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*C12P 19/02* (2006.01)

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[Continued on next page]

(54) Title: BIOMASS EXTRACTS AND USES THEREOF

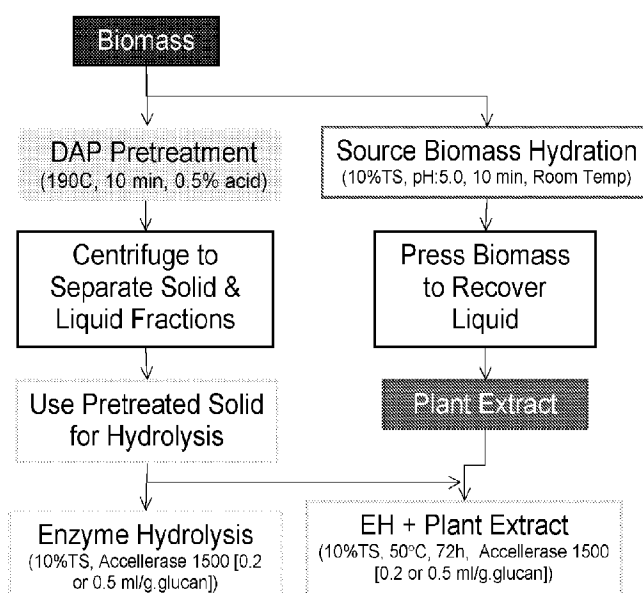


Figure 1

(57) Abstract: Methods of using plant biomass extracts to improve glucan conversion, to increase fermentation yields, to reduce biomass recalcitrance, to improve silage quality, to increase starch hydrolysis, and/or to bleach cellulosic material.



SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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29 March 2012

**A. CLASSIFICATION OF SUBJECT MATTER***C08B 1/00(2006.01)i, C12P 19/02(2006.01)i, C12N 9/14(2006.01)i*

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

C08B 1/00; C08B 15/00; C12N 7/06; C12P 7/10; A23K 1/12; C01F 11/02; C12P 19/14; C07H 1/06

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) &amp; Keywords: lignocellulose, biomass, plant extract, pretreatment, hydration, enzyme activity, starch, bleaching, recalcitrance

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-----------|------------------------------------------------------------------------------------|-----------------------|
| X         | US 2009-0093027 A1 (BALAN, V. et al.) 09 April 2009                                | 1-42                  |
| A         | See abstract; paragraphs [0005],[0010][0037]-[0047];[0052]-[0062]; claims 1-23.    | 43-47                 |
| X         | US 2010-0159552 A1 (BENSON, R. A. C. & BENECH, R. -O.) 24 June 2010                | 1-42                  |
| A         | See the entire document, especially, abstract; claims 1-29.                        | 43-47                 |
| X         | US 2009-0270609 A1 (HEIKKILA, H. et al.) 29 October 2009                           | 43, 44                |
| A         | See abstract; claims 1,26-34.                                                      | 1-42, 45-47           |
| X         | US 2008-0160514 A1 (SEALEY, J. E. et al.) 03 July 2008                             | 45, 46                |
| A         | See abstract; claims 1,5-14.                                                       | 1-45, 47              |
| Y         | US 2010-0159569 A1 (MEDOFF, M. & MASTERMAN, T. C.) 24 June 2010                    | 47                    |
| A         | See abstract; claims 1-9,18.                                                       | 1-46                  |

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

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"P" document published prior to the international filing date but later than the priority date claimed

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&amp;" document member of the same patent family

Date of the actual completion of the international search

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International application No.

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| C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT |                                                                                                      |                       |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------|-----------------------|
| Category*                                             | Citation of document, with indication, where appropriate, of the relevant passages                   | Relevant to claim No. |
| Y<br>A                                                | US 05865898A A (HOLTZAPPLE, M. T. & DAVISON, R. R.) 02 February 1999<br>See abstract; claims 1-3,15. | 47<br>1-46            |

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

**PCT/US2011/041109**

| Patent document<br>cited in search report | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
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