beer disclosed in document (1) was the nature of the  $\beta$ -glucan present. The use of starting material of different cereal species origin, i.e. oats or oats and barley in the claims as opposed to barley in document (1), resulted in wort and beer containing structurally and thus physiologically distinguishable  $\beta$ -glucans.

*Auxiliary request*

*Amendments*

- The claims of the auxiliary request complied with the requirements of Article 123(2) EPC. The amendments were supported by the first full paragraph on page 4 of the application as published.

*Novelty*

- None of the documents cited disclosed the production of wort or beer from oats or oats and barley as defined in claims 1 and 7.

*Inventive step*

- The invention related to a process of preparing wort and beer that was rich in soluble  $\beta$ -glucan, a so-called soluble dietary fiber "SDF", generally considered to be responsible for a reduced risk of coronary heart disease.
  
- In the conventional beer making process  $\beta$ -glucanase, an enzyme which was not contained naturally in dry grains but was formed in abundance during germination, degraded  $\beta$ -glucan in the malting step. This degradation was desired because increasing concentration of  $\beta$ -glucan led to an almost exponential rise in the viscosity. Such high viscosity led to mash run off and filtration problems. On the other hand,  $\beta$ -glucan had been made responsible for positive effects on flavour, palate fullness and foam stability. As a consequence, in the conventional brewing art the  $\beta$ -glucan contents in wort and beer was controlled, such that viscosity and run off problems were avoided and the positive properties were as much as possible preserved. This was done by lowering (degrading) the  $\beta$ -glucan contents to a level which was good for beer making, however, no longer favourable under nutritional aspects.



- The invention did not make the such compromises between brewing requirements and product requirements. In contrast, the  $\beta$ -glucanase contents of the wort was controlled such that no degradation occurred by exclusion of natural enzymatic activity contained in the cereal or obtained by treatment of the cereal, and to replace the naturally present and formed enzymes by added enzymes. Furthermore since oats was known to be particularly rich in healthy SDF oats was the preferred material to provide high  $\beta$ -glucan contents in cereal worts and beers.
  - Neither high  $\beta$ -glucan worts or beers nor such made from oats were suggested in the prior art. The subject-matter of the method claims involved accordingly an inventive step.
- X. The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of claims 1 to 10 (main request) or, alternatively, on the basis of claims 1 to 7 (auxiliary request), both requests filed during oral proceedings.

## **Reasons for the Decision**

*Main request, claims 8 and 9  
novelty (Article 54 EPC (1)(2)EPC 1973)*

1. The subject-matter of claim 8 is a cereal wort containing more than 0.5% by weight of soluble  $\beta$ -glucan prepared by the process of any of claims 1-6 and containing more than 0.2% by weight of soluble  $\beta$ -glucan

from oats or a mixture of oats and barley selected from one or several of rolled oats, rolled barley, oats flour, barley flour, fractions of such flours rich in  $\beta$ -glucan, incompletely germinated oats, incompletely germinated barley. The subject-matter of claim 9 is a cereal beer containing more than 0.5% by weight of soluble  $\beta$ -glucan prepared by the process of claim 7, containing more than 0.2% by weight of soluble  $\beta$ -glucan from oats or a mixture of oats and barley selected from one or several of rolled oats, rolled barley, oats flour, barley flour, fractions of such flours rich in  $\beta$ -glucan, incompletely germinated oats, incompletely germinated barley.

2. The wort and the beer of both claims 8 and 9 are thus defined by a "structural" characteristic, i.e. a certain minimum amount of soluble  $\beta$ -glucan, and by a method of its manufacture. These claims thus constitute so-called "product-by-process" claims.
3. Document (1) is a review of literature on  $\beta$ -glucan and  $\beta$ -glucanase in the field of beer brewing. On page 154, left-hand column, lines 6 to 9, the document reports on the  $\beta$ -glucan content of a particular variety of barley (4,8%) as well as of malt (1,1%), wort (4,1%) and beer (4,0%) prepared therefrom. The wort and beer as disclosed in the referred to passage in document (1) comply with the  $\beta$ -glucan content requirements of claims 8 and 9.
4. In the case law of the boards of appeal "product-by-process" claims are claims to a physical entity (product) *per se*. They constitute an accepted claim format for a product if and when the product can only

be defined by its preparation process but remain product claims which have to fulfil all the requirements of the EPC (see e.g. decision T 728/98, OJ EPO 2001, 319, point 6.2. of the reasons for the decision). Thus, a claim for a product defined in terms of its preparation is to be considered novel if the claimed product as such fulfils the requirement of novelty. In order to establish novelty, the board has to be certain that the process features of a "product-by-process" claim are such that the resulting product is influenced by them in a way that it can be distinguished from products in the public domain produced by a different process, i.e. that modification of the preparation process results in differences in the product's properties (see decision T 205/83, OJ EPO 1985, 363, points 3.1 and 3.2.1 of the reasons for the decision, Case Law of the Boards of Appeal of the European Patent Office, 5th Edition, 2006, II.B.6.2).

5. In application of the above principle to the present case, the appellant contended that the distinctly different property of the wort and beer of claims 8 and 9 and the wort and beer disclosed in document (1) was the nature of the  $\beta$ -glucan present. In particular, the use of starting material of different cereal species origin, i.e. oats or oats and barley in the claims as opposed to barley only in document (1), resulted in wort and beer containing structurally and thus physiologically distinguishable  $\beta$ -glucans.
  
6. The board notes however, that the appellant has neither submitted explicit documentary evidence supporting the fact that the  $\beta$ -glucans in the wort and the beer as subject-matter of claims 8 and 9 are structurally

distinct to the wort and the beer disclosed in document (1) nor explicit documentary evidence supporting the fact that they would be have physiologically distinct effects.

