VT BIOMASA PATENTES
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26
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SISTEMAS BIOELECTROQUÍMICOS

Los sistemas biolectroquímicos (bioelectrochemical systems, BES) están suscitando un enorme interés en distintos campos en los últimos diez años. Se trata de sistemas donde se combinan simultáneamente procesos biológicos y electroquímicos de modo que determinados microrganismos intervienen en las reacciones de oxidación/reducción (liberación/captura de electrones) que tienen lugar en los electrodos.

Los primeros representantes de esta tecnología podrían considerarse las pilas de combustible microbianas, en las que la oxidación de materia orgánica en los bioánodos genera una corriente eléctrica, liberándose agua en los cátodos a partir del oxígeno del aire. Con el paso de los años, estos sistemas han ido evolucionando y apareciendo otros tales como los electrolizadores biocatalíticos (microbial electrolysis cells), los desalinizadores microbianos (microbial desalination cells) o las celdas de electrosíntesis microbiana (microbial electrosynthesis cells).

El grado de desarrollo de los sistemas bielectroquímicos es a día de hoy todavía muy limitado, pero éstos muestran grandes expectativas en su aplicación al tratamiento de residuos orgánicos e inorgánicos (aguas residuales urbanas, agrícolas e indutriales, etc.), como biosensores/transductores biológicos con aplicaciones médicas, así como en la producción de biocombustibles (hidrógeno y metano, por ejemplo) a partir de biomasa residual.

En ISI Web of Knowledge (ISI WoK), se han identicado hasta Diciembre de 2017 alrededor de 9300 publicaciones científicas a nivel mundial sobre sistemas bioelectroquímicos. El 28% son de instituciones chinas y el 26% estadounidenses. A estos países les siguen a distancia Korea del Sur (7%), Japón (6%) y La India (6%). En Europa los líderes son Francia, Inglaterra y Alemania, cada uno de ellos aportando el 4% del total mundial, así como Italia y España, ambas en torno al 3%.

En la Figura 1 se muestra la evolución temporal del número de artículos publicados a nivel mundial y en España, apreciándose cómo la tecnología comenzó a despegar a partir del año 2000, aumentando su velocidad de crecimiento desde 2006.

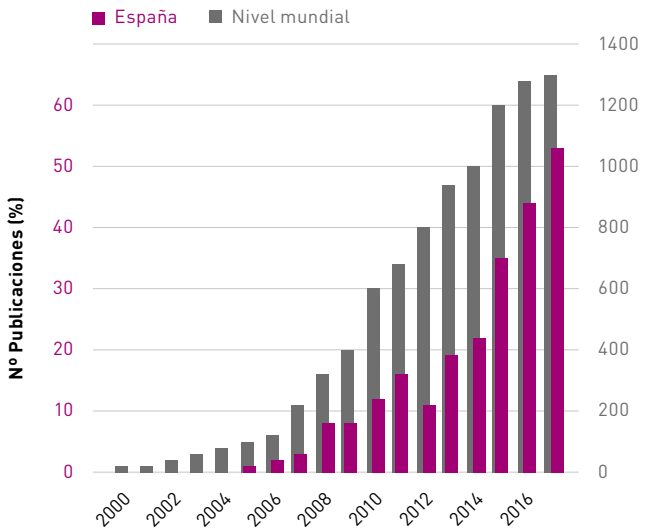

Figura 1. Evolución temporal del número de publicaciones científicas en España y a nivel mundial

Hasta Diciembre de 2017, se han identificado 231 publicaciones pertenecientes a centros españoles. El líder es el Consejo Superior de Investigaciones Científicas (CSIC), con más de 50 (Figura 2), siendo el Instituto de Catálisis y Petroleoquímica (ICP) y el Instituto de Microelectrónica de Barcelona (IMB-CNM) sus institutos más representativos. Las Universidades de Castilla-La Mancha, la de Gerona (Laboratory of Chemical and Environmental Engineering, LEQUiA), la Politécnica de Cartagena y la de Murcia disponen, asimismo, de 20 o más publicaciones en este ámbito. En la Tabla 1 se recogen algunas de sus líneas de trabajo más relevantes, a modo de palabras clave, atendiendo a la temática de las publicaciones. Esto nos da una visión clara de la situación en España en este campo y de las tendencias futuras.

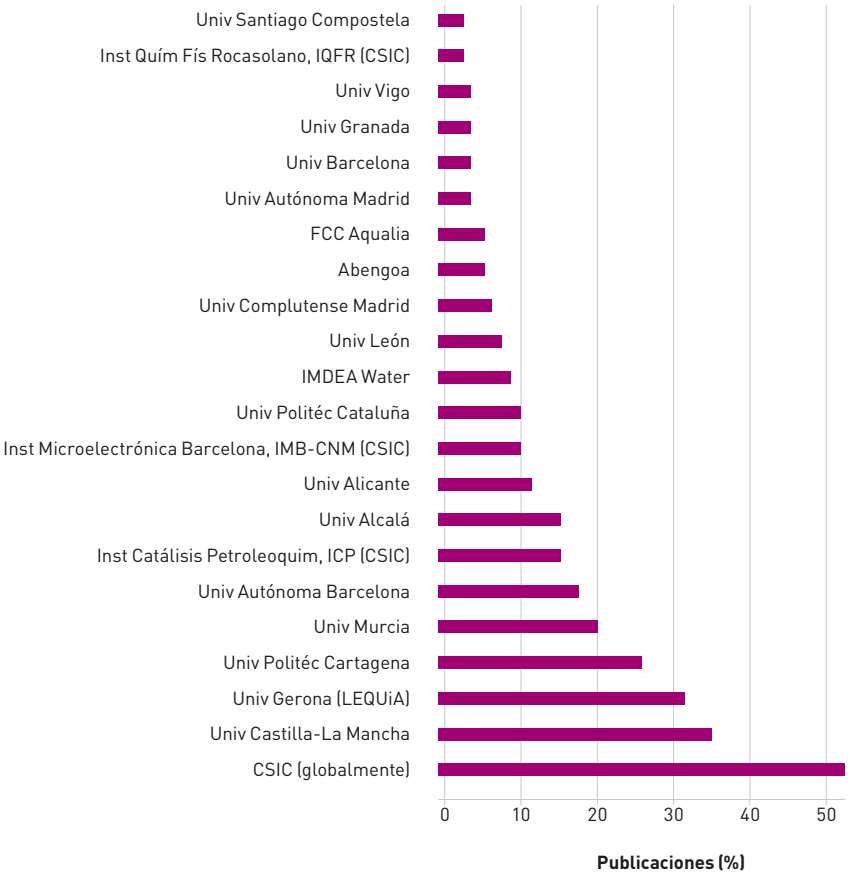

Figura 2. Centros españoles con 3 o más publicaciones

Centros	Palabras clave
Univ. Castilla-La Mancha	Tratamiento de aguas residuales (urbanas, industriales -industrias del vino y zumos-), eliminación de nitrógeno y sulfuros; estudio de parámetros del proceso; materiales de los electrodos; MFC fotosintéticas, Wetland MFC, air breathing-cathode MFC
Univ. Gerona (LEQUiA)	Tratamiento de aguas residuales (eliminación de nitrógeno y materia orgánica), residuos porcinos y lixiviados de vertederos; electrosíntesis microbiana (metano, hidrógeno y acetato)
Univ. Politéc. Cartagena	Materiales de los electrodos, membranas basadas en líquidos iónicos, membranas cerámicas, fotocatalizadores catódicos (LaTaO3, LiNbO3), cátodos basados en TiO2 o MnO2, cátodos basados en óxidos mixtos Cu/Co, Ni/Co; tratamiento de aguas residuales (urbanas, de la industria cervecera, purines); MFC fotosintéticas, air breathing-cathode MFC
Univ. Murcia	
ICP (CSIC)	Nanoelectrodos, soportes conductores transparentes y nanoestructurados, MFC sin membranas, cátodos basados en In2O5Sn (ITO), biocátodos basados en lacasas; N2/H2 fuel cells productoras de NH3, pilas de combustible microfluídicas enzimáticas
IMB-CNM (CSIC)	Pilas de combustible microfluídicas enzimáticas, biosensores de actividad microbiológica, biosensores de toxicidad

Tabla 1. Áreas de trabajo de los centros españoles principales

ANÁLISIS DE PATENTES

Durante el cuarto trimestre de 2017 se han identificado en la base de datos WPI (World Patent Index) 241 familias de patentes sobre tecnologías de conversión de la biomasa para la producción de energía, excluyendo las invenciones con ámbito de protección exclusivamente asiático. Cabe señalar que el 74.3% de las familas se refiere a tecnologías termoquímicas. El 23.2% y el 8.7% hacen referencia a tecnologías bioquímicas y químicas, respectivamente. La tecnología de pirólisis/gasificación es la que cuenta con mayor número de resultados, 43.2% del total, seguida de la de combustión, con el 32.8% (Tabla 2).

