

INVENCIONES ESPAÑOLAS EN EL SECTOR DEL BIOETANOL

Para realizar este estudio se han considerado las solicitudes de invenciones publicadas hasta el momento de los residentes en España, las invenciones cubren tanto las patentes como los modelos de utilidad. Se han contabilizado 24 invenciones que se mueven alrededor del sector del bioetanol. Es importante señalar que pueden existir invenciones que se hayan solicitado y aún no se hayan publicado.

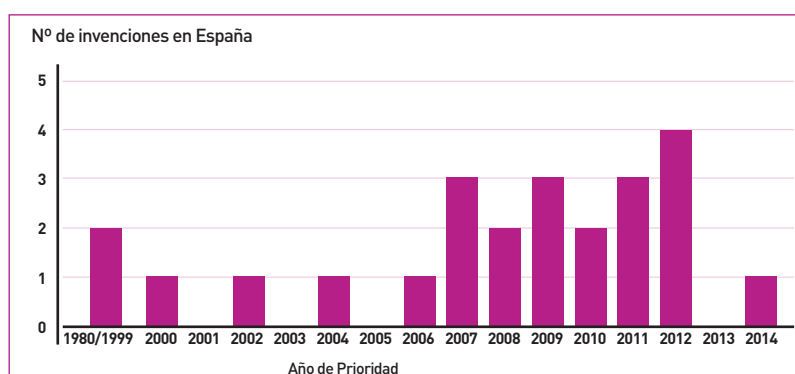


Figura 1: Evolución del número de invenciones relacionadas con el bioetanol

En la Figura 1, se muestra la evolución de las solicitudes, teniendo en cuenta el número de prioridad. En la misma se observa un comportamiento irregular, aunque podríamos indicar que el interés en proteger las invenciones en el ámbito de la producción de bioetanol comenzó a ser notorio a partir del año 2006. Hasta ese momento, sólo se había pedido protección para 6 invenciones (25%) (Nº 2, 4, 5, 10, 16 y 20 de la Tabla 1) y la cifra máxima, por ahora, se ha alcanzado en el año 2012 (4 solicitudes).

Para el 62% de las invenciones, además de la solicitud nacional, se presentó la solicitud internacional. En el 93% de las solicitudes internacionales se expresó el deseo de obtener la patente europea. En la actualidad, pasarán a fase europea el 21% y fueron denegadas el 43%. Con respecto a las solicitudes nacionales cabe indicar que se han concedido el 66%.

Teniendo en cuenta el tipo de solicitante, el 40% de las solicitudes publicadas tienen como titular una empresa, el 27% son universidades, el 20% son organismos públicos y el 13% son particulares (Figura 2). El solicitante más activo es Merino Febrero, V., seguido de la Universidad de Cádiz, la Universidad de Córdoba y el Consejo Superior de Investigaciones Científicas (CSIC). En el caso del CSIC una de las invenciones tiene titularidad compartida (Tabla 1).

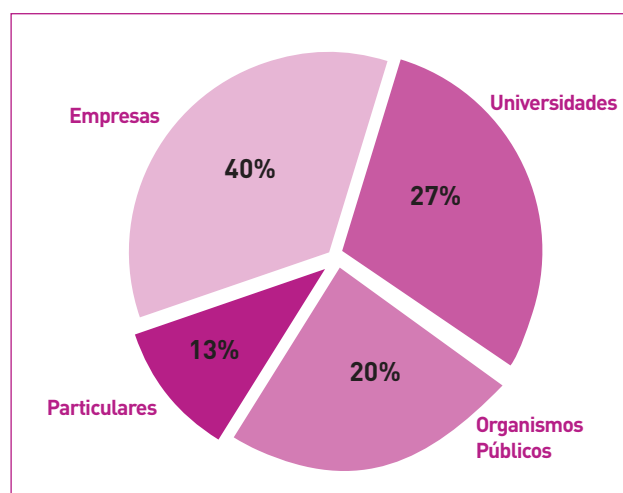


Figura 2: Naturaleza de los solicitantes españoles de patentes en el área del bioetanol

Tabla1:

PATENTES RELACIONADAS CON BIOETANOL TÍTULO DE LA PATENTES, Nº DE PUBLICACIÓN DE LA SOLICITUD			
Nº	Título	Nº Publicación	Solicitante
1	Procedimiento de producción de biocombustibles y co-productos alimentarios empleando extractos de cultivos de microalgas	ES2433765 WO2013182715	Abengoa Bioenergía Nuevas Tecnologías SA
2	Procedimiento de producción de etanol a partir de biomasa lignocelulósica utilizando una nueva levadura termotolerante	ES2166316 EP1130085	CIEMAT
3	Endoxilanas termorresistente obtenida por mutagénesis y su aplicación al proceso de obtención de bioetanol	ES2371317 WO2011157877	- CSIC - BIOPOLIS, SL
4	Obtención de etanol en condiciones de alta presión osmótica mediante Schizosaccharomyces pombe (CECT 12775)	ES2257206	CSIC
5	Procedimiento de obtención de cepas de levadura capaces de fermentar rápidamente azúcares con producción rápida de dióxido de carbono y etanol	ES2048645 WO9321333	
6	Procedimiento para el almacenamiento de energía solar en forma de combustibles ecológicos	ES2425694 WO2013135917	Guradoor, SL
7	Un procedimiento para la revalorización energética de la fracción orgánica de residuos sólidos urbanos e instalación	ES2303792 EP2112226 WO2008099038	- Industrias Mecánicas Alcuía, SA - CIEMAT
8	Cepa de hongo Hormonema sp. CECT 13092 y procedimiento de aplicación para la deslignificación de biomasa lignocelulósica	ES2455491	- INIA - Univ. Politec. Madrid
9	Proceso para la producción de bioetanol en una biorrefinería multifuncional	WO2013156642	Merino Febrero, V
10	Procedimiento de obtención de bioetanol en una planta azucarera	ES2278532 WO2007082976	
11	Metodo de obtención de biocombustible	ES2319604	
12	Metodo para la producción de productos petroquímicos, agroalimentarios u otros a partir del bioetanol obtenido en biorrefinería multifuncional	ES2326509 WO2009125037	
13	Métodos para la obtención de biocombustibles y productos químicos a partir de bioetanol y de subproductos del proceso de producción de bioetanol	ES2376682	
14	Método para mejorar la expresión de proteínas en cloroplastos	ES2336754 WO2010018251	Plant Bioproducts, SL
15	Cepa de levadura Kluyveromyces Lactis y procedimiento de obtención de azúcares, etanol, beta-galactosidasa y biomasa	ES2397334 EP2725098 WO2012175760	Queizúar, SL
16	Procedimiento para la fabricación del carburante alcohol etílico para vehículos a partir de materias celulósicas	ES541009	Rabbani Mahmoud, M
17	Proceso para el aprovechamiento de subproductos de la industria agroalimentaria para la obtención de precursores de biocombustibles, alimentos funcionales y cosméticos	ES2395162 WO2013017708	Univ. Cádiz
18	Medio de cultivo simplificado y optimizado para la producción de etanol e hidrógeno, a partir de glicerina, por escherichia coli, para potenciar la productividad de biomasa	ES2395170 WO2013017710	
19	Procedimiento para pretratar biomasa lignocelulósica mediante oxidación química a alta presión	WO2014068152	
20	Procedimiento de obtención de biocapsulas de levaduras, biocapsulas así obtenidas y aplicaciones	ES2204316 WO2004029240	Univ. Córdoba
21	Levadura vinica osmotolerante cect 13014 y su aplicación en la producción y mejora de vinos dulces y la obtención de bioetanol	ES2350223	
22	Levadura vinica osmotolerante cect 13015 y su aplicación en la producción y mejora de vinos dulces y la obtención de bioetanol	ES2350431	

