

INFORME DE BÚSQUEDA DE PATENTES PARA EL No de Radicación: 14-139494						
CRITERIOS PARA LA BÚSQUEDA (anexar pantallazo o reporte en PDF, junto con los boleanos utilizados)						
Palabras clave utilizadas		Acetic acid from biomass, biomass pretreatment process, hydrothermal conversion of biomass, nanofiltration, pre-soaking process, soaking process.				
CLASIFICACIONES INTERNACIONALES UTILIZADAS PARA LA BÚSQUEDA		C12P19/02; C13K1/02; D21C1/02; D21C5/00				
BASES DE DATOS CONSULTADAS.						
ESPACENET		Patent scope		Patbase		Espatentes
USPTO		Sciencedirect				
INFORMES DE EXÁMENES REALIZADOS EN OTRAS OFICINAS (documentos patentes, literatura no patente etc...)						
Oficina	Fecha del examen o de reporte de búsqueda de documentos	Anterioridades encontradas para el examen o reportados en el examen de búsqueda(relacionarlos todos)	Reiv. afectadas	RELEVANCIA (requisito que afecta)	FUERON TENIDOS EN CUENTA PARA EL EXAMEN EN LA OFICINA COLOMBIANA	
					SI	NO
WIPO	26/04/2013	Integrated process for separation of lignocellulosic components to fermentable sugars for production of ethanol and chemicals US 20080057555	1-20	A	X	
		Hydrolysis process US 4908067	1-20	A		X
		Method and apparatus for conversion of cellulosic material to ethanol EP 2172568	1-20	A		X
DOCUMENTOS ADICIONALES ENCONTRADOS POR EL EXAMINADOR DE ACUERDO A LOS CRITERIOS DE BÚSQUEDA.						
Improved biomass pretreatment process WO2010113129						
Improved pre-soaking process for biomass conversion EP2610346						
Continuous flowing pre-treatment system with steam recovery WO 2006034590						
Method and devices for the continuous processing of renewable raw materials WO 2006024242						
Method and apparatus for conversion of cellulosic material to ethanol WO 2007009463						
Integrated process for separation of lignocellulosic components to fermentable sugars for production of ethanol and chemicals US 7666637						
Purification of oligosaccharides from rice husk autohydrolysis liquors by ultra- and nano-filtration, 2006						
Separation of furfural from monosaccharides by nanofiltration, 2011						
Separation of acetic acid from xylose by nanofiltration, 2009						
Hydrothermal conversion of biomass into acetic acid, 2006						
Continuous process for the production of ethanol from lignocellulosic biomass US2012115200						
Process for the production of organic products from lignocellulose containing biomass sources WO0132715						
Observaciones						

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WO2010113129 (A3)

Bibliographic data

Description
Claims
Mosaics
Original document
Cited documents
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INPADOC legal status
INPADOC patent family

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Bibliographic data: WO2010113129 (A3) — 2010-12-29

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IMPROVED BIOMASS PRETREATMENT PROCESS

Page bookmark [WO2010113129 \(A3\) - IMPROVED BIOMASS PRETREATMENT PROCESS](#)

Inventor(s): GARBERO MIRKO [IT]; OTTONELLO PIERO [IT]; COTTI COMETTINI MARCO [IT]; FERRERO SIMONE [IT]; TORRE PAOLO [IT]; CHERCHI FRANCESCO [IT]; BONANNI ANDREA [IT] ±

Applicant(s): CHEMTEX ITALIA S R L [IT]; GARBERO MIRKO [IT]; OTTONELLO PIERO [IT]; COTTI COMETTINI MARCO [IT]; FERRERO SIMONE [IT]; TORRE PAOLO [IT]; CHERCHI FRANCESCO [IT]; BONANNI ANDREA [IT] ±

Classification: - international: C12P19/02; C12P19/04; C13K1/02; D21C5/00
- cooperative: C08H8/00; C12P19/02; C12P19/04; C13K1/02; D21C5/005; C12P2201/00; Y02E50/16

Application number: WO2010113129 20100331

Priority number(s): WO2009IT00125 20090331 ; WO2009IT00129 20090331 ; WO2009IT00130 20090331