Tipos de tecnologías de conversión de la biomasa	Nº Familias
Tecnologías termoquímicas	179
Combustión directa	79
Gasificación/pirólisis	104
Tecnologías bioquímicas	56
Digestión anaeróbica	32
Fermentación de azúcares	25
Tecnologías químicas (transesterificación, Fischer-Tropsch, síntesis de metanol)	21
Nº TOTAL FAMILIAS DE PATENTES	**241**

Nota: Alguna invención puede incluirse en más de una tecnología

Tabla 2. Número de familias de patentes clasificados por tecnologías

En la Tabla 3 se muestran los países líderes en protección. En primer lugar se encuentran las solicitudes internacionales (PCT), con 97 documentos; en segundo lugar se encuentra EE.UU, con 63. En tercer lugar y a distancia, se sitúa Rusia, con 38 referencias. En España, en el periodo analizado, se publicaron 5, ocupando la octava posición en el ranking junto a Francia y Austria. En la Tabla 4 se recogen los ámbitos de protección más representativos de las invenciones correspondientes a las distintas tecnologías.

	País	Nº Documentos
1	PCT	97
2	EE.UU. (US)	63
3	Rusia (RU)	38
4	EP	19
5	Alemania (DE)	17
6	Brasil (BR)	8
7	Canadá (CA)	6
	Reino Unido (GB)	6
	Austria (AT)	5
8	España (ES)	5
	Francia (FR)	5

Tabla 3. Ranking por países

Tipos de Tecnología (Nº Documentos)			
	Termoquímicas	Bioquímicas	Químicas
PCT	68	28	9
EP	12	5	4
Alemania (DE)	10	8	0
Austria (AT)	5	1	0
Brasil (BR)	3	2	3
Canadá (CA)	4	2	2
EE.UU. (US)	49	12	7
España (ES)	3	2	0
Francia (FR)	4	1	0
Reino Unido (GB)	4	1	1
Rusia (RU)	32	4	2

Tabla 4. Ámbitos de protección más solicitados por tecnologías

En los Apartados posteriores se presenta una selección de los documentos de patente identificados este trimestre.

TECNOLOGÍAS TERMOQUÍMICAS
Patentes

COMBUSTIÓN DIRECTA		
Nº Publicación	Solicitante (País)	Contenido técnico
ES2638739	Anortec SL (ES)	**Estufa de pellets.** La estufa propuesta incluye un chasis formado por una estructura estática y una estructura rotativa articulada alrededor de un eje vertical (EV), incluyendo la estructura rotativa una cámara de combustión cerrada, dotada de una ventana transparente, conectada a un alimentador de pellets conectado a un depósito de pellets; a una conducción de entrada de aire de combustión y a una conducción de salida de aire de combustión; y en donde dicha conducción de salida de aire de combustión incluye una porción rotativa, sostenida por dicha estructura rotativa, y una porción estática unidas a través de una junta rotativa concéntrica con dicho eje vertical (EV) del chasis, estando dicha porción estática conectada a dicha conducción de evacuación de aire de combustión externa a la estufa.
GB2551106	Brian Elliott et al. (GB)	**Solid fuel burner.** A burner comprises a combustion chamber whose volume is adjusted using arrangement, and a means of delivering solid fuel to the combustion chamber. The arrangement may be manually adjusted with handle to adjust the width of the combustion chamber and may be movable perpendicular to the flow of fuel from fuel delivery means, which may comprise a fuel chute. The arrangement may comprise a body portion, grate and guide arrangement. The burner may comprise a slidable choke which can adjust the volume or close off the fuel chute of the duel delivery means. During combustion, fuel from combustion chamber may pass into secondary combustion chamber. The burner is suitable for burning biomass or wood pellets and may comprise an induction chamber to extract heat to a connected heat load such as a water boiler, space heater, or oven.
ES1188433	Bronpi Calefaccion SL (ES)	**Estufa de pellets de combustible.** Estufa de pellets de combustible que comprende - un cuerpo principal, - una cámara de combustión alojada en el interior del cuerpo principal, y cerrada por - una puerta, - una entrada de aire primario configurado para la conducción de aire hasta la cámara de combustión, - una conexión para la evacuación de los humos generados en la combustión dispuesta en la parte trasera del cuerpo principal, - medios de alimentación de combustible que conducen los pellets de combustible hasta la cámara de combustión, - y una placa de fundición vitrificada dispuesta en la parte superior del cuerpo principal configurada para el calentamiento y cocinado de alimentos, la estufa de pellets de combustible caracterizada porque la placa de fundición vitrificada es abatible permitiendo el acceso a la cámara de combustión.
WO2017209632	Carbontim Sp Zoo (PL)	**Device for biomass carbonisation.** A device for biomass carbonisation designed as a vertical reactor equipped with a column for drying and degassing of biomass and a combustion chamber with a cone-shaped grate and a scraper, and consisting of a tray at the top part of the device hermetically connected with the inside of the device, and inside the device there is a metal vertical retort. Inside the retort, there is an inner tube, onto which an augered strip is attached inclined at an angle from 30° to 60° relative to the lateral plane of the tube. The retort is finished with a cylindrical element. The top part of the retort is equipped with openings. The vortex combustion chamber has a cylinder shape. The side walls of the chamber are equipped with tangent nozzles. Under the retort and the cylindrical part there is a truncated cone. Above the surface of the cone there is a mixer. The retort is inserted inside a circular flue. The retort is equipped on the outer surface with an additional auger. The cylindrical part is equipped with at least two levels of tubes. In the bottom part of the device there is a system for discharging the product.