PATENTES RELACIONADAS CON BIOETANOL

TÍTULO DE LA PATENTES, Nº DE PUBLICACIÓN DE LA SOLICITUD

Nº	Título	Nº Publicación	Solicitante
23	Cepas de levadura capaces de secretar beta-galactosidasa al medio y su uso para la producción de biomasa, etanol, beta-galactosidasa y proteínas de interés	ES2319489	Univ. Coruña
24	Cepas de <i>S. Cerevisiae</i> capaces de crecer en medios con melibiosa, estaquiosa y rafinosa	ES2351296 EP2418275 WO2010116020	

*Solo se recogen, la solicitud española, internacional y europea

ANÁLISIS DE PATENTES

Durante el segundo trimestre de 2014 se han identificado en la base de datos WPI (World Patent Index) 1.415 familias de patentes sobre tecnologías de conversión de la biomasa para la producción de energía. De la Tabla 2 se desprende que, aproximadamente, el 58% de las referencias encontradas están relacionadas con las tecnologías bioquímicas y el 30% con termoquímicas. La tecnología de digestión anaeróbica es la que cuenta con mayor número de resultados, 48% de los totales, seguida de la gasificación/pirólisis (25%)

Tipos de tecnologías de conversión de la biomasa	2º trimestre. 2014
Tecnologías termoquímicas	420
Combustión directa	173
Gasificación/pirólisis	247
Tecnologías bioquímicas	820
Digestión anaeróbica	675
Fermentación de azúcares	145
Tecnologías químicas (transesterificación, Fischer-Tropsch síntesis de metanol)	175
Nº TOTAL FAMILIAS DE PATENTES	1.415

Tabla 2. Número de familias de patentes clasificadas por tecnologías

En la Tabla 3 se muestran los países que tienen más de 10 solicitudes. El país líder es China con 971 solicitudes de patente, en segundo lugar, y con gran diferencia, le siguen las solicitudes internacionales (PCT). En tercer y cuarto lugar se encuentra Corea y EE.UU. con 95 y 84 solicitudes, respectivamente. España se encuentra en la posición once, con 10 solicitudes.

En los apartados posteriores se recoge una selección de los documentos de patentes identificados en el trimestre analizado.

	País	Nº referencias
1	China (CN)	971
2	Patente PCT (WO)	132
3	Corea (KR)	95
4	EE.UU. (US)	84
5	Japón (JP)	48
6	Alemania (DE)	41
7	Patente Europea (EP)	25
8	Indonesia (ID)	20
9	Rusia (RU)	17
10	Brasil (BR)	13

Tabla 3. Ranking por países.

TECNOLOGÍAS TERMOQUÍMICAS

Patentes

COMBUSTIÓN DIRECTA		
Nº Publicación	Solicitante (País)	Contenido técnico
WO2014063200	Bowers Neal Alexander (AU)	Wood fuelled heating stove. A wood fuelled heating stove including: a stove portion having a stove chamber therein and an fine mesh charcoal basket dividing the stove chamber into upper and lower chambers; a reduction portion having a primary combustion chamber therein and at least partly within the upper chamber of the stove chamber and having a primary grating vertically separating the primary combustion chamber from the upper chamber; an air jacket surrounding at least some of the primary combustion chamber and having a plurality of ports providing fluid communication between the primary combustion chamber and the air jacket and a primary grating providing limited flow of mobile solids and fluid between the primary combustion chamber and the stove chamber; an air passage providing fluid communication from the outside of the stove chamber to the air jacket and to the inside of the stove chamber; ; and a flue passage providing fluid communication from the lower chamber of the stove chamber to a flue outlet at a level above the primary combustion chamber and upper level of the stove chamber.
ES2451513	Biomasa Ecoforestal de Villacanas SAU (ES)	Estufa para combustibles sólidos. Estufa para combustibles sólidos, que comprende una cámara de combustión cuyas paredes y techo limitan exteriormente una cámara de combustión, cámaras de calentamiento y cámaras de evacuación de humos. La pared que separa las cámaras de calentamiento de la cámara de combustión y de las cámaras de evacuación de gases lleva fijadas, por la superficie dirigida hacia dichas cámaras de calentamiento, aletas a base de un material buen conductor de calor.
ES1105030	Bronpi Calefaccion SL (ES)	Dispositivo de calefaccion domestico. Dispositivo de calefacción doméstico que, utilizando leña, briquetas u otro combustible sólido, se configura a partir de una cámara de combustión, dotada de regulación primaria y regulación secundaria, y conformada por un cristal sobre el que se acopla una estructura metálica con una placa posterior de soporte para su anclaje a pared, por una base superior donde se acopla el tubo de salida de humos al que se ha instalado un deflector y por una base inferior con una bandeja donde se deposita el combustible y un cajón para recogida de cenizas, está caracterizado porque la base inferior de la cámara de combustión consiste en una plataforma móvil inferior que, gracias a medios de actuación y deslizamiento, se desplaza verticalmente entre una posición inferior abierta y de no uso, que permite la introducción de combustible,
ES1104580	Caralt Alborna Josep (ES)	Caldera Biomasa Policombustibles. Caldera biomasa poli-combustibles, destinada a la utilización de una gran variedad de biomásas (combustibles), se caracteriza porque el conjunto principal está formado de tres cilindros superpuestos horizontalmente, creando otras tres cámaras, siendo el cilindro anterior y el intermedio el cuerpo de la caldera, que es extraíble. Dispone de dos puertas, una anterior y otra posterior y un sinfín de dos alturas de trabajo anticompactaciones. 2. Caldera biomasa poli-combustibles, según reivindicación 1, caracterizada porque el cilindro interior delimita la cámara de combustión. Entre el cilindro interior y el intermedio se comprende la cámara de agua o cuerpo de caldera y entre el intermedio y el superior, se crea la cámara de paso de humos.