Also published as: [WO2010113129 \(A2\)](#) [US2012104313 \(A1\)](#) [TW201040279 \(A\)](#) [SG183710 \(A1\)](#) [SG174592 \(A1\)](#) → more

Abstract of WO2010113129 (A3)

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EP2172558 (A1) → EP2610346 (B1)

EP2610346 (B1)

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Mosaics
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INPADOC legal status
INPADOC patent family

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Bibliographic data: EP2610346 (B1) — 2014-07-30

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Improved pre-soaking process for biomass conversion

Page bookmark [EP2610346 \(B1\) - Improved pre-soaking process for biomass conversion](#)

Inventor(s): CHERCHI FRANCESCO [IT]; OTTONELLO PIERO [IT]; FERRERO SIMONE [IT]; TORRE PAOLO [IT]; DE FAVERI DANILU [IT]; RIVAS TORRES BEATRIZ [IT]; TONET RENZI LUIGI [IT]; RIVA DANIELE [IT]; BOSIO FEDERICA [IT] ±

Applicant(s): BETA RENEWABLES SPA [IT] ±

Classification: - international: C09K3/00; C12P19/02; C13B20/16; C13K1/02; C13K13/00; D21C1/02; D21C5/00
- cooperative: C07C53/08; C09K3/00; C12P19/02; C13B20/16; C13K1/02; C13K13/00; C13K13/007; D21C1/02; C12P2201/00; D21C5/005

Application number: EP20120199683 20121228

Priority number(s): IT2011T001219 20111228

Also published as: [EP2610346 \(A1\)](#) [US2013188602 \(A1\)](#) [US9102856 \(B2\)](#) [SG11201403549P \(A\)](#) [PH12014501519 \(A1\)](#) → more

Abstract of EP2610346 (A1)

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An improved method of conducting the pre-soaking step involving pre-soaking the lignocellulosic biomass in a liquid (water) at a temperature in the range of between 100 DEG C to 150 DEG C prior to soaking at higher temperatures. This material can then be soaked and soaked liquid filtered by nano-filtration. When nano-filtration is used, the pre-soak temperature can be in the range of 10 DEG C to 150 DEG C.

Google Patents search results for WO 2006034590 A1. The page displays the patent title, abstract, and a table of metadata including publication number, type, date, and inventors. The abstract describes a continuous flowing pre-treatment system with steam recovery. The claims section lists the invention's features.

Continuous flowing pre-treatment system with steam recovery
WO 2006034590 A1

ABSTRACT

The present invention is directed to a continuous process for pretreating a lignocellulosic feedstock. A feedstock slurry is provided, which has a solids concentration of 10% to 30% by weight. The feedstock slurry is pumped through a heating train of at least two stages, each stage including a pump to increase stage pressure and a direct steam injection to heat the feedstock slurry. Acid is also added to the feedstock slurry prior to the heating train, during a heating stage, or after leaving the heating train; the acid is added at a concentration of 0.2% to 12% weight of acid on weight of initial feedstock. A heated, acidified feedstock slurry is thus produced. The heated, acidified feedstock slurry is flowed through a pre-treatment reactor at a temperature of 160°C to 280°C for a time sufficient to increase efficiency of conversion of cellulose in the feedstock to glucose using cellulase enzymes. After the slurry exits the pretreatment reactor, it is cooled using two, or more than two flashing stages at successively lower pressures, without increasing the steam pressure after flashing. The steam energy, at or near its flash pressure, from two or more than two of the flashing stages is used to heat the feedstock slurry in the heating train.

DESCRIPTION

CONTINUOUS FLOWING PRE-TREATMENT SYSTEM WITH STEAM RECOVERY

[0001] The present invention relates to a pre-treatment process in the conversion of lignocellulosic feedstocks into sugars. More specifically, the present invention relates to a continuously flowing pre-treatment process with simultaneous steam recovery, for the conversion of lignocellulosic feedstocks into sugars.

