

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

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PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No. PCT/EP2019/065685	International filing date (day/month/year) 14.06.2019	Priority date (day/month/year) 14.06.2018
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International Patent Classification (IPC) or both national classification and IPC
INV. C12C7/04 C12C1/18 C12C12/00 C12C1/16 C12G3/02

Applicant
ANHEUSER-BUSCH INBEV S.A.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA:  European Patent Office P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Fax: +31 70 340 - 3016	Date of completion of this opinion see form PCT/ISA/210	Authorized Officer Diller, Reinhard Telephone No. +31 70 340-0	
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Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:
 - ☒ the international application in the language in which it was filed.
 - ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).
2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))
3. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:
 - a. ☐ forming part of the international application as filed:
 - ☐ in the form of an Annex C/ST.25 text file.
 - ☐ on paper or in the form of an image file.
 - b. ☐ furnished together with the international application under PCT Rule 13ter.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
 - c. ☐ furnished subsequent to the international filing date for the purposes of international search only:
 - ☐ in the form of an Annex C/ST.25 text file (Rule 13ter.1(a)).
 - ☐ on paper or in the form of an image file (Rule 13ter.1(b) and Administrative Instructions, Section 713).
4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	<u>1-12, 16</u>
	No: Claims	<u>13-15</u>
Inventive step (IS)	Yes: Claims	
	No: Claims	<u>1-16</u>
Industrial applicability (IA)	Yes: Claims	<u>1-16</u>
	No: Claims	

2. Citations and explanations

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Reference is made to the following documents:

D1 DE 39 27 315 A1 (THURN & TAXIS BRAUEREI [DE]) 12 juli 1990
(1990-07-12)

D2 US 3 039 876 A (BAKER DWIGHT L ET AL) 19 juni 1962 (1962-06-19)

2. Novelty and inventive step

2.1 Claims 1-12

2.1.1 Document D1 discloses a method of producing beer from wort by mashing malt and fermenting the wort (cf. claim 1), wherein a mixture of malt is provided and wherein the mashing is conducted as a two-step-mashing ("Zweimaischverfahren"), wherein the first step comprises mashing the malt at a temperature of 50°C for about 10 min ("Temperaturrast bei 50°C", cf. col. 7, l. 15-23 and example at column 10, l. 59-67) and the second step comprises mashing at a temperature of 70°C for about 10 min (cf. "Temperaturrast bei 70°C", cf. col. 7, l. 15-23 and example at column 10, l. 59-67). D1 teaches that the first step allows proteolytic activity ("Eiweißabbau"), whereas the second step inactivates the proteases at a temperature of 65-75°C (cf. col. 9, l. 10-19) and causes saccharification ("für die Bildung von Zucker wesentlich ist"; cf. col. 7, l. 15-23).

In addition, D1 teaches that the saccharification is performed by amylase which is inherently part of the malt at a temperature of up to 65°C (cf. col. 1, l. 47-56).

Further, the process of D1 includes filtering the mash to obtain wort e. g. by lautering or filtering (cf. col. 11, l. 20-25).

Moreover, D1 teaches that the inactivation of protease improves foam stability (cf. col. 9, l. 10-19) and is therefore considered being the prior art closest to the subject-matter of claim 1.

2.1.2 However, D1 fails to disclose the addition of malt rootlets to the wort during the second step of mashing which renders the subject-matter of claims 1-11 novel over D1 in the sense of Article 33(2) PCT.

2.1.3 The distinguishing feature causes the technical effect that the foam stability is improved (cf. example of the present application).

2.1.4 The problem to be solved by the subject-matter of claim 1 may therefore be regarded as the provision of a process for preparing beer, wherein the foam stability of the beer is improved.

2.1.5 This problem is solved by the process of claim 1 by the addition of malt rootlets to the wort during the second step of mashing as shown in the example.

2.1.6 Starting from D1, the person skilled in the art gets an incentive to add a foam stabilizer, since D1 suggests to add foam stabilizers which are known to the person skilled in the art (cf. col. 11, l. 67 - col. 12, l. 2). Further, the person skilled in the art knows in view of the disclosure of D1 that a higher content of proteins in the second stage of mashing at a temperature of 65-75°C increases the foam stability, because proteases are inactivated at such a temperature (cf. col. 9, l. 10-19).

Consequently, in view of the disclosure of D1, the person skilled in the art would take into account the disclosure of D2, which is concerned with an improved process of producing beer resulting in a product having enhanced foam stability (cf. claim 1 and col. 1, l. 11-16). D2 teaches to replace hops by a peroxidase e. g. by use of a peroxidase adjunct prepared from an aqueous malt rootlet extract (cf. col. 7, l. 34-36 and claim 15).

Thus, in view of the combined disclosure of D1 and D2, the person skilled in the art would arrive in an obvious manner at the process of claim 1. Further, also the process of claim 2 and the product of claim 9 is considered obvious in view of D1 and D2.

Dependent claims 3-8 and 10-12 pertains to trivial modifications or measures for which no surprising effect is shown and which are considered obvious in view of the disclosure of D1 and D2.

Consequently, the subject-matter of claims 1-12 does not comprise an inventive step in the sense of Article 33(3) PCT.

2.2 Claims 13 and 14

D2 teaches that horse-radish peroxidase increases the foam stability of beer (cf. col. 1, l. 11-16, col. 7, l. 49-57 and example II). D2 discloses moreover that an aqueous extract of ground malt rootlets was equivalent to purified horse-radish peroxidase as far as the

peroxidase activity is concerned. Thus, D2 directly and unambiguously teaches the use of a malt rootlet extract for enhancing the foam stability of beer, which renders claim 13 not novel in the sense of Article 33(2) PCT.

Further, the subject-matter of claim 14 is considered so broad and unclear (see Re Item VIII below) that it is considered anticipated by the horseradish peroxidase according to D2, which is well known to the skilled person and has a molecular weight of about 44 kDa.

Thus, claims 13 and 14 are not novel in view of the disclosure of D2 in the sense of Article 33(2) PCT.

2.3 Claims 15 and 16

2.3.1 The method for brewing beer according to claim 15 is considered anticipated by the teaching of D2, since it is taught that the peroxidase may be added to the malt mash (cf. sentence bridging columns 3 and 4) and that the peroxidase is malt-derived from sources such as malt rootlets (cf. col. 4, l. 8-129).

Consequently, the subject-matter of claim 15 is not novel vis-à-vis D2 in the sense of Article 33(2) PCT.

2.3.2 In addition, the method according to dependent claim 16 is considered obvious in view of D1 and D2 as explained above (Article 33(3) PCT).

Re Item VIII

Certain observations on the international application

The subject-matter of claims 12 and 14 is not supported by the description as required by Article 6 PCT, as its scope is broader than justified by the description and drawings.

On page 8 of the description it is taught that the enriched protein fraction is visible around 40 kDa. This is supported by figure 3 wherein a protein band may be derivable having a molecular weight of about 40 kDa.

However, the broad range of 10-40 kDa is not supported by these disclosures and consequently offends Art. 6 PCT.