COMBUSTIÓN DIRECTA

Nº Publicación	Solicitante (País)	Contenido técnico
WO2014057172	Kettunen Jouko (FI)	Method and device for intensifying the burning of solid fuels in a fireplace. The invention relates to a method for intensifying the burning of solid fuels in fireplaces, in which fuel is heated up and gasified in a fire chamber. Furthermore, the invention relates to a device for applying the method, which device includes a fire chamber. According to the method in the burning of fuel, the burning of gases in it is separated from the burning of solid carbon in the fuel by releasing gases from the fuel in the fire chamber by means of heat and by conveying them to a uniform, planar flow of combustion air in the top part of the fire chamber in which air is conveyed and in which gases are burned. In the device according to the invention, on the edges of the top part of the fire chamber there is all around a gap entering from a combustion air channel/channels which is directed towards an exit opening along the bottom surface of the top part of the fire chamber advantageously in the middle section, from which a flow channel extends to an afterburner being above it, the inner surface of the fire chamber is of heat-resistant material having a low heat capacity, behind it there is a heat insulator layer, and in a batch-burning fire chamber there is in the bottom part a grate or inside the grate a char basket and an adjustable supply mechanism of combustion air.
ES2457073	INGELIA SL (ES)	Biofuel product and method for the production thereof. The invention relates to a method for producing a biofuel from an aqueous mixture of carbonised biomass obtained by means of a method for the hydrothermal carbonisation of biomass, characterised in that it comprises: (a) grinding the aqueous mixture of carbonised biomass until a maximum size of less than 500 micrometres of the particles contained in the mixture is obtained; (b) applying a method for the physical separation of inorganic substances; and (c) reducing the humidity content until a water content of between 25 and 55 wt. % is reached. The invention also relates to the biofuel obtained by said method, and to the use thereof in various applications.

PIRÓLISIS/GASIFICACIÓN

Nº Publicación	Solicitante (País)	Contenido técnico
WO2014085762	HM3 Energy Inc (US)	Method and process for producing a water-resistant, mechanically stable form of torrefied biomass. Disclosed herein is a binder-free product and process for making the product. The product is a mechanically stable, water resistant torrefied biomass product that does not comprise an extrinsic binder additive. The product is made using a combination of appropriate pre-treatment steps and compressing the conditioned biomass feedstock into a thermally managed compaction device comprising at least one modified die. The modified die allows for differential cooling/heating modifications so as to control the temperature near the entrance to the compaction device and passing the formed torrefied biomass into a post-formation curing zone.
WO2014083517	Haarlemmer Geert (FR)	Process for drying wet gas with desiccants and for regenerating the desiccants with syngas for implementing water gas shift. The invention relates to a process and equipment for drying wet gas by means of desiccants and for regenerating the desiccants, the process comprising the following steps: - a) adsorption of the water contained in a wet gas by circulating said gas on at least one bed of desiccants, - b) regeneration of the desiccants by circulating a syngas on the at least partially saturated desiccants so as to implement the reaction known as water gas shift.

PIRÓLISIS/GASIFICACIÓN

Nº Publicación	Solicitante (País)	Contenido técnico
WO2014068344	Int EN Kft (HU); et al	<p>Structural configuration and method for environmentally safe waste and biomass processing to increase the efficiency of energy and heat generation. The present invention relates to the method and structural configuration for environmentally safe waste and biomass processing to increase the efficiency of energy and heat generation. In the structural configuration of the invention solid municipal and industrial waste as well as biomass are loaded and milled and afterwards they are subject to pyrolysis and gasification. The produced pyrolysis gas is cooled, cleaned and carbon dioxide is captured from it, pyrolysis gas is compressed and accumulated together with syngas and they are used for electric power and heat generation and this generated electric power and heat is supplied to external consumers. During pyrolysis and gasification, melting occurs and basalt-like slag is produced which is processed and used for production of a heat-insulation material or granulated slag, additional electric power is further generated from the heat occurred as a result of pyrolysis gas cooling. Carbon dioxide captured from exhaust gases occurred as a result of electric power and heat generation, is compressed and accumulated together with carbon dioxide recovered from pyrolysis gas, and after distribution and dosing, first, it is sent to plasma torches as plasma-forming gas, second, it is used for production of marketable products using carbon dioxide for external consumers, third, it is fed as a nutrient to cultivate algae; herewith, seed material is loaded and algae is cultivated using heat source and carbon dioxide and thus algae biodiesel and biomass production is provided.; Produced biodiesel is cleaned, accumulated and used for generation of electric power and heat. Biomass extraction is returned to the beginning of the process, algae biomass and oil received as a result of liquid biofuel production are supplied to external consumers as marketable products. In addition, for the purpose of processing waste range expansion, coal dust is loaded simultaneously at the beginning of the process afterwards syngas is generated using heat then it is compressed and together with pyrolysis gas it is accumulated and used for generation of electric power and heat.</p>
WO2014068176	Teknologian Tutkimuskeskus VTT (FI)	<p>Method and apparatus for treating waste material and a product gas. The invention relates to a method and apparatus for treating waste material including organic components and radioactive agents. According to the invention, the method comprising steps: the waste material including organic components and radioactive agents is gasified at temperature between 600 -950 C in a reactor to form a gaseous material; the gaseous material is cooled so that temperature is between 300 -500 C after the cooling; and solid fraction including radioactive agents is removed from the gaseous material in a gas cleaning step, in order to form a treated gaseous material. Further, the invention relates to a product gas.</p>
WO2014069840	Univ Seoul Industry Coop Found (KR)	<p>Dual biomass gasification reactor having nickel distribution plate and biomass gasifier having same. Disclosed is a dual biomass gasification reactor and a biomass gasifier having the dual biomass gasification reactor, and the reactor comprises: a first reactor which gasifies injected biomass using an external heat source and the oxidation heat source of the biomass, and in which sand or a tar pyrolysis catalyst is filled and moves along with the flow of the external heat source so as to gasify the biomass and to produce bio-char; a second reactor which is provided to communicate with the first reactor so as to use the heat sources of the first reactor and is filled with a carbon adsorbent so as to decrease the content of the tar in the gas produced in the first reactor and to increase hydrogen production for the supply of the gas to a subsequent process; and a distribution plate which is disposed in the communication portion between the first and second reactors so as to prevent the movement of the bio-char and the sand or the tar pyrolysis catalyst in the first reactor towards the second reactor and to prevent the leakage of the carbon adsorbent in the second reactor towards the first reactor, wherein the distribution plate is a nickel plate. When the dual biomass gasification reactor of the present invention and the biomass gasifier having the same are used, gas production from the biomass can be economically and effectively obtained with minimized amounts of tar and ammonia.</p>