CLAIMS (1)

1. THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A continuous process for pre-treating a lignocellulosic feedstock, comprising:

(a) providing a pumpable feedstock slurry having a solids

Google Patents search results for WO 2006024242 A1. The page displays the patent title, abstract, and a table of metadata including publication number, type, date, and inventors. The abstract describes a method and devices for the continuous processing of renewable raw materials. The claims section lists the invention's features.

Method and devices for the continuous processing of renewable raw materials
WO 2006024242 A1

ABSTRACT

By means of the continuous pressure hydrolysis of lignocellulose material and subsequent enzymatic hydrolysis of solid unhydrolysed residues is obtained glucose, to which starch raw materials are added and all of which undergoes amylolytic cleavage and spirituous fermentation. Ethanol, furfural, acetic and lignin are obtained. The device, which comprises the filling unit, hydrolysers, expanders, distilling and rectifying columns is represented in that the continuous worm pressure filling unit (13) consists of segments formed by the body (94) with single-threaded conveyor worms (86) placed on the shaft (85). Between the worms there is at least one steam ring (88), which conically widens on the input side of the raw material. In the outlet filler (93) with the reducing part leading into the first hydrolyser (22) a pressure identical to that of the first hydrolyser (22) is achieved. The last hydrolyser (24) is connected to the first rectifying column (43) for furfural and to the section of the cellulolytic enzyme hydrolysis, amylolytic cleavage, and ethanol fermentation.

DESCRIPTION

METHOD AND DEVICE FOR THE CONTINUOUS PROCESSING OF RENEWABLE RAW MATERIALS

Field of the invention

The invention relates to the method of processing lignocellulosic materials using continuous pressure hydrolysis resulting in the production of furfural and furane, acetic acid, lignin, hydrolytic sugars - glucose. The method also includes processing the residues after hydrolysis using methods of enzymatic hydrolysis.

CLAIMS (1)

1. Patent claims

1. The method for complex processing of lignocellulosic and starch materials where furfural, acetic acid and lignin are produced by continuous pressure hydrolysis, followed by two stages expansion, separation of the hydrolysate into the gaseous phase and solution of sugars, characterized by the fact that the disintegrated lignocellulosic raw material is continuously hydrolysed, the hydrolysed material is

Method and apparatus for conversion of cellulosic material to ethanol
WO 2007009463 A2

ABSTRACT

The present invention provides an apparatus and a method for conversion of cellulosic material, such as chopped straw and corn stover, and household waste, to ethanol and other products. The cellulosic material is subjected to continuous hydrothermal pre-treatment without addition of chemicals, and a liquid and a fibre fraction are produced. The fibre fraction is subjected to enzymatic liquefaction and saccharification. The method of the present invention comprises:

- performing the hydrothermal pre-treatment by subjecting the cellulosic material to at least one soaking operation, and conveying the cellulosic material through at least one pressurised reactor, and subjecting the cellulosic material to at least one pressing operation, creating a fibre fraction and a liquid fraction; - selecting the temperature and residence time for the hydrothermal pretreatment, so that the fibrous structure of the feedstock is maintained and at least 80% of the lignin is maintained in the fibre fraction.

Publication number	WO2007009463 A2
Publication type	Application
Application number	PCT/DK2006/000419
Publication date	Jan 25, 2007
Filing date	Jul 19, 2006
Priority date	Jul 19, 2005
Also published as	CA2615844A1, 19 More »
Inventors	Christensen Boerge Holm, Christensen Lena Holm
Applicant	Holm Christensen Biosystemer A, 2 More »
Export Citation	BiTeX, EndNote, RefMan
Patent Citations (9), Referenced by (75), Classifications (28), Legal Events (15)	
External Links: Patentscope, Espacenet	

DESCRIPTION CLAIMS (1)

METHOD AND APPARATUS FOR CONVERSION OF CELLULOSIC MATERIAL TO ETHANOL

Technical field

The present invention relates to sustainable methods for cost and energy effective conversion of lignocellulosic biomass to ethanol and other products based on continuous hydrothermal pre-treatment followed by enzymatic hydrolysis, ethanol fermentation and recovery.