Nº Publicación	Solicitante (País)	Contenido técnico
WO2017205884	Distand GmbH (AT)	**Solid fuel burner.** Slag is formed during the combustion of solid fuels with a lower ash fusion temperature and covers parts of the solid fuel, prevents complete combustion and blocks the air supply, thereby leading to an interruption of the combustion process. According to the invention, the embers and the fusing ashes are mixed by means of a cleaning comb and are discharged from the burner. The burner consists of rotating grate bars which are arranged parallel to one another within the inner walls. The cleaning comb moves between the grate bars; upwards between the grate bars; in direction of the burner opening; downwards under the grate bars; and finally in the direction of the burner flange. When the slag adheres to the rotating grate bars, it is scraped off by the cleaning comb. The fuel supplied to a funnel slides downwards by the force of gravity, the funnel lid opens, and the fuel is pushed onto the grate bars by the plunger. The plunger has at least one opening for secondary air which also provides cooling. A blower blows the ashes fallen through the grate bars through a cut-out section in the burner floor opened by the floor trap.
EP3252380	Dru Verwarming BV (NL)	**Gas fireplace with a pivotable front wall and method for rendering accessible a combustion chamber of a gas fireplace.** The present invention relates to a gas fireplace, comprising a combustion chamber, a gas supply which ends in the combustion chamber and is at least partly hidden by non-flammable decorative material, such as artificial logs, and provided with outlet openings. The combustion chamber comprises at least a glass front wall, through which the combustion chamber is visible to a user, and is pivotable about a pivot axis with respect to the combustion chamber between a closed position and an open position. The pivot axis is a vertical pivot axis, and the gas fireplace has a displacement mechanism which is configured to displace the glass front wall along or with the pivot axis in a vertical direction between a first position and a second position, in which the front wall is pivotable, in the second position, between the closed position and the at least one open position. The invention furthermore relates to a method for rendering accessible a combustion chamber of a gas fireplace.
WO2017201628	ERS Fuel Inc (CA)	**System and method for forming a solid fuel element.** A system for forming a woody biomass component and a binder component into a solid fuel element having a predetermined density. The system includes a first compression assembly for compressing an uncompressed mixture of the woody biomass component and the binder component to provide a first compressed mixture formed into a preliminary element having a preliminary density. The system also includes a second compression assembly for compressing the preliminary element to form the solid fuel element having the predetermined density, which is greater than the preliminary density.
RU2633833	Kochetov Oleg Savelevich (RU)	**Mobile plant for incineration of organic waste on polygons on reception of solid household wastes.** FIELD: machine engineering.SUBSTANCE: in the mobile plant for incineration of organic waste consisting of a pyrolysis furnace body, a module for supplying air and energy carrier to furnace combustion chamber, containing an exhaust gas reclamation system, there is additionally a vehicle chassis with a control cabin, sprung against the chassis by the cabin depreciation system, on which a platform with vibration isolation system is disposed relative to the vehicle chassis, wherein the rotation of the furnace can be provided, for example, by gear or chain drive, the rotation of which is set from the shaft rotating the wheel on which it is fixed, wherein the shaft being is from the drive of electric or diesel engine, and in the center of the end surface of the housing there a seat for installing the burner is provided, and the outer tube of the burner is connected by means of a rotating detachable connection along the axis of symmetry of the cup with pipeline of feeding the fuel mixture to the burner.EFFECT: increase the productivity of thermal neutralization and utilisation of organic waste both at the places of their direct location or collection, and with direct departure from there and waste disposal on the road.3 dwg
US2017347832	Lin Yu-Chia (TW)	**Portable biomass stove.** A portable biomass stove includes a tubular seat unit and an insulation unit. The tubular seat unit includes an inner tubular seat and an outer tubular seat. The outer tubular seat surrounds the inner tubular seat, cooperates with the inner tubular seat to define an internal space therebetween, and is formed with an air inlet located under the tubular body. A top end portion of the outer tubular seat is connected to a top end portion of the tubular body in a sealing contact manner. The insulation unit is disposed in one of the internal space and an ambient space outside the outer tubular seat so as to prevent dissipation of heat out of the outer tubular seat.

Nº Publicación	Solicitante (País)	Contenido técnico
US2017343218	Mak Grills Llc (US)	**Pellet Grill.** An automated self-contained pellet grill includes a base housing that defines a heat distribution chamber with a cooking grid supported in an opening at the top of the base for supporting food to be cooked. A pellet burning mechanism, located within the housing, includes a pellet feeder driven by an electrical motor. Electrical power is provided for the motor by a thermoelectric generator having a hot side that is heated by burning pellets and a cold side that is cooled by flowing ambient air.
EP3236151	Prisma Stufe Srl (IT)	**Biomass stove, in particular for pellet, exhibiting an automatic operation.** An innovative biomass stove, in particular pellet, comprising: - a heat generator apt to be loaded with a biomass (BM); - a feeding system apt to feed a primary flow of combustion air to the heat generator, so as to produce a combustion flame and generate heat; - a ventilation system including a fan apt to blow a secondary flow of forced air in the gaps of the biomass (BM), loaded in the heat generator, so as to increase the size of the flame combustion; - a temperature sensor apt to detect the temperature of the combustion flame; and - an electronic control unit apt to govern and control the operation of the biomass stove; wherein the electronic control unit is configured to automatically control the speed of the fan and consequently the secondary flow of forced air aimed at supplying the combustion of the biomass, as a function of the temperature of the combustion flame, in particular during the final phase of the biomass combustion cycle and therefore its carbonisation, so as to determine the complete combustion of the biomass (BM) at the end of its combustion cycle.
US2017328572	Qstoves Inc (US), et al.	**Biomass Pellet Stove.** A stove, using biomass pellets as fuels, includes: a stove body that includes a firebox; at least one hopper; and at least one feed tube extending between the at least one hopper and the firebox; and at least one control lever laterally disposed on the at least one feed tube; wherein, fuels within the at least one hopper enter the firebox along the at least one feed tube under gravity when the at least one control lever is in a second position.
EP3239606	Ravelli SPA (IT)	**Feeding device for pellet heating equipment.** A feeding device for pellet heating equipment, comprising: a pellet load compartment; a combustion chamber having a brazier inside which a flame is generated by the combustion of the pellet; and transfer means of the pellet to move, in a controlled manner, predefined amounts of pellet along at least a feeding pipe extending from the load compartment to the combustion chamber; the transfer means comprise a plurality of screws each of which developing within a respective feeding pipe; said screws being mutually coupled by means of a motion transmission element for simultaneously rotating the same screws and define the movement of the pellet.
WO2017177989	Saverbrik - Závod Beta SRO (CZ)	**Procedure for the manufacture of pellets, briquettes and other products intended for combustion.** The current procedure to manufacture pellets, briquettes and other products consisting mainly of wood mass where the technological procedure - production line - includes a branch with a disintegrator, with one disintegrator as a minimum serving to crush a fraction of the material into tiny, dust particles - the crushed component, which is dried directly in the disintegrator to the required moisture content by using the waste heat generated during the crushing process, the water vapour generated being exhausted off the facility. The crushed fraction coming from the disintegrator possesses a moisture content and particle size different from those of the sawdust coming from the conventional line branch. The two fractions are mixed at a specific ratio to form a mixture whose properties are appropriate for subsequent pressing on a pelleting/briquetting press. The moisture contents of the sawdust and of the crushed component as well as the particle size of the constituents are monitored continuously and the proportions of the components are modified to achieve correct mixing. The precise proportioning and input parameter monitoring enable a high-quality product to be obtained. This sawdust/crushed component mixture not only exhibits better bonding properties: it also ensures a lower moisture content of the final product owing to the presence of the crushed component, prior subjected to the drying procedure. In other respects the procedure is no different from the established procedures.
WO2017170735	Sumitomo Heavy Industries (JP)	**Object-to-be-combusted supply system.** This object-to-be-combusted supply system supplies an object to be combusted to a furnace for combusting the object to be combusted, and is provided with: an object-to-be-combusted supply part that supplies the object to be combusted toward the furnace; and a supply position adjusting mechanism that adjusts the position, in the furnace, of supply of the object to be combusted.