PIRÓLISIS/GASIFICACIÓN

Nº Publicación	Solicitante (País)	Contenido técnico
WO2014070001	Stichting Energie (NL)	Reactor for producing a product gas from a fuel. Reactor for producing a product gas from a fuel having a housing with a combustion part accommodating a fluidized bed in operation, a riser extending along a longitudinal direction of the reactor, and a downcomer positioned coaxially around the riser and extending into the fluidized bed. One or more feed channels for providing the fuel to the riser are provided. The riser is attached to the housing of the reactor in a bottom part of the housing, and a part of the riser above the one or more feed channels is moveable with respect to the downcomer in the longitudinal direction of the reactor.
WO2014066594	Univ Michigan (US)	Method of preparing biocrude from wet biomass having improved yield. A method of preparing a biocrude from a wet biomass comprises the step of providing the wet biomass. The method further comprises heating the wet biomass for a first period of time from ambient temperature to a first temperature of from about 100 to about 600 DEG C to form a reaction mixture comprising the biocrude. The method optionally further comprises the step of heating the reaction mixture at the first temperature for a second period of time. In the method, the first period of time and the second period of time are collectively less than about 180 seconds.
WO2014064261	Shell Int Research (NL)	Process for catalytic cracking a pyrolysis oil. A process for catalytic cracking of a pyrolysis oil derived from material comprising biomass, comprising the steps of a) subjecting a feed comprising the pyrolysis oil to a hydrodeoxygenation step to prepare an at least partially deoxygenated pyrolysis oil; b) heating a hydrocarbon feed to a temperature in the range from equal to or more than 50 °C to equal to or less than 200 °C to prepare a preheated hydrocarbon feed; c) mixing the at least partially deoxygenated pyrolysis oil and the preheated hydrocarbon feed to prepare a feed mixture; d) optionally atomizing the feed mixture to prepare an atomized feed mixture; e) contacting the, optionally atomized, feed mixture with a catalytic cracking catalyst in a catalytic cracking reactor at a temperature of at least 400 °C to prepare a product stream containing one or more cracked products.
WO2014064008	Shell Int Research (NL)	Process for catalytic cracking of a biomass. A process for converting a biomass, comprising contacting the biomass with a catalytic cracking catalyst at a temperature of more than 400 DEG C in a catalytic cracking reactor to produce a product stream containing one or more cracked products, wherein the catalytic cracking reactor comprises: - a first section; - a second section having a fluid connection to and located downstream of the first section, the second section having an inner diameter which decreases in a downstream direction; - a third section having a fluid connection to and located downstream of the second section; - a catalyst supply pipe being connected to the first section for supplying the catalytic cracking catalyst to said first section between a first level and a second level, said second level being located downstream of the first level; and - a feed nozzle having a feed nozzle outlet for supplying the biomass to the reactor, the feed nozzle outlet being located between the second level and the fluid connection between the first section and the second section.
WO2014060437	Dieffenbacher GmbH Maschinen (DE)	Method and apparatus for drying and torrefying biomass. The present invention relates to a method and apparatus for drying and torrefying biomass, particularly utilizing the waste heat from a power station. The apparatus according to the invention consists of: a drying device for drying the biomass (B) to form a dried biomass (B1); a mixing chamber for a conditioning device to mix flue gas from the boiler and/or from the turbine of the power plant to form a conditioning gas with a temperature of approximately 200 °C; the conditioning device for conditioning the dried biomass (B1) to form a conditioned biomass (B2); a mixing chamber for a torrefaction device, to mix flue gas from the boiler and/or from the turbine and/or from a combustion chamber of the power station to form a torrefaction gas at a temperature [T7] between approximately 300 and 400 °C; and the torrefaction device for torrefying the conditioned biomass (B2) to form a torrefied biomass (B3).