7. It is therefore left to the board to investigate the documents on file for technical information on the structure and properties of  $\beta$ -glucan. In document (1), on page 151, right hand column, in the last two paragraphs, it is stated that " *$\beta$ -glucan is a general name for all compounds of two or more glucose molecules linked together in the  $\beta$  configuration. (...) In barley the chains consist of a mixture of  $\beta$  1-3 and  $\beta$  1-4 linked glucose units and equal numbers of each type were found by Aspinall and Telfer in  $\beta$ -glucan obtained by Preece and MacKenzie from barley. By partially hydrolysing oat  $\beta$ -glucan and identifying the products, Peat, Whelan and Roberts suggested a structure consisting of two or three 1-4 bonds separated by 1-3 bonds. Chandra, Hurst and Manners and Parrish, Perlin and Reese from investigations involving periodate oxidations concluded that both barley and oat  $\beta$ -glucan consisted of approximately 70% 1-4 linkages and 30% 1-3 linkages. Parrish, et al., further, by enzymatic degradation, confirmed the structure put forward by Peat et al. for the  $\beta$ -glucan of barley as did Igarashe and Amaha for  $\beta$ -glucan from beer. There is, however, some evidence if adjacent 1-3 linkages, but from quantitative work the number present are thought to be very small.*" (references to literature omitted). From this information the skilled person would be able to infer that, indeed,  $\beta$ -glucans may in principle be different, but the board is unable to conclude that the above passages constitute conclusive corroborating

evidence for a distinction between the  $\beta$ -glucans in the wort and the beer as subject-matter of claims 8 and 9 and the  $\beta$ -glucan in the wort and the beer disclosed in document (1). This would amount to a mere guess exercise which not suited as a basis for a decision in favour of the appellant (see e.g. decision T 464/94 of 21 May 1997, point 16 of the reasons).

8. The above-mentioned technical information on file thus fails to demonstrate the novelty of the product according to claims 8 and 9. The main request is therefore not allowable.

#### *Auxiliary request*

#### *Amendments*

9. Both independent claims 1 and 7 find a basis in the application as published on page 4, lines 5 to 12 combined with the subject-matter of claims 1, 2, 10. Dependent claims 2 to 6 find their counterpart in claims 3 and 6 to 9 of the application as published, respectively.

#### *Novelty*

10. The board is satisfied that none of the documents considered during the preceding examination procedure discloses a process for the production of a boiled cereal wort - or a process for the brewing of a beer there from - having a content of more than 0.2% by weight of soluble  $\beta$ -glucan thereby employing oats or a mixture of oats and barley materials employed which

lack  $\beta$ -glucanase activity. The subject-matter of claims 1 and 7 is therefore novel.

*Inventive step*

11. The invention relates to a process for the preparation of a beer of high nutritional value from cereals, in particular from oats, barley and their mixtures (see application as published, page 1, lines 6 to 8). Accordingly, the independent method claims concern processes for the production of boiled cereal wort having a high  $\beta$ -glucan content made from oats or oats and barley material lacking  $\beta$ -glucanase activity (claim 1) as well as to a process for the production of a cereal beer having a high soluble  $\beta$ -glucan content from that wort (claim 7).
12. For assessing whether or not a claimed invention meets the requirements of Article 56 EPC 1973 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.
13. The board considers document (1) to represent the closest prior art as it discloses as the only cited document on page 154, left-hand column, lines 6 to 9 (see point 3 above) wort and beer brewed from barley

- with high  $\beta$ -glucan contents (4,1% for the wort and 4,0% for the beer).
14. In view of this closest prior art teaching the problem to be solved by the subject-matter of claims 1 and 7 is the provision of an alternative process for the production of a boiled cereal wort with high  $\beta$ -glucan contents and for the production of a cereal beer with high  $\beta$ -glucan contents to that using cereal barley material. In view of the results presented in the examples of the application, the board is satisfied that this problem is solved by the subject-matter of claims 1 and 7, respectively.
15. It therefore needs to be established whether or not the prior art rendered the use of oats or a mixture of oats and barley selected from one or several of rolled oats, rolled barley, oats flour, barley flour, fractions of such flours rich in  $\beta$ -glucan, incompletely germinated oats, incompletely germinated barley, whereby said materials employed in the process lack  $\beta$ -glucanase activity and whereby conventional malting is omitted thereby preventing  $\beta$ -glucanase from being formed, obvious to the skilled person.
16. Although document (1) mentions on page 156, right-hand column, second full paragraph stating that "[i]n recent years with the increasing use of larger proportions of unmalted adjunct the use of exogenous enzymes to supplement those of the malt has increased." and document (4) describes a homogeneous and stable cereal suspension having the taste and aroma of natural oats prepared of grinded rolled oats meal (see claim 1), none of the cited documents mentions the use of oats

for the production of wort or beer or the omission of the malting step in such production.

17. The board concludes therefore that, in view of the above considerations, the subject-matter of independent claims 1 and 7, and hence of any claim dependent thereon, involves an inventive step.

*Other issues*

18. As the board is satisfied that the other requirements of the EPC are also met, the auxiliary request as filed during the oral proceedings before the board forms a basis for the grant of a patent.



**Order**

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

1. The decision under appeal is set aside.
  
2. The case is remitted to the department of first instance with the order to grant a patent on the basis of claims 1 to 7 according to the auxiliary request filed at the oral proceedings and a description still to be adapted thereto.

The Registrar

The Chair

P. Cremona

U. Kinkeldey