PIRÓLISIS/GASIFICACIÓN

Nº Publicación	Solicitante (País)	Contenido técnico
US2017306238	Abri-Tech Inc (CA)	**Compact Fast Pyrolysis System for Conversion of Carbonaceous Materials to Liquid, Solid and Gas.** An apparatus for pyrolysis of organic material biomass, including: i) a first, horizontal auger tube having inlet for a heat carrier and a second inlet for biomass; and a first outlet for pyrolysis gas and a second outlet for the heat carrier and transformed biomass; ii) a second, inclined auger tube having an inlet at or below the second outlet of the first auger tube, for receiving the heat carrier and transformed biomass from the second outlet of the first auger tube and an outlet at a level above the inlet thereof, the outlet communicating with the first inlet of the first auger tube to deliver heat carrier thereto.
WO2017161445	Anaergia Inc (CA)	**Two stage pyrolysis of organic waste.** Organic waste is treated by pyrolysis or by anaerobic digestion followed by pyrolysis of the digestate. The pyrolysis is performed in two staged reactors. The second stage reactor treats char produced in the first stage. The temperature of the first stage reactor is preferably 450 degrees C or less. The temperature of the second stage reactor is higher than the temperature of the first stage, for example by 50 degrees C or more. Optionally, there may be a char cooler, a water sprayer, or both downstream of the char outlet of the second reactor. In an exemplary system, a digestate outlet is connected to the inlet of the first pyrolysis reactor. A pyrolysis liquid outlet of the first pyrolysis reactor is connected to the digester. Char produced in the second pyrolysis reactor may be used as a soil amendment.
US2017283714	Combs Johnny D (US)	**Waste to Fuel System.** A waste to fuel system is disclosed that provides for simplified pyrolysis and cracking of useful hydrocarbons from waste by using molten salt as a heat transfer medium in the pyrolysis stage and using molten salt mixed with catalyst in the cracking stage.
WO2017194805	CSIC (ES)	**Process for producing synthesis gas by means of the microwave heating of organic substrates.** The invention relates to a process for producing synthesis gas by means of the microwave heating of organic residues, based on producing synthesis gas by means of microwave heating in two steps. Initially, the organic substrate, together with a microwave susceptor, is subjected to microwave heating, without oxygen, to temperatures of between 400ºC and 800ºC, thereby producing a synthesis gas, a carbonaceous residue, and a liquid fraction of pyrolysis oils. Subsequently, the oils form the first step are mixed and heated in a microwave oven, without oxygen, to a temperature greater than 700ºC, thereby producing a synthesis gas and the carbon-enriched susceptor. The whole process produces only synthesis gas and a carbonaceous residue.
CA2926483	Dementev Alexander (CA)	**Mobile apparatus for carbon-containing materials including biohazard wastes gasification by thermal decomposition and conversion into a liquid fuels.** The present invention relates to a method for gasification of carbon-containing materials including biohazard wastes, and more specifically, to a method for gasification of carbon-containing materials which allows an increase in carbon efficiency and a reduction in carbon dioxide emission, comprising the steps of: biohazard wastes grinding and sterilization, mix with carbon-containing materials for the gasification; and catalytic production of diesel fuel. A system having a movable platform including: material preparation block, gasification and catalytic of diesel fuel production reactors which are structurally and functionally integrated. In the practice of the process, a mixture of carbon-containing materials, a compressed air feed and process steam is fed to the gasifier to produce a synthesis gas. The synthesis gas is fed to the Fischer-Tropsch reactor where it is catalytically reacted to produce heavy hydrocarbons. The outlet from the Fischer-Tropsch reactor is separated into water, a low heating value tail gas, and the desired hydrocarbon liquid product. The water is pressurized and heated to generate process steam. The system further includes a plurality of heat exchangers that enable heat to be recovered from the outlet of the gasifier. The recovered heat is used to make the process steam as well as to preheat the hydrocarbon mix before it is fed to the gasifier and preheat the synthesis gas before it is fed to the Fischer-Tropsch reactor. The method of the present invention greatly increases carbon efficiency and reduces the generation of carbon dioxide.

Nº Publicación	Solicitante (País)	Contenido técnico
WO2017204703	Envigas AB (SE)	**Process and reactor for producing biochar from renewable material.** The present invention relates to a process for producing biochar from biomass material in a reactor comprising the following steps: -supplying biomass material into a material chamber of the reactor; - drying the biomass material by evaporating moisture from the biomass material; -pyrolysing the biomass material to obtain biochar and pyrolysis gas; -supplying gasification air and pyrolysis gas to a reaction chamber in the reactor; -combustion of gasification air and pyrolysis gas in the reaction chamber; -removing exhaust gas from the reaction chamber; -heating the biomass material by indirect heat from the exhaust gas. The present invention relates also relates to a reactor for producing biochar from biomass material.
WO2017163266	Indian Inst Scient (IN)	**System and method for producing hydrogen rich syngas for hydrogen generation.** A process for producing hydrogen-rich syngas by biomass gasification is provided. It comprises determining a height above a fixed bed in a downdraft gasifier for introduction of one of oxygen and oxy-steam mixture in the downdraft gasifier. The height is based on mass-flux of biomass, diameter of biomass particles, relevant ambient temperature for water gas shift reaction to proceed in the forward direction, and thermal diffusivity. The process comprises charging biomass through a lock-hopper into the downdraft gasifier and introducing the oxy-steam mixture in the downdraft gasifier at the height determined. The char in the ignition zone at the bottom of the reactor is then ignited. Hydrogen-rich syngas is then collected from the downdraft gasifier. Mass-flux of the biomass is varied in a range of 0.05-0.11 kg/m2s to control a flame propagation rate (FPR) in the downdraft gasifier.
WO2017203587	Japan Blue Energy Co Ltd et al. (JP)	**Biomass gasification apparatus.** The present invention provides an apparatus which is for producing a hydrogen-containing gas from biomass, and which can optimize biomass pyrolysis temperature and pyrolysis gas modification temperature to reduce problems caused by tar. The present invention pertains to a biomass gasification apparatus which is provided with a biomass pyrolysis device, a pyrolysis gas modification device, and pyrolysis gas introduction pipes, wherein: the biomass pyrolysis device and the pyrolysis gas modification device include an introduction opening and a discharge opening for a heat carrier; biomass pyrolysis and pyrolysis gas modification are carried out by the heat of the heat carrier; the biomass pyrolysis device and the pyrolysis gas modification device are arranged in parallel; and the pyrolysis gas introduction pipes are provided on container side surfaces of both of the biomass pyrolysis device and the pyrolysis gas modification device below an upper surface of a heat carrier layer formed in each device, and the pyrolysis gas introduction pipes are horizontally positioned.
US2017327746	Moss Kenneth D (US)	**Fast Pyrolysis Heat Exchanger System and Method.** A fast pyrolysis heat exchanger system and method for economically and efficiently converting biomass and other combustible materials into bio-oil. The system employs multiple closed loop tubes situated inside the heat exchanger. As heat carrier is deposited at the top of the heat exchanger and caused to move downwardly therethrough, heat is transferred from the tubes to the heat carrier which is then transferred to a reactor where it is placed in contact with the combustible materials. Vapor containing char fines is discharged from the reactor into a vacuum-operated blow back filter. The blow back filter is activated when a drop in vacuum level at the output of the reactor is detected. Thereby, excess char buildup on the blow back filter elements is removed.
WO2017176220	Özkan Abdülbari (TR)	**Recycling of industrial and organic wastes that contain energy by innovative gasification method.** The invention relates to a method for mixing well the material to be gasified in reactors, producing high-quality pyrolysis gas and benefiting also from highly humid products of materials to be gasified by means of a special fire brick that is resistant to high temperature and that will be coated around the gasification reactors like bearings inside the gasification unit in order to enable a rigid heat distribution, i.e. the same temperature value at every point of reactors; a homogenous distribution, in the pre-reactor and the main reactor that are located in the gasification unit for industrial and organic wastes that contain any kind of energy especially in energy and recycling industry.