PIRÓLISIS/GASIFICACIÓN

Nº Publicación	Solicitante (País)	Contenido técnico
WO2014061527	Mitsubishi Heavy Ind Ltd (JP)	Gasification apparatus. A gasification apparatus that is capable of appropriately controlling a differential pressure variation between the interior of a pressure vessel and the interior of a gasification furnace, and of simplifying a structure, by providing: a pressure vessel which forms a hollow shape; a gasification furnace which forms a hollow shape, and which is positioned inside the pressure vessel with a space section therebetween; a heat exchanger positioned at the upper section of the gasification furnace; a gas nozzle which supplies seal gas to the lower section of the space section; a char-receiving section provided above the heat exchanger in the space section; a pressure equaliser of which one end communicates with the interior of the gasification furnace, and the other end opens into the char-receiving section; and a gas flow channel which passes vertically through a side section of the char-receiving section.
ES2447615	Sedamir Renovables SL (ES)	Procedimiento catalítico de pirólisis flash para la obtención de bio-oil o biofuel a partir de materias poliméricas carbonadas. La invención se denomina "Procedimiento catalítico de pirolisis flash para la obtención de bio-oil o biofuel a partir de materias poliméricas carbonadas". Es un procedimiento de pirolisis de alta eficacia, mediante la adecuada catálisis y control de la atmósfera de reacción, para generar bio-oil, consistente en una mezcla líquida de hidrocarburos de cadenas lineales y ramificadas. Su objeto es un procedimiento físico-químico de pirolisis catalítica de materias poliméricas (residuos, plásticos, biomasa) para producir biofuel, similar al generado mediante el fraccionamiento del crudo. Se describe como un procedimiento de pirólisis bajo una determinada configuración de equipos y empleo de catalizadores y aditivos, que maximiza la producción de combustible líquido, minimizando la generación de gases y sólidos.
EP2719749	Coal Products Ltd (GB)	Process for the production of a fuel briquette. A process for the production of a fuel briquette comprising the steps of: a) providing components comprising: biomass; and, coal and/or petroleum coke; b) mixing the components; c) drying the components; d) crushing the components; e) forming a feedstock by mixing the components with a binder in the following proportions: f) briquetting the feedstock; and, after steps a) - f) have been performed g) curing the binder and torrefying the briquette.
EP2716740	Baldi Giancarlo (IT) et al	Continuous-type gasifier, in particular for biomasses and urban and industrial wastes. A continuous-type gasifier of the "down-draft" type is described, in particular for biomasses and urban and industrial wastes, comprising at least one reaction chamber divided into at least one upper portion and at least one lower exhaustion portion by at least one mobile grid for withdrawing charcoal and supporting a solid bed, such reaction chamber having at least one first upper end equipped with at least one opening for introducing substances to be gasified inside such chamber, such chamber being internally equipped with at least one rotary stirring shaft, such shaft being equipped with a plurality of openings for delivering inside such chamber at least one comburent fluid pre-heated at a temperature sufficient to guarantee triggering oxidation reactions.
WO2014051514	Cassandra Oil Technology AB (SE)	Reactor, method of increasing the efficiency in a reactor and use of the reactor. The present invention concerns a reactor for the gasification of organic material included in composite raw material and the separation of gasified organic material from inorganic material included in the composite raw material, the reactor comprising at least one reaction chamber and at least one rotor, said reaction chamber comprising at least one housing that is sealed in relation to the surroundings and has at least one inlet opening and at least one outlet opening, and said rotor comprising at least one shaft. Said housing is in heat exchanging contact with at least one channel intended to convey gas for heat exchange between the gas and said housing. Said housing is preferably cylindrical and has a primarily circular cross-section in a plane that is primarily perpendicular to a principal direction of extension of said at least one shaft, said channel being in contact with at least one-third of the radial external envelope surface of said housing and in addition entirely or partly surrounding said at least one inlet opening. At least a first part of said rotor is situated in said housing and said shaft extends in only one direction from said first part through and out of said housing. The present invention also concerns a method of increasing the efficiency in the reactor and the use of the reactor.

PIRÓLISIS/GASIFICACIÓN

Nº Publicación	Solicitante (País)	Contenido técnico
WO2014051637	Adaptivearc Inc (US)	Plasma assisted gasification system with an indirect vacuum system. A plasma assisted gasification system with an indirect vacuum system for drawing syngas through a reactor vessel is disclosed. In particular, the plasma assisted gasification system is configured to draw syngas through the combustion reaction zone, the syngas collection chamber, the syngas heater and the syngas outlet in the reactor vessel. The plasma assisted gasification system may include a reactor vessel with distinct reaction zones that facilitate greater control and a more efficient system. The system may include a sealing system for a continuous feed system of a gasifier enabling an inlet opening of a feedstock system to remain open yet seal the reactor without a mechanical system. The system may include a syngas heater channeling syngas collected downstream of the carbon layer support and to the pyrolysis reaction zone.; The system may further include an agitator drive assembly that prevents formation of burn channels with in the fuel.

TECNOLOGÍAS BIOQUÍMICAS

Patentes

DIGESTIÓN ANAERÓBICA

Nº Publicación	Solicitante (País)	Contenido técnico
WO2014076062	Univ Wien Tech (AT)	Selective removal of water by means of membrane processes in an anaerobic bioprocess. The invention relates to a method for selective separation of water out of process liquids in an anaerobic fermentation process for preparation of methane. Water is separated out selectively in a membrane module by means of pervaporation.
WO2014077419	Wanjihia Dominic FP (KE)	Biogas production from a flexible digester. In one aspect, the invention provides an apparatus for anaerobic digestion of digester feed, the apparatus having: (a) a flexible tubular bladder; (b) a digester feed inlet port and tube; (c) a slurry outlet port and tube; and (d) a gas outlet port and tube. The invention also provides a method for using such an apparatus and similar apparatus described within.
WO2014075192	Gea Farm Technologies Canada Inc (CA)	System and method for producing biogas. A system and method for producing biogas from biomass. The system includes a digestion reservoir having a path defined by passageways along which biomass is conveyed and digested, the digestion reservoir being configured for containing biogas generated from a digestion of biomass along the path. The system also includes at least one mixing assembly located along the path, each mixing assembly being operatively connected between different passageway segments of the path so as to be able to selectively mix given biomass from one segment to another, in order to increase overall production of biogas along the path.
WO2014076494	Blaygow Ltd (GB)	Spent solids processing. The present invention provides a process for producing biogas and/or methane from solid spent products derived from, for example, the mashing process of malt whisk(ely) and/or beer production, processing of sugar or other industrial processes. There is also provided a system for producing biogas and/or methane from solid spent products derived from, for example, the mashing process of malt whisk(ely) and/or beer production, processing of sugar or other industrial processes