1. A method for conversion of cellulosic material to ethanol and other products, the cellulosic material comprising at least cellulose, lignin, hemicellulose and ash, in which method the cellulosic material is cleaned and subjected to continuous hydrothermal pre-treatment without addition of acids or bases or other chemicals, which must be recovered, and in which method a liquid and a fibre fraction are produced, the fibre fraction being subjected to enzymatic liquefaction and saccharification, the method including ethanol fermentation and product recovery, the method

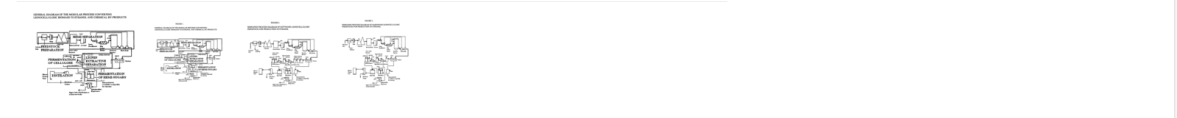
Integrated process for separation of lignocellulosic components to fermentable sugars for production of ethanol and chemicals
US 7666637 B2

RESUMEN

The invented process separates main components in lignocellulosic biomass, specifically hardwoods, softwoods into lignin and fractions of high purity sugars which are used for ethanol production. The invented process comprises of treatment stages at high temperature and high pressure with hydrochloric acid or sulfuric acid. Residual lignin and extractives in the cellulosic solid fraction are selectively removed by chemical treatments of sodium chlorite, anhydrous acetic acid, chlorine and chlorine dioxide to enhance the purity and biological conversion of cellulose to ethanol. The pre-hydrolysate generated from the acid treatment stage, containing xylose, arabinose, galactose, glucose and the purified cellulosic fraction are enzymatically hydrolyzed and fermented to produce ethanol. Significant amount of lignin from the process is recovered as a by-product.

Número de publicación	US7666637 B2
Tipo de publicación	Concesión
Número de solicitud	US 11/700,718
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Fecha de presentación	1 Feb 2007
Fecha de prioridad	5 Sep 2006
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También publicado como	US20080057555
Inventores	Xuan Nghinh Nguyen
Cesionario original	Xuan Nghinh Nguyen
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Citas de patentes (51), Citada por (27), Clasificaciones (12), Eventos legales (3)	
Enlaces externos: USPTO, Cesión de USPTO, Espacenet	

IMÁGENES (4)



DESCRIPCIÓN RECLAMACIONES (2)

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Bioresource Technology 102 (2011) 7111–7118

Contents lists available at ScienceDirect

Bioresource Technology

journal homepage: www.elsevier.com/locate/biortech

Separation of furfural from monosaccharides by nanofiltration

Benkun Qi, Jianquan Luo, Xiangrong Chen, Xiaofeng Hang, Yinhua Wan^{*}

National Key Laboratory of Biochemical Engineering, Institute of Process Engineering, Chinese Academy of Sciences, Beijing 100190, China

ARTICLE INFO

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Received 13 February 2011
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ABSTRACT

Furfural, found in the lignocellulosic prehydrolyzates at high concentration, is a strong inhibitor of growth and ethanol fermentation of *Saccharomyces cerevisiae*. Removal of furfural and concentration of

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Separation and Purification Technology 67 (2009) 95–102

Contents lists available at ScienceDirect

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Separation of acetic acid from xylose by nanofiltration

Yu-Hsiang Weng^{a,b,*}, Hwa-Jou Wei^{a,c}, Tsung-Yen Tsai^a, Wei-Hsi Chen^a,
Tsong-Yang Wei^a, Wen-Song Hwang^a, Chia-Pao Wang^a, Chin-Pao Huang^b

^a Institute of Nuclear Energy Research, Atomic Energy Council, Executive Yuan, 1000 Wenhua Rd., Chiaoan Village, Lungtan, Taoyuan 325, Taiwan, ROC
^b Department of Civil and Environmental Engineering, University of Delaware, Newark, DE 19716, USA
^c Department of Chemical and Materials Engineering, National Central University, Chungli 320, Taiwan, ROC

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ABSTRACT

Lignocellulose has drawn great attention in the bioethanol industry as an alternative feedstock for ethanol