Nº Publicación	Solicitante (País)	Contenido técnico
WO2017207104	Schottdorf Bernd (DE)	**Device and method for continuous production of vegetable carbon and vegetable carbon produced by said method.** The invention relates to a device for continuous production of vegetable carbon by pyrolysis of biomass under exclusion of oxygen, having at least one vertically erected reactor, which has a top cover having a feed device for biomass, a bottom removal device for vegetable carbon, a discharge apparatus for pyrolysis gas, and an interior heating apparatus. According to the invention, the heating apparatus is designed as at least one heating rod arranged vertically within the reactor. The invention further relates to a method for the continuous production of vegetable carbon by pyrolysis of biomass under exclusion of oxygen, characterized by the following method steps: a) providing at least one device according to the invention; b) filling the at least one reactor with biomass by means of the feed device; c) heating the at least one heating rod to at least 700°C under exclusion of oxygen and pyrolytic conversion of the biomass to vegetable carbon; d) continuous extraction of vegetable carbon in a defined quantity per unit of time by the extraction with simultaneous continuous feed of biomass in a defined quantity per unit of time by the feed device and simultaneous continuous discharge of the resultant pyrolysis gas via the discharge apparatus.
WO2017195407	Taniguro Katsumori (JP)	**Method for ultra-low-temperature carbonization treatment of biomass material, and method for producing carbide.** To provide: a novel carbonization treatment method for carbonizing a biomass material containing a large amount water at an extremely low temperature; and a method for producing a carbide. [Solution] A water-containing biomass material is carbonized while maintaining the biomass material under treatment conditions including an oxygen-containing atmosphere and a temperature range of 70°C or higher and lower than 100°C, without the need to subject the biomass material to a drying step for removing or reducing the water forcibly. In this process, it is preferred that the water content (in percent) in the biomass material at a time point at which the carbonization of the biomass material starts while maintaining the biomass material under the above-mentioned treatment conditions is 40 to 80% inclusive, and it is more preferred that the above-mentioned maintenance is carried out for two weeks or longer. As the biomass material, at least one biomass material selected from a waste-material-type biomass material, e.g., a food-derived waste material, a livestock excrement, an agricultural-product-derived waste material, a seafood-derived waste material and a forest-product-derived waste material, and a plant- (cultivated crop)-derived biomass material can be used.
WO2017160146	Torrgas Tech BV (NL)	**Process to prepare a char product and a syngas mixture.** The invention is directed to a process to prepare a char product and a syngas mixture comprising hydrogen and carbon monoxide from a solid biomass feed comprising the following steps: (i) performing a continuously operated partial oxidation of the solid biomass feed at a gas temperature of between 700 and 1100 ° C and at a solids residence time of less than 5 seconds, (ii) continuously separating the formed char particles as the char product from the formed gaseous fraction and (iii) subjecting the gaseous fraction obtained in step (ii) to a continuously operated partial oxidation and/or to a steam reforming to obtain the syngas mixture. The solid biomass feed has been obtained by torrefaction of a starting material comprising lignocellulose and is a sieve fraction wherein 99 wt% of the solid biomass particles is smaller than 2 mm.
WO2017153970	Univ King Abdullah Sci & Tech (SA)	**Supercritical water gasification with decoupled pressure and heat transfer modules.** The present invention discloses a system and method for supercritical water gasification (SCWG) of biomass materials wherein the system includes a SCWG reactor and a plurality of heat exchangers located within a shared pressurized vessel, which decouples the function of containing high pressure from the high temperature function. The present invention allows the heat transfer function to be conducted independently from the pressure transfer function such that the system equipment can be designed and fabricated in manner that would support commercial scaled-up SCWG operations. By using heat exchangers coupled to the reactor in a series configuration, significant efficiencies are achieved by the present invention SCWG system over prior known SCWG systems.

Nº Publicación	Solicitante (País)	Contenido técnico
WO2017162914	Valmet Technologies OY (FI)	**Method and system for hydrothermal production of activated carbon.** A method and a system for producing activated carbon. The method comprises:- subjecting carbon-containing raw material to hydro ther-mal (HT) process for obtaining carbon product having in-creased carbon content,- and as a secondary product, off-gas comprising carbon dioxide (CO2) and water (H20),- subjecting carbon product to activation process, compris-ing physical activation carried out by activation medium comprising carbon dioxide (CO2) and/or water (H20),- wherein said activation medium comprises carbon diox-ide (CO2) and/or water (H20) produced in said hydrother-mal (HT) process.
WO2017177883	Wang Dong (CN)	**Low-temperature treatment method for household wastes.** Disclosed is a low-temperature treatment method for household wastes. The method comprises the following steps: adding household wastes into a pyrolysis container, dewatering the household wastes in the pyrolysis container, carrying out low-temperature pyrolysis on the dewatered household wastes to generate semicoked and sol-like gaseous pollutants, the generated pollutants are semicoked, waste residues are discharged from the bottom of the pyrolysis container, heat generated in the semicoking process is absorbed and stored by the walls and the bottom of the pyrolysis container, and energy for dewatering and pyrolysis is provided by a first heat source (240) and a second heat source (250), the steps are repeated, and the required heat source is provided by the second heat source. Low-temperature pyrolysis and a heat storage material are used to store heat generated during the pyrolysis of wastes, and the low-temperature pyrolysis and the heat storage material are used to continuously treat new wastes, and the continuous pyrolysis of the wastes can be implemented without adding outside energy. In addition, by combining an electrical tar precipitator with a corona plasma air-purification technology, secondary pollutants generated in the pyrolysis are treated, so that smoke-free and odor-free direct charging of the household wastes is implemented.
WO2017199192	Welman Artur (PL)	**A process and system for the flow gasification of solid fuel for energy production, in particular bituminous coal, brown coal or biomass.** The invention discloses a process and system for the flow gasification of solid fuel for energy production, in particular bituminous coal, brown coal or biomass, which comply with the requirements in the field of power industry in terms of energy efficiency above 90%, and thus result in a lower production cost of power and heat.

TECNOLOGÍAS BIOQUÍMICAS
Patentes

DIGESTIÓN ANAERÓBICA		
Nº Publicación	Solicitante (País)	Contenido técnico
EP3255138	Bwe Energiesysteme GmbH & Co KG (DE)	**Device for removing at least one biomass sample from at least one fermenter in particular a biogas system.** In an apparatus for removing at least a biomass sample from at least a fermenter, in particular a biogas plant, wherein the fermenter at least one biomass-line is connected, which is assigned at least one feed pump for the biomass, it is provided that the biomass line in a portion on the pressure side of the pump, two branch pipes are connected, at least, which open into a common branch line, wherein this common branch line is formed aufzweigend in at least two partial lines and a conduit closure member is arranged in the bypass line and in each sub line. With this apparatus, a defined quantity of biomass from mutually different regions of one or more fermentors can be removed.
WO2017198834	Cambi Tech AS (NO)	**Method for recovery of phosphate.** The present invention provides a method for recovery of phosphate, in the form of magnesium ammonium phosphate (MAP), from a process for treating a biomass material which process comprises a digestion step performed in a digestion tank and includes a pre-treatment step employing a thermal hydrolysis, characterised in that a magnesium source is added to the material in the process flow before said flow enters the digestion tank, and phosphate is recovered as MAP as an integral part of a solid or semi-solid digestate product from the digestion tank.
WO2017158224	CSIC et al. (ES)	**Method for monitoring anaerobic digesters.** A method for monitoring anaerobic digesters uses a device comprising a microbial fuel cell linked to an anaerobic digester by at least one first pipe and a second pipe, a voltmeter which determines the electrical potential difference created inside the microbial fuel cell, and a control unit that receives the measurements determined by the voltmeter. The anode of the microbial fuel cell is supplied with a continuous stream of a mixture of effluent and biomass from the inside of the anaerobic digester, allowing the digestion process inside the anaerobic digester to be accurately and continuously monitored.
EP3219783	Eisenmann SE (DE)	**Installation and method for the use of biomaterial.** Plant comprises a fermentation stage having a fermentation chamber for producing biogas by anaerobic fermentation of the biomaterial, and a hygienic stage having a sanitation chamber for receiving and thermally sanitizing biomaterial discharged from the fermentation stage, arranged downstream of the fermentation stage.
EP3225596	FCC Aqualia AS et al. (ES)	**Anaerobic process with filtration procedure for treating wastewater at room temperature.** The present invention refers to an anaerobic process with filtration procedure for wastewater treatment at room temperature, that comprises: - continuously feeding at least one anaerobic reactor, with previously sieved wastewater and feeding biodegradable organic waste - BOW - also previously sieved, said reactor being coupled to at least one gasified filtration membrane, with recirculation of biogas from the reactor, - carrying out the anaerobic digestion of the organic fraction contained in the mixture of wastewater and the BOW, in the reactor, obtaining a treated mixture and - filtering the mixture treated in the reactor, in at least one filtration tank through the gasified membrane under conditions such that the relationship between the biogas recirculated per square meter of membrane, and time unit, and the wastewater filtered - - SGDp - is the minimum value allowed by the solid concentration in a treatment plant.
US2017291858	Home Biogas Ltd (IL)	**Lightweight assemblable appliance with pliant exoskeletal support respective kit-of-parts and method for production of biogas and liquid fertilizer.** An assemblable appliance and method of recycling organic waste into biogas and liquid fertilizer, implementing essentially anaerobic digestion processes, is described. The assemblable appliance includes: a pliant structured exoskeletal envelope, pliable collapsible anaerobic digester and gas tank. A compact kit-of-parts for assembling the aforementioned appliance and respective method using the aforementioned appliance for recycling organic waste into biogas and liquid fertilizer are described.