DIGESTIÓN ANAERÓBICA

Nº Publicación	Solicitante (País)	Contenido técnico
EP2733197	Fotyga Ryszard Aleksander (PL)	<p>Biogas generating plant with tunnel fermentation chamber and installations to produce and utilise biogas. The object of the invention is a biogas generator with tunnel fermentation chamber, equipped with biomass container with thermally insulated base and essentially vertical foundation walls, installations for moisturising biomass with a process liquid, installations for recirculation of seepage water, arch roof covering spread over arch load-bearing construction and supported on essentially vertical foundation walls, gas-tight gable walls, and biogas store created by double layer of roof covering foil with inlet to biogas store situated in upper part of fermentation chamber, characterised in that two layers of foil, upper and lower, forming biogas store, are secured on opposite sides of rigid arch roof covering load bearing construction, the lower foil has, at approx. 1/4 of the height of arch load-bearing construction, gas slots, duct fan and a duct fan forcing circulation of biogas to biogas store is connected into the inlet channel, wherein lower edges of roof covering are supported on upper part of essentially vertical foundation walls of the biomass container, while the installations for moisturising biomass with process liquid have moisturising nozzles, placed in the biomass loading zone and variable heights, depending on the height of the biomass loading zone, preferably in intermediate zone, and furthermore in the biomass loading zone there is a channel for pulp, preferably created by a perforated barrier supported on the base of biomass container or constituting a perforated pipe, suspended, supported or resting freely in a biomass layer. The invention also includes installation to produce and utilise biogas, comprising a tunnel fermentation chamber, constituting a space inside a biogas generator with a convex roof covering spread over an arch load-bearing structure, a gas store formed by two layers of roof covering foil with an inlet to the gas store situated in the upper part of the fermentation chamber, installations for moisturising biomass with a process liquid, installations for recirculation of seepage water, a cogeneration system powered by biogas supplied through a gas pipeline from the biogas store and an automated system for controlling the process of production and utilisation of biogas, characterised in that two layers of foil, upper and lower, forming the biogas store, are secured on opposite sides of the rigid arch roof covering load-bearing construction, the lower foil; has gas slots at approx. 1/4 of the height of the arch load-bearing construction, and a duct fan forcing circulation of biogas to biogas store is connected into the inlet channel, wherein lower edges of roof covering are supported on upper part of essentially vertical foundation walls of the biomass container, while the installations for moisturising biomass with process liquid have moisturising nozzles, placed in the biomass loading zone and variable heights, depending on the height of the biomass loading zone, preferably in intermediate zone, and furthermore in the biomass loading zone there is a channel for pulp, preferably created by a perforated barrier supported on the base of biomass container or constituting a perforated pipe, suspended, supported or resting freely in a biomass layer, supplied with pulp through an internal pipeline; situated in the channel for pulp, wherein the installations for recirculation of seepage water include a non-membrane heat and mass exchanger connected with through a seepage water pipeline with the biomass container and a return pipeline with installations for moisturising biomass with a process liquid, and wherein the non-diaphragm heat and mass exchanger has a permanent mass of a high heat capacity, through which seepage water is passed in the opposite direction to exhaust gases supplied to the permanent mass by an exhaust conduit from the cogeneration system.</p>
EP2730641	4Biogas GmbH & CO KG (DE)	<p>Biogas reactor with an over pressure - low pressure safety device. Biogas reactor comprises an overpressure-negative pressure safety device comprising a housing having a roof which comprises a liquid receiving region on its side facing away from housing inner side, and an opening in the region above the housing inner side. The roof is a fermenter roof or a part of the fermenter roof. Independent claims are also included for: the overpressure-negative pressure safety device; and protecting overpressure and negative pressure in a fermenter of the biogas reactor, comprises forcing a liquid through a gas from a liquid column of the overpressure-negative pressure safety device, where the liquid is forced in the liquid receiving region of the overpressure-negative pressure safety device, which collects the liquid.</p>

DIGESTIÓN ANAERÓBICA

Nº Publicación	Solicitante (País)	Contenido técnico
WO2014070099	Bioprocess Control Sweden AB [SE]	System setup for monitoring and/or controlling fermentation processes. The present invention describes a system setup for monitoring and/or controlling one or multiple fermentation processes, said system setup comprising -at least one fermentation unit; -a data acquisition unit; and -a cloud computing unit having a database, a file storage capability, a data calculation capability and a user interface capability; wherein the at least one fermentation unit is connected to the acquisition unit which in turn is connected to the cloud computing unit so that on-line, real-time data on the one or multiple fermentation processes may be transferred from the at least one fermentation unit via the data acquisition unit to the cloud computing unit to be interpreted and displayed for a user being on-line, and wherein the system set-up enables measuring in the at least one fermentation unit and/or the data acquisition unit of the on-line, real-time data on the one or multiple fermentation processes, wherein the system setup also comprises -one or multiple laboratory simulation platform(s) and/or full-scale process(es) comprising said at least one fermentation unit, being in data connection with the cloud computing unit; and wherein the data acquisition unit is connected to the cloud computing unit so that all data acquisition, data interpretation and data storage is performed centralized on the cloud computing unit.
WO2014064639	Suez Environnement (FR)	Line for treating waste consisting of household waste and/or biowaste. The invention relates to a line for treating waste consisting of residual household waste and/or biowaste, which includes: means for storing waste, means for sorting products of different particle sizes, means for directing the products having a larger particle size toward at least one treatment unit, and at least one digester (B) for the methanisation of products having a smaller particle size. According to the invention, the sorting means supply a fraction of products having a particle size of less than 20 mm, at least one digester (B) is used for the methanisation of the fraction having a particle size of less than 20 mm, and the treatment line includes at least one low-temperature thermal dryer (ST) which is supplied with the digestate from the fraction having a particle size of less than 20 mm.
WO2014068016	UTS Biogastechnik GmbH (DE)	Fermenter of a biogas system. The invention relates to a fermenter of a biogas system, comprising a fermenter wall, a fermenter interior, a flexible fermenter roof inclined from the horizontal, and a stirring device for stirring a substrate present in the fermenter interior. The stirring device has a guiding unit, a supporting unit, and a stirring unit adjustably accommodated on the guiding unit. The supporting unit is fastened to the fermenter wall in order to support the guiding unit. The height of the stirring unit can be adjusted, and an adjusting device for adjusting the stirring unit is provided. The upper end of the guiding unit extends above an upper end of the fermenter wall and ends below the fermenter roof within the fermenter interior.
WO2014062137	Univ Nanyang Tech (SG)	A method for the in-situ thermal-alkaline treatment of organic waste to enhance anaerobic solids degradation and biogas generation. There is disclosed a process for the treatment of organic waste comprising the steps of: introducing a feed stream comprising organic waste into a first reactor; generating an effluent from the first reactor; and providing the effluent from the first reactor to a second reactor, wherein the first reactor is maintained at a pH of from about 6.5 to about 10.0. There is also disclosed a plant adapted for running and/or using said process.
WO2014060778	Advanced Technology and Engineering Ltd (GB) et al	Fermentation apparatus and method of fermentation for protein production. A fermenter and a method for the continuous aerobic cultivation of biomass and fermentation of methane is described. The methane fermenter is for protein production and comprises a volumetric reactor arranged to provide a gas phase portion and a liquid phase portion of the reactor, a first ring bubble-distributor for methane-containing gas, a second ring bubbler-distributor for oxygen or air, a liquid recirculation loop, a gas recirculation loop, a first input nozzle for input of a nutrient medium into the liquid recirculation loop and a second input nozzle for input of water into the liquid recirculation loop. The fermenter includes a heat exchanger for removal of heat from the fermentation process, an ejector arranged to add recirculating gas into the liquid recirculating loop, a pipeline for feeding a gas-liquid mixture into the reactor and an output nozzle. The output nozzle is located at the top of the fermenter.