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A NOVEL METHOD OF ADVANCED MATERIALS PROCESSING

J MATER SCI 41 (2006) 1495-1500

Hydrothermal conversion of biomass into acetic acid

F. JIN*, Z. ZHOU, A. KISHITA, H. ENOMOTO
Department of Environmental Science and Technology, Graduate School of Environmental Studies, Tohoku University, Sendai, 980-8579, Japan
E-mail: jin@mti.kankyo.tohoku.ac.jp

Hydrothermal process is one of the most promising processes for the conversion of biomass waste into resources among the several biomass conversion processes, because water of high temperature and high pressure has remarkable properties as a reaction medium. This paper described advances in our research involving overall reaction pathways for acetic acid production from biomass, mainly including (1) acetic acid production by controlling pathways of hydrothermal reaction, (2) acid-base behavior of water in the subcritical region and (3) effect of lignin on the acetic acid production in WO of lignocellulosic biomass.

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1. Introduction

Recycling process of the conversion of biomass waste into resources is receiving increased interest due to the perceived need for maintaining the global carbon cycle system to work harmoniously. Any technological process for converting biomass into chemicals involves the breakdown of complex organic structures. Several treatment processes have been under development. Hydrothermal treatment is one of the most effective ways, because water of high temperature and high pressure behaves as a reaction medium with remarkable properties.

Our previous results on supercritical water oxidation (SCWO) of food wastes showed that acetic acid was a stable intermediate product for almost all food wastes [1-3]. This gives us a suggestion that it is possible to obtain

of biomass wastes, then it would help not only to reduce the cost of manufacturing CMA, but also to give a new process for organic waste treatment.

Therefore, our research group began research work on the acetic acid production from biomass waste by WO, to produce calcium/magnesium acetate (CMA) [7-11]. Results so far obtained indicate that the direct oxidation of cellulose would produce formic acid but not acetic acid, so that the yield of acetic acid is limited to only 11-13% on the carbon basis by a usual WO. In order to improve the conversion efficiency to acetic acid, a comprehensive research on WO mechanisms, properties of a solution at high temperatures and pressures, etc. has been carried on. In this paper, advances in our research involving overall reaction pathways for acetic acid production

worldwide.espacenet.com/publicationDetails/claims?CC=WO&NR=2012080702A2&KC=A2&FT=D&ND=8&date=20120621&DB=&locale=en_EP

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What is Global Dossier?

Claims: WO2012080702 (A2) — 2012-06-21

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TREATMENT

Claims of WO2012080702 (A2)

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Original claims	Claims tree
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The EPO does not accept any responsibility for the accuracy of data and information originating from other authorities than the EPO; in particular, the EPO does not guarantee that they are complete, up-to-date or fit for specific purposes.

Claims

1. A method of treating a biomass to dissolve the lignin therein, but not the cellulose comprising:
(a) contacting the lignocellulose biomass with a composition comprising an ionic liquid to produce a cellulose pulp, wherein the ionic liquid comprises a cation and an anion selected from C1-20 alkyl sulfate [AlkylSO4]<->, C1-20alkylsulfonate [AlkylSO3]<->, hydrogen sulfate [HSO4]<->, hydrogen sulphite [HSO3]<->, dihydrogen phosphate [H2PO4]<->, hydrogen phosphate [HPO4] and acetate, [MeCO2] with the proviso that the anion is acetate then the composition further comprises 10-40% v/v water.
2. A method as claimed in claim 1 wherein said cation is a protic cation.
3. A method as claimed in claim 1 or claim 2 wherein the anion selected from [MeSO4] acetate, [HSO4]<-> and [MeSO3]<->.
4. A method as claimed in any one of claims 1 to 3 wherein the cation in the ionic liquid is selected from an imidazolium derivative, pyridinium derivative or ammonium derivative.
5. A method as claimed in any one of claims 1 to 4 wherein the cation is selected from 1-butyl-3-methylimidazolium [C4mim]<->, 1-ethyl-3-methylimidazolium [C2cmim]<->, 1-methylimidazolium [C4him]<-> and 1-butylimidazolium [C4him]<->.
6. A method as claimed in any one of claims 1 to 5 wherein said ionic liquid is selected from 1-butyl-3-methylimidazolium methyl sulfate