
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 and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - a sequence listing
 - table(s) related to the sequence listing
 - b. format of material:
 - on paper
 - in electronic form
 - c. time of filing/furnishing:
 - contained in the international application as filed.
 - filed together with the international application in electronic form.
 - furnished subsequently to this Authority for the purposes of search.
4. In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US2009/068373

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	
	No: Claims	<u>1-23</u>
Inventive step (IS)	Yes: Claims	
	No: Claims	<u>1-23</u>
Industrial applicability (IA)	Yes: Claims	<u>1-23</u>
	No: Claims	

2. Citations and explanations

see separate sheet

1. Reference is made to the following documents:

- D1 US 5 171 592 A (HOLTZAPPLE MARK [US] ET AL) 15 December 1992 (1992-12-15)
- D2 US 2007/031919 A1 (DUNSON JAMES B JR [US] ET AL) 8 February 2007 (2007-02-08)
- D3 WO 2006/110902 A1 (DU PONT [US]; DUNSON JAMES B [US]; TUCKER MELVIN [US]; ELANDER RICHARD) 19 October 2006 (2006-10-19)
- D4 US 1 817 525 A (RICHTER GEORGE A) 4 August 1931 (1931-08-04)
- D5 US 1 891 337 A (ELMER SEAMAN STEWART) 20 December 1932 (1932-12-20)

2. The application does not meet the requirements of Article 6 PCT, because the claims are not clear.

2.1 Although claims 1 and 18 have been drafted as separate independent claims, they appear to relate effectively to the same subject-matter and to differ from each other only with regard to the definition of the subject-matter for which protection is sought and/or in respect of the terminology used for the features of that subject-matter. The aforementioned claims therefore lack conciseness and as such do not meet the requirements of Article 6 PCT.

3. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1 and 18 is not new in the sense of Article 33(2) PCT.

3.1 Concerning independent claim 1, the document D1 discloses (the references in parentheses applying to this document):

- A method for producing carbohydrate-enriched biomass with high retention of hemicellulose comprising (column 1, lines 10-21; column 2, line 41 - column 3, line 39):
 - (a) providing lignocellulosic biomass comprising lignin, cellulose and hemicellulose (column 7, lines 53-62);
 - (b) suspending the biomass of (a) in an organic solvent solution comprising water, ammonia in an amount of about 2% to about 20% relative to weight of dry biomass and one or more nucleophile, whereby a biomass-solvent suspension is formed under alkaline conditions (column 7, lines 53-62);

- (c) heating the biomass-solvent suspension to a temperature of about 100-220 °C for about 5 minutes to about 5 hours whereby lignin is fragmented and is dissolved in the suspension; and (column 9, lines 15-20; column 10, line 8)

- (d) filtering free liquid under pressure after heating the suspension in (c) whereby the dissolved lignin is removed and whereby carbohydrate-enriched biomass with high retention of hemicellulose is produced (column 2, line 41 - column 3, line 39).

D2 (page 1, paragraph 13-16; page 2, paragraphs 25,26,32; page 3, paragraph 36-43; example 19), D3 (page 1, lines 14-18; page 5, line 27 - page 6, line 32; page 14, line 15 - page 16, line 34; page 18, lines 10-14; example 5; claims 25-32), D4 (the whole document) and D5 (page 1, lines 1-5,48; claims 1-23; example 1) also disclose the subject-matter of claim 1.

3.2 Concerning independent claim 18, the document D1 discloses (the references in parentheses applying to this document):

- A method of simultaneous fragmentation and selective extraction of lignin from lignocellulosic biomass to produce a substantially lignin-free biomass comprising (column 1, lines 10-21; column 2, line 41 - column 3, line 39):

- (a) providing: 1) an amount of lignocellulosic biomass comprising lignin and carbohydrate; 2) a multi-component solvent solution comprising from about 40% to about 70% ethanol in water; 3) ammonia in an amount of 2% to about 20% ' 4) and one or more nucleophile(s) (column 7, lines 53-62);

- (b) contacting said biomass with the multi-component solvent solution of (a) to form a solvent-biomass mixture (column 7, lines 53-62);

- (c) placing the solvent-biomass mixture in a sealed pressure vessel whereby the mixture of (b) is heated at a temperature of about 100 °C to about 220 °C for about 5 minutes to about 5 hours whereby lignin is fragmented and dissolved in the solvent (column 9, lines 15-20; column 10, line 8);

- (d) removing the dissolved lignin of (c) by filtration; and (e) washing the residual with organic solvent, whereby substantially lignin-free biomass is produced (column 2, line 41 - column 3, line 39).

D2 (page 1, paragraph 13-16; page 2, paragraphs 25,26,32; page 3, paragraph 36-43; example 19), D3 (page 1, lines 14-18; page 5, line 27 - page 6, line 32; page 14, line 15 - page 16, line 34; page 18, lines 10-14; example 5; claims 25-32), D4 (the whole document) and D5 (page 1, lines 1-5,48; claims 1-23; example 1) also disclose the subject-matter of claim 18.

4. Dependent claims 2-17,19-23 does not appear to contain any additional features which, in combination with the features of any claim to which it refers, meet the requirements of the PCT in respect of novelty and/or inventive step, the reasons being as follows:

D1 (column 1, lines 10-21; column 2, line 41 - column 3, line 39; column 7, lines 53-62; column 9, lines 15-20; column 10, line 8; claims 1-4) already discloses the subject-matter of claims 2-9, 17 and 19-21.

D2 (page 1, paragraph 13-16; page 2, paragraphs 25,26,32; page 3, paragraph 36-43; example 19) and D3 (page 1, lines 14-18; page 5, line 27 - page 6, line 32; page 14, line 15 - page 16, line 34; page 18, lines 10-14; example 5; claims 25-32) already disclose the subject-matter of claims 2-6, 10-17 and 19-23.

5. Proceeding with the application, the applicant is kindly asked to observe:

The wording "incorporated by reference" does not meet the requirements of PCT Guidelines, III-4.3 a. Therefore, this wording should have been deleted.