DIGESTIÓN ANAERÓBICA

Nº Publicación	Solicitante (País)	Contenido técnico
WO2014060132	Bailer Edwin (DE)	Gas purification device. A gas purification device for purifying biogas from a biogas plant or foul gas from a sewage treatment plant is improved in respect of economic operation without additional energy or material supply in that: a cooling chamber is provided in which a cooling pipe helix is arranged, the inlet end of which is connected to a feed pipe for feeding in unpurified biogas/foul gas; and a discharge end of the cooling pipe helix is connected to a trap device, which is arranged beneath the cooling pipe helix in the cooling chamber. The water vapour contained in the unpurified biogas/foul gas is condensed out with impurities in the cooling pipe helix and the condensate is separated out in the trap device from the thereby purified biogas/foul gas, which can be drawn off from a clean gas outlet of the trap device .
WO2014060423	Renegon Internat AG (CH)	Method and device for producing biogas. The present invention relates to a method for producing biogas in a solids fermenter in which a percolate stream can flow through stackable biomass in order to produce biogas in a fermentation process, said fermentation process being controlled on the basis of the quality of the biogas produced.
ES2442971	Environmental Green Engineering SL (ES)	Sistema para el tratamiento de residuos sólidos urbanos basado en la tecnología de visión multiespectral. Sistema para el tratamiento integral de los residuos sólidos urbanos, basado en la aplicación de la tecnología de visión artificial del tipo multiespectral que permite la clasificación y recuperación automática de todos los materiales reciclables contenidos en los residuos sólidos así como la extracción de los materiales no reciclables e impropios lo cual posibilita la obtención de una fracción orgánica exenta de los mismos y de materiales impropios, idónea para la obtención de energía por procesos que operan a bajas temperaturas 30-60 °C, que son medioambientalmente y económicamente sostenibles.
WO2014049138	DSM IP Assets BV (NL)	Process for the digestion of organic material. The present invention provides a process for the digestion of organic material into biogas which comprises: - pretreating the organic material by thermal treatment, mechanical treatment, chemical treatment or any combination of these treatments; - treating the pre-treated organic material with at least two carbohydrases to obtain a weight ratio of soluble oligosugars to monosugars of between 1000 : 1 and 1 : 1; - separating the liquid fraction from the solid fraction of the enzyme-treated organic material; and - digesting the liquid fraction to form biogas.
EP1428868	Schiedermeier Ludwig (DE)	Device for anaerobic fermentation of biomass. Apparatus for anaerobic fermentation of biomass comprising a fermenter comprising at least one fermentation cell with a gas-permeable base plate for aeration, intermediate and main biogas reservoirs that can be connected to opposite sides of the base plate through biogas lines, and a closable control valve on the inlet side of the main reservoir.
EP2730642	Jope Beteiligungs GmbH (DE)	Membrane roof for a biogas container. Cone or dome-shaped inflatable roof (2) for biogas tank (1), comprises gas-tight and liquid-tight outer film (4) comprising a container mantle with circular or angular basic form on open top of outer wall of tank and heat protection film underneath the outer film, where cone is gastight and comprises in edge area a variety of fermentation gas passage apertures. Independent claims are also included for: (1) biogas passage openings reinforced by chain together with yarn, or by introducing passage rivets from plastic or light metal, or by welding on a reinforcement ring made from the same plastic material as the insulation film; (2) the biogas tank with cone or dome shaped carrying air roof; and (3) thermic protection film for biogas tank comprising gas-tight with variety of fermentation gas passage apertures in the edge area.

FERMENTACIÓN

Nº Publicación	Solicitante (País)	Contenido técnico
WO2014075694	Inbicon AS (DK)	Methods of processing empty fruit bunches (efb) to fermentable sugars using multiple-stage enzymatic hydrolysis. Provided are methods of processing empty fruit bunches (EFB) using cellulase enzymatic hydrolysis in multiple stages. Hydrolysis yields are improved in a multiple-stage process featuring at least one solid/liquid separation step to an extent that is surprisingly great, much more than can be accounted for by alleviation of glucose product inhibition of cellulase enzymes.
WO2014070856	BP Corp North America Inc (US) et al	Thermotolerant beta-glucosidase variants. The present disclosure relates to variant [beta]-glucosidase polypeptides that have enhanced thermostability, and compositions, e.g., cellulase compositions, comprising variant [beta]-glucosidase polypeptides. The variant [beta]-glucosidase polypeptides and related compositions can be used in variety of agricultural and industrial applications. The present disclosure further relates to nucleic acids encoding variant [beta]-glucosidase polypeptides and host cells that recombinantly express the variant [beta]-glucosidase polypeptides
WO2014068152	Univ de Cádiz (ES)	Method for pre-treating lignocellulosic biomass by means of high-pressure chemical oxidation. The invention relates to a method for pre-treating lignocellulosic biomass by means of high-pressure chemical oxidation. This method combines the action of alkaline hydrogen peroxide with high pressure in a single step. Said method is used to partially delignify the substrates, improving the accessibility thereof to enzymatic attack for producing fermentable sugars, obtaining hydrolysis yields close to 100%.
WO2014069823	Sogang University Res Foundation (KR)	Strain expressing frsa and method for producing ethanol using same. The present application relates to a strain expressing the FrsA protein, and a method for producing ethanol using the same. The FrsA of the present application has a high PDC enzyme activity for a pyruvate, which is a substrate, and thus can be used in a process for producing ethanol. In addition, an FrsA mutant having improved stability in a host cell can be more effective in producing ethanol due to the increase in stability when the FrsA mutant is overexpressed together with IIAGlc, compared with when using conventional Zymomonas mobilis-derived PDC.
WO2014060673	IFP Energies Nouvelles (FR)	Method for producing alcohols and/or solvents from a biomass, including recirculating an internal flow including alcohols and/or solvents upstream from or within the pretreatment. The invention relates to a method for producing alcohols from a biomass, which includes a step in which at least one aqueous internal flow is recirculated, said flow including at least one alcohol having n atoms of carbon, n being between 2 and 5, provided that, when the alcohol includes 2 carbon atoms, same is mixed with at least one other alcohol, so as to recover a vapor-phase effluent containing alcohols that is output from said pretreatment reactor.
WO2014058896	Novozymes AS (DK) et al	Polypeptides having cellulolytic enhancing activity and polynucleotides encoding same. The present invention relates to isolated polypeptides having cellulolytic enhancing activity and polynucleotides encoding the polypeptides, catalytic domains, cellulose binding domains and polynucleotides encoding the polypeptides, catalytic domains or cellulose binding domains. The invention also relates to nucleic acid constructs, vectors, and host cells comprising the polynucleotides as well as methods of producing and using the polypeptides, catalytic domains or cellulose binding domains

FERMENTACIÓN

Nº Publicación	Solicitante (País)	Contenido técnico
WO2014060379	DSM IP Assets BV (NL) et al	Cell wall deconstruction enzymes of myceliophthora fergusii (Corynascus thermophilus) and uses thereof. The present invention relates to novel Myceliophthora fergusii (Corynascus thermophilus) enzymes or proteins for cell wall deconstruction, polynucleotide sequences encoding the polypeptides according to the invention, a production process for the enzymes according to the invention and the use of the enzymes according to the invention in various industrial processes.
WO2014048863	VIB VZW (BE) et al	Mutant yeast strain with decreased glycerol production. The present invention relates to the use of a mutant SSK1 gene encoding a truncated ssk1 protein for the construction of a mutant yeast strain with decreased glycerol production, when compared to the wild type strain. It relates further to the use of such strains for high yield bioethanol production, especially in high osmotic media, or on cellulosic hydrolysates, where normal yeast strains do produce a significant amount of glycerol.

TECNOLOGÍAS QUÍMICAS

Patentes

Nº Publicación	Solicitante (País)	Contenido técnico
WO2014080379	ENI SPA (IT)	Compositions useful as fuels comprising hydrophobic oxygenated compounds. The present invention relates to a composition that can be used as fuel, comprising: at least one hydrocarbon mixture at least one compound having formula (I) X-CH ₂ -A- (B) _y -OR (I) wherein X is selected from H and OR R is a C1-C8 alkyl A and B are different from each other and are selected from CH ₂ and CO y is selected from 0 and 1. Said composition can be advantageously used as fuel for diesel or gasoline engines.
WO2014068253	IFP Energies Nouvelles (FR) et al	Improved method for converting a feedstock containing biomass for the production of hydrocarbons, by means of fischer-tropsch synthesis. The invention relates to an integrated method for the production of liquid hydrocarbons from a feedstock containing at least one fraction of biomass and optionally at least one fraction of another feedstock, said method comprising at least one pre-treatment step, a gasification step, a synthesis gas conditioning step, a water washing step, an acid gas removal step, a final purification step, a Fischer-Tropsch synthesis catalytic reaction step.
ES2438442	Rodriguez Garcia Juan (ES)	Proceso de producción de biodiesel a partir de aceites vegetales obtenidos a tal efecto o de frituras reciclados. Se trata de un proceso en continuo para producir biodiesel a partir de aceites vegetales y de los reciclados de fritura, que al tener distinto grado de acidez pueden ser sometidos a una esterificación en medio ácido seguido de una transesterificación en medio alcalino en base al despliegue de las siguientes etapas: 1. Acondicionamiento del aceite usado mediante su paso por un filtro prensa y posterior calentamiento. 2. Acondicionamiento de los reactivos en un depósito provisto de un sistema de agitación por aspas donde se mezclan el metanol y el ácido sulfúrico. 3. Esterificación en reactor a tal efecto una vez el aceite y los reactivos se mezclan haciendo uso de una turbina. 4. Transesterificación mediante catálisis alcalina de forma que los triglicéridos presentes en el aceite se transesterifican con metanol. 5. Destilación y decantación mediante columna de destilación. 6.

Nº Publicación	Solicitante (País)	Contenido técnico
WO2014053180	Alfa Laval Corp AB (SE)	Hot ethanol extraction of lipids from plant or animal materials. The present invention relates to a process for the production of a fat rich and a fat lean product from a plant or animal starting material, comprising the steps of: i) providing a particulate fat containing starting material, ii) mixing the particulate fat containing starting material with ethanol of at least 90 %w/w concentration, iii) heating the mixture, iv) subjecting the heated mixture to a hydrocyclone treatment to provide a fat reduced underflow stream and an overflow stream, v) recovering the fat lean product from the fat reduced underflow stream, vi) recovering the fat rich product from the overflow stream. The fat rich and the fat lean products are suited for use in human food or for animal feed products. Use: Production of fat-rich and fat-lean product e.g. oil used in human food and animal feed product, and for producing biodiesel.
WO2014052823	Univ Yale (US)	System and method for separating lipid based products from biomass. Methods and systems for the production and isolation of fatty acid methyl esters (FAMEs) from a lipid source are described. The method includes extracting a lipid from a lipid source and transesterifying the lipid into a FAME. The method may also include fractionating the FAME from the system. A method of selectively transesterifying a lipid into a FAME is also described.
WO2014047103	Translational Genomics Res Ins (US) et al	Isolated genes and transgenic organisms for producing biofuels. Methods for the production of lipids and biofuels with a culture of Candidatus Microthrix spp. grown on a medium such as wastewater or sewage sludge are provided. The Candidatus Microthrix spp. may be cultured with additional microorganisms that contribute to the accumulation of lipids from the growth medium such as Zoogloea spp., Rhizobacter spp., Blautia spp., Hydrolatea spp., ODI genera incertae sedis. Further discloses are transformed organisms comprising genes isolated from Candidatus Microthrix parvicella, as well as methods and processes for producing lipids, fatty acids, or biofuels in vitro using the protein products of the isolated genes.

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PATENTES

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