VT BIOMASA PATENTES
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FERMENTACIÓN DE AZÚCARES: PRODUCCIÓN CIENTÍFICA

En las últimas ediciones de este boletín se han ido presentando revisiones de la producción científica existente en las distintas tecnologías de conversión de la biomasa a través del análisis de las publicaciones identificadas en la base de datos Web of Science de ISI WoK. Continuando con esta línea, en este apartado se va a abordar la fermentación de azúcares para la síntesis de bioetanol y otros biocombustibles.

La producción científica a nivel mundial en el área de estudio supera las 10 000 publicaciones hasta Marzo de 2016. Los primeros artículos publicados datan de principios de la década de los ochenta. Desde entonces, la producción bibliográfica ha ido en aumento, experimentando un crecimiento espectacular a partir del año 2006, de modo que en los últimos diez años el número de publicaciones totales se ha multiplicado por siete (Figura 1). Atendiendo al tipo de documentos de que se trata, el 86% de las publicaciones son artículos en revistas especializadas y el 9% comunicaciones a congresos. El 8% son revisiones del estado del arte de la tecnología.

En relación a las Áreas de Investigación en que Web of Science clasifica las publicaciones contenidas en sus bases de datos, señalar que el 55% pertenecen al Área de Biotecnología y Microbiología Aplicada, el 29% al Área de Energía y Biocombustibles, el 20% a la de Agricultura y el 20% a la de Ingeniería, por mencionar las mayoritarias.