Nº Publicación	Solicitante (País)	Contenido técnico
WO2017153792	Laczikó Aranka (HU)	**Process for producing alternative soil and thereby optimising of producing biogas.** A process is provided to produce alternative'substrate or soil by converting waste materials and for biogas production. The biogas yield is optimised. Communal and agricultural waste is pretreated by ultrasound digestion or wetting, or particle size optimisation, or microbiological treatment, etc. The proposed solution is characterised by six interventions in the known biogas production technology to increase efficiency and optimise the biogas process as follows: The first intervention is the selection and grouping of the raw materials to ensure the formation of identical volumes of biogas and wettability. The second intervention is the treatment of waste feedstock with microbiological and/or physical methods. The third intervention is the preparation of waste feedstock. The fourth intervention is the optimisation of biogas production by utilising waste heat. The fifth intervention is gas cleaning, the reduction of gas dioxin and hydrogen sulfide contamination and, at the same time, the microbiological production of product(s), moreover, the burning of inadequate gas on the flare. The sixth intervention is the microbiological production of new product(s).
DE102016004026	Nefigmann GmbH (DE)	**Bioconverter with carbon-containing floating heads.** A bioconverter consists of a carbonaceous floating material in a fermentation liquid. The bioconverter is capable of producing biogas and valuable product by fermentation of biomass.
WO2017203732	Nikkan Tokushu Co Ltd (JP)	**Cell wall/cell membrane disruption device and method for using device.** Provided is a device for disrupting cell walls and/or cell membranes of microorganisms, algae, etc., included in organic sludge etc., the cell wall/cell membrane disruption device comprising fixed disks, rotary disks, a rotary shaft for driving said rotary disks, a depressurizing means, and a housing, wherein: at least one set of said fixed disk and said rotary disk is arranged so as to oppose one another; a central section of said fixed disk has a hollow section that is larger than the outer diameter of the rotary shaft passing through the central section; a shearing force produced between said rotary disks and said fixed disks is applied to a target fluid introduced inside the device and having a water content of 89% or higher; and the pressure inside the cell wall/cell membrane disruption device is reduced to -0.08 MPa or less by the depressurizing means. This device can contribute to an increase in the amount of biogas, a reduction in the amount of sludge, culturing of algae, plant cultivation, culturing of aquatic products, etc., and can separate, for example, CH4 and CO2 and make them into resources.
DE102016003146	Pöttinger Entsorgungstechnik GmbH & Co KG (AT)	**Process and apparatus for the production of biogás.** The present invention relates to a method and a device for producing biogas, biomass is fermented in which in fermenter. The invention relates in particular the dry fermentation of organic waste by means of a small fermenter. It is suggested not to allow the biomass to be fermented remain static in the fermenter, but to move again or rotate to thereby achieve a better gas yield. According to the invention the biomass to be fermented is receiving fermentation vessel about a horizontal pivot axis mounted tiltably to the hold by tilting the fermenter biomass to be fermented in motion or move to.
DE102016105937	Renergon Int AG (CH)	**Injection of liquid organic biomass for solid-state fermentation.** Producing biogas in a solid fermenter, comprises applying biogas to the stackable biomass percolate to produce biogas in a fermentation process, where liquid biomass is additionally applied to the stackable biomass.
EP3228692	SFL Tech GmbH (AT)	**Method and device for treating biomass.** The invention relates to a device for treatment of biomass for a fermenter, comprising at least one container, at least one feed line and at least one outlet, said biomass via the feed line in the at least one container and out through the at least one discharge line from this is discharged. According to the invention it is provided that the at least one container is formed with at least one steam inlet and at least one steam outlet and at least one ancillary steam circulation unit is provided, which via at least one steam inlet and the at least one steam outlet communicating with the container in communication and through which vapor in the container can be circulated to treat the biomass in the vessel under increased pressure and at elevated temperature, and that the container downstream a flash tank is recreates in which the treated in the container biomass is detensioned against atmospheric pressure. Furthermore, the invention relates to a process for treatment of biomass with a corresponding device, a flowable composition prepared by the method as well as a fermenter assembly.

Nº Publicación	Solicitante (País)	Contenido técnico
WO2017203505	SGT -Sustainable Green Tech Ltd (IL)	**Process and facility for the treatment of livestock waste.** The invention provides an efficient system for treating livestock waste, particularly waste from cattle or pig farming. The new facility and method employ special transfers of slurry streams through ASBR, SBR, and a unique pretreatment reactor, resulting in treated water, quality compost, and biogas.
WO2017190224	Ultra Clean Ecolene Inc (CA)	**Integrated techniques for producing bio-methanol.** Methods and systems for producing bio-methanol can include anaerobic digestion of a biomass feedstock to produce biogas including methane and carbon dioxide, partial oxidation of the biogas with oxygen from water electrolysis to produce syngas, synthesizing bio-methanol from the syngas and hydrogen from the water electrolysis, storing the bio-methanol during off-peak electricity demand, intermittently generating electricity from the bio-methanol during peak electricity demand and using such electricity for the water electrolysis. The techniques provide a route for the production of bio-methanol without the engagement of fossil fuels as feedstocks and mitigating fossil fuel derived greenhouse gas emissions from processing and utilization of transportation fuels and commercial or industrial alcohols.

FERMENTACIÓN DE AZÚCARES

Nº Publicación	Solicitante (País)	Contenido técnico
WO2017178686	Abengoa Res S L (ES)	**Catalytic process for lignin depolymerisation.** The invention relates to a catalytic process for lignin depolymerisation, which uses a catalyst consisting of a transition metal and a support selected from the list containing metal oxide nanoparticles, a one-dimensional structure, and metal oxide nanoparticles supported in a one-dimensional structure. The invention also relates to the catalyst and to the use of said catalyst for the depolymerisation of lignin.
MX2015015190	Centro de Investigación Científica de Yucatán A C (MX)	**Ethanol production from the breadnut tree (Brosimum Alicastrum).** The present disclosure is related to the ethanol production from alternate sources different to the conventional ones, to be used as fuel or also for other uses, being all about a scientific and technological development, subject that is being attended by researchers from different disciplines. The present invention is related to a process for the ethanol production coming from the Brosimum alicastrum seeds, which by its high carbohydrate content is an ideal raw material for the production of biofuels. The process for obtaining ethanol from this raw material is described and results as a simple method, beginning with the flour and suspensions preparation, so that the carbohydrates can be fermented, to then perform the corresponding distillation using conventional equipment. The Brosimum alicastrum ethanol yield is competitive in comparison to that of grass seeds, converting the present invention a valid alternative for the biofuels generation.
US2017305767	Green Plains Inc (US)	**Process and method for stillage fermentation.** The present invention generally relates to a novel process in which thin stillage is processed to produce algae oil and protein rich biomass as well as other energy rich byproducts. In accordance with a preferred embodiment, thin stillage is removed from an evaporator during the evaporation process to produce mid-stillage. This mid-stillage is preferably routed to a new process where it is directed to a pre-treatment centrifuge to remove suspended solids, sludge and corn oil. Thereafter, the mid-stillage is preferably cooled and then directed to a fermentation tank where the mid-stillage is subject to a batch fermentation process with algae "seed" fed from an algae inoculation system. Once the batch is harvested, the oil-rich algae/mid-stillage is then preferably heated to rupture the cells and liberate the oil. Thereafter, the oil-rich algae/mid-stillage is preferably processed by a centrifuge which produces solids, a light phase oil and a "clean" mid-stillage stream that can be evaporated to a very high level of solids.
RO132149	ICDO-INOE 2000 Inst de Cercetări Pentru Instrumentație Analitică Cluj-Napoca (RO)	**Process for producing fuel from algae.** The invention relates to a process for producing a fuel from algae. According to the invention, the process consists in pre-treating the algae Nannochloropsis oculata by autohydrolysis, at a temperature of 120...200°C, at a pressure of 30...50 bar, reaction time of 10...30 min, for separating hydrocarbons in liquid phase, fermenting the sugar liquid fraction with beer yeast Saccharomyces cerevisiae at a temperature of 30...40°C, pH 4...6, fermentation time 36...96 h, the resulting ethanol being distilled and anhydrated.
WO2017174378	IFP Energies Now et al. (FR)	**Method for producing cellulases with pretreated lignocellulosic pomace.** The invention relates to a method for producing cellulolytic or hemicellulolytic enzymes comprising: a phase a) of growing a cellulolytic microorganism in a closed reactor, in the presence of at least one carbonaceous growth substrate with a concentration of 10 to 90 g/L, at a temperature of 25-30°C and a pH of 4-5.5; a phase b) of producing enzymes into which at least one inductive carbonaceous substrate is added, at a temperature of 25-27°C and a pH of 4-5, in which method said inductive substrate is a pretreated pomace resulting from a method for pretreatment of lignocellulosic material that has not undergone enzymatic hydrolysis and which is added in fed-batch or continuous mode, and which has specific features: a hydrolysis yield of more than 80% in one test and an apparent viscosity, measured in one test, of less than 1 Pa.s for a shear rate of 10 s-1.
WO2017151957	Novozymes AS (DK) et al.	**Cellobiohydrolase variants and polynucleotides encoding same.** The present invention relates to cellobiohydrolase variants, polynucleotides encoding the variants; nucleic acid constructs, vectors, and host cells comprising the polynucleotides; and methods of producing and using the variants.
WO2017148389	Novozymes AS (DK) et al.	**Combined use of at least one endo-protease and at least one exo-protease in an ssf process for improving ethanol yield.** Improved processes for producing ethanol from starch-containing materials by the combined use of at least one endo-protease and at least one exo-protease in an SSF process are disclosed. More particularly the exo-protease should make up at least 5% (w/w) of the protease mixture.

Nº Publicación	Solicitante (País)	Contenido técnico
US2017306369	Ylitalo Maxwell Robert (US)	**Method for surfactant enhanced enzymatic hydrolysis.** A method for producing fermentable sugars from paper is described. The method comprises the steps of preparing an aqueous paper slurry, treating the paper slurry with non-ionic surfactant, adding an enzyme blend to the mixture and incubating the mixture at a temperature ranging from 30° C. to 50° C. to provide fermentable sugars for bioethanol production. The enzyme blend was optimized by combining three parts of cellulase and one part of cellobiase enzymes. The addition of non-ionic surfactant further improved the process yield where the optimum surfactant concentration at twice its critical micelle concentration was selected.
US2017306361	Microvi Biotech Inc (US)	**Enhanced efficiency ethanol and sugar conversion processes.** Overlay processes are disclosed for making ethanol that not only increase ethanol conversion but do so in a cost effective manner with a reduction in energy requirements per unit of ethanol production. The processes can provide, if desired, higher organic compound as a co-product with ethanol.
WO2017164388	Nat Inst Advanced Ind Science & Tech (JP)	**Mutant xylose-metabolizing enzyme and use thereof.** The present invention provides information on a mutant xylose isomerase gene and a mutant protein with which it is possible to impart high xylose metabolic capacity to budding yeast. Also provided is a yeast strain having the mutant xylose isomerase gene. Additionally provided is an efficient method for producing a useful substance using the yeast strain. The present invention provides mutant Clostridium-phytofermentans-derived xylose isomerase (CpXI) having high xylose metabolic activity, the CpXI including an amino acid sequence corresponding to an amino acid sequence in which the number 63 threonine of SEQ ID NO: 11 of CpXI is substituted by isoleucine, lysine, glycine, or histidine and/or the number 162 valine is substituted by alanine. Also provided are: a transformed yeast having high ethanol productivity, the transformed yeast being obtained by transformation using a mutant CpXI gene that includes a codon mutation corresponding to a codon mutation in which the number 63 threonine of SEQ ID NO: 11 in a CpXI gene optimized for the preferred codon of budding yeast is substituted by isoleucine, lysine, glycine, or histidine and/or the number 162 valine is substituted by alanine; and a method for producing ethanol using the transformed yeast.
US2017321128	Xyleco Inc (US)	**Processing hydrocarbon-containing materials.** Methods are provided for enhancing oxidative molecular weight reduction in a hydrocarbon-containing material. For example, some methods include (a) providing a first hydrocarbon-containing material comprising a first hydrocarbon, said first hydrocarbon-containing material having been exposed to irradiation from a beam of particles, the beam of particles imparting one or more functional groups to said first hydrocarbon containing material; and (b) oxidizing the first hydrocarbon-containing material with one or more oxidants in the presence of one or more compounds comprising one or more naturally-occurring, non-radioactive group 5, 6, 8, 9, 10 or 11 elements, the one or more elements participating in a Fenton-type reaction while oxidizing, to produce a second hydrocarbon-containing material comprising a second hydrocarbon, the second hydrocarbon having a molecular weight lower than that of the first hydrocarbon, the functional groups enhancing the effectiveness of the oxidizing reaction.
AU2017232236	Xyleco Inc (US)	**Processing biomass.** Biomass feedstocks (e.g., plant biomass, animal biomass, and municipal waste biomass) are processed to produce useful products, such as fuels. For example, systems are described that can convert feedstock materials to a sugar solution, which can then be fermented to produce ethanol. Biomass feedstock is saccharified in a vessel by operation of a jet mixer, the vessel also containing a fluid medium and a sachcharifying agent.

TECNOLOGÍAS QUÍMICAS
Patentes

Nº Publicación	Solicitante (País)	Contenido técnico
WO2017187237	Ahmed Mohammed Idris (IN)	**A method for preparing biodiesel (methyl ester) from animal tallow oil and a biodiesel thereof.** The present invention discloses a method for preparing biodiesel (Methyl Ester) from animal tallow oil and a biodiesel thereof. Further, it relates to a method for preparing biodiesel (Methyl Ester) with 100% purity which can be directly used as a fuel in cars, trucks, buses industrial & domestic purpose without any need to blend with any petroleum diesel. The present invention also discloses the biodiesel having improved cold flow properties, flash point and 55 cetane number.
CA2926483	Dementev Alexander (CA)	**Mobile apparatus for carbon-containing materials including biohazard wastes gasification by thermal decomposition and conversion into a liquid fuels.** The present invention relates to a method for gasification of carbon-containing materials including biohazard wastes, and more specifically, to a method for gasification of carbon-containing materials which allows an increase in carbon efficiency and a reduction in carbon dioxide emission, comprising the steps of: biohazard wastes grinding and sterilization, mix with carbon-containing materials for the gasification; and catalytic production of diesel fuel. A system having a movable platform including: material preparation block, gasification and catalytic of diesel fuel production reactors which are structurally and functionally integrated. In the practice of the process, a mixture of carbon-containing materials, a compressed air feed and process steam is fed to the gasifier to produce a synthesis gas. The synthesis gas is fed to the Fischer-Tropsch reactor where it is catalytically reacted to produce heavy hydrocarbons. The outlet from the Fischer-Tropsch reactor is separated into water, a low heating value tail gas, and the desired hydrocarbon liquid product. The water is pressurized and heated to generate process steam. The system further includes a plurality of heat exchangers that enable heat to be recovered from the outlet of the gasifier. The recovered heat is used to make the process steam as well as to preheat the hydrocarbon mix before it is fed to the gasifier and preheat the synthesis gas before it is fed to the Fischer-Tropsch reactor. The method of the present invention greatly increases carbon efficiency and reduces the generation of carbon dioxide.
EP3225682	Inst Nat Polytechnique et al. (MX)	**Use of heterogeneous acid catalysts based on mixed metal salts to produce biodiesel.** Summary of the Invention: The present invention relates to the use of heterogeneous acid catalysts primarily Lewis in nature to produce biodiesel by the transesterification of triglyceride esters, preferably by transesterification of fresh, refined or wasted vegetable oils or oils and fats of animal origin, with alcohols in heterogeneous phase, in batch reactor or continuous flow systems with yields higher than 80%, at the following operating conditions: temperature from 0 to 300°C, residence time from 20 minutes to 20 h, space velocity of 0.1 to 10 h -1 , pressure of 25-100 kg/cm 2 (24.5-98.07 bar), methanol/oil molar ratio of 10 to 40 and catalyst concentration of 0.001 to 20 weight % based on tri-, di- or monoglyceride. More specifically, we refer to the use of heterogeneous acidic catalysts primarily Lewis in nature to produce biodiesel in the preparation of alkyl esters of alkyl by transesterification of tri-, di- or mono-glycerides, such as those derived from vegetable oils or animal origin, in particular palm, jatropha, castor, soybean and sunflower oils, wherein the R groups of the alcohoxyls R 1 O, R 2 O and R 3 O of the glycerides are from C 1 to C 24 and a C 1 -C 4 alcohol, such as methanol, in an alcohol ratio:oil from 3:1 to 50:1. On the other hand, a primary reason for effecting the heterogeneous phase transesterification reaction to produce biodiesel is to avoid loss of catalyst, contaminating liquid effluents and eliminate undesirable side reactions such as the hydrolysis of triglycerides, diglycerides and monoglycerides into free fatty acids; in addition, in the case of catalysts of a basic nature, saponification could generate soaps.

Nº Publicación	Solicitante (País)	Contenido técnico
MX2015017460	Inst Tecnológico Superior de Ciudad Serdán (MX)	**System and method for producing biodiesel from vegetable oils through solar energy for the transesterification process.** The present disclosure is related to a system for producing biodiesel from vegetable oil, which is made up of: A support structure housing the elements of the system; a methoxide preparation tank containing a catalyst agent, preferably potassium hydroxide, which is mixed with methanol and thereby forming the methoxide; this mixture is in fluid communication with a transesterification reactor containing vegetable oil which may be commercial, obtained from some plants like the Ricinus or the Jatropha, or oil already processed from fried foods; a settling/washing tank in which biodiesel is separated from the glycerin that was formed in the process and soap remnants resulting from saponification, as well as impurities and wash water, derived from the purification process; the biodiesel production system has in turn, a temporary storage tank where samples of the processed biodiesel will be taken to perform the different tests and analysis and which will serve as a temporary storage tank, m eanwhile is released for final storage or use. The system has a centrifugal pump that will circulate the biodiesel obtained in the transesterification reactor to the settling/washing tank. A preferred modality is to obtain the energy required for the transesterification process by a photovoltaic system. Unlike the existing systems in the market for the production of biodiesel, the proposed system has a Methoxide deposit, a transesterification reactor which uses solar energy to reach the temperature to perform the process, moving mechanical stirring systems, a settling/washing tank that can be used for purification.
CZ20160088	Nikl Stanislav et al. (CZ)	**A method of preparation of fatty acid esters by esterification of oils and fats with a higher content of free fatty acids (FFA) using methanol or ethanol.** The process consists in an acid-catalyzed esterification of free FFA in a higher excess of the esterifying alcohol. After separation of the excess methanol and neutralization, the mixture of esters formed by acid-catalyzed esterification and fat is neutralized with the base and the mixture is subjected to further esterification with an alkaline catalyst. Both acidic and alkaline esterification takes place in a batch process followed by a continuous purification process. Phase interface and layer separation are monitored based on conductivity. The excess esterifying alcohol is rectified and reused for esterification. Distillation residues are also used, so the process is largely non-wasteful.
EP3219778	Umicore AG & CO KG (DE)	**Biofuel and method for preparation by isomerizing metathesis.** Subject of the invention is a process for producing a biofuel from fatty acid methyl esters (FAMEs) obtained by transesterification of vegetable oils, comprising the steps of (a) ethenolysis of the fatty acid methyl esters in the presence of ethylene and an ethenolysis catalyst, and (b) isomerizing metathesis in the presence of an isomerization catalyst and a metathesis catalyst. The invention also relates to biofuels obtainable by the inventive process and to uses of ethylene for adjusting and optimizing biofuels.
MY162182	Univ Malaya (MY)	**A method for producing biodiesel from crude plant-derived oil using deep eutectic solvent**. The present invention relates to a method for reducing free fatty acid content of crude plant-derived oil used for producing biodiesel, characterized by the steps of preheating the crude plant-derived oil; esterifying the preheated crude plant-derived oil with an alcohol wherein the molar ratio of the alcohol to the preheated crude plant-derived oil is in a range of 1:1 to 20:1, in the presence of 0.25% to 3.5% by weight of deep eutectic solvent catalyst loading, at a temperature in a range of 40 °C to 80 °C for a period in a range of 3 to 120 minutes; removing excess alcohol and water from the esterified crude plant-derived oil; centrifuging the esterified crude plant-derived oil to recover the deep eutectic solvent; reacting a base solution catalyst and the alcohol with the esterified crude plant-derived oil to form a mixture comprising crude biodiesel and crude glycerol; evaporating and centrifuging the mixture to remove excess alcohol, thereby separating the crude glycerol from the crude biodiesel; and purifying the crude biodiesel with water.
US2017283344	Univ of South Florida et al. (US)	**Systems and methods for producing liquid fuels from landfill gases.** In some embodiments, a system for producing liquid fuel from landfill gas includes a tri-reformer that receives landfill gas and produces synthesis gas having a H2:CO ratio of approximately 2:1, and a Fischer-Tropsch synthesis (FTS) reformer that receives the synthesis gas from the tri-reformer and produces liquid fuel.

Nº Publicación	Solicitante (País)	Contenido técnico
WO2017192029	Univ Teknologi Mara (MY)	**A method of producing biodiesel.** The present invention relates a method for biodiesel production from waste oil comprising the steps of mixing waste oil and alcohol; and performing transesterification in a reactor comprising a combination of a high speed mixer operating at 1000 to 5000 rpm and a sonic mixer operating at 1.5 to 2.4 MHz wherein the mixture is passed through a plurality of reactors connected in series.
US9809781	Univ Toledo (US)	**Thermal fractionation of biomass of non-lignocellulosic origin for multiple high-quality biofuels.** Preparing multiple bio-fuels by using pyrolytic thermal fractionation of microalgae biomass involves using protein component and triglyceride component with or without additional carbohydrate component, heating the microalgae biomass to a first volatilization temperature of first component comprises one of proteins or carbohydrates, holding the first volatilization temperature of the heated microalgae biomass constant for first period of time until no further mass loss of the first component occurs producing a first volatilized vapor product derived from proteins and/or carbohydrates.
US2017342014	UT-Battelle LLC (US)	**Surface treated carbon catalysts produced from waste tires for fatty acids to biofuel conversion.** A method of making solid acid catalysts includes the step of sulfonating waste tire pieces in a first sulfonation step. The sulfonated waste tire pieces are pyrolyzed to produce carbon composite pieces having a pore size less than 10 nm. The carbon composite pieces are then ground to produce carbon composite powders having a size less than 50 μm. The carbon composite particles are sulfonated in a second sulfonation step to produce sulfonated solid acid catalysts. A method of making biofuels and solid acid catalysts are also disclosed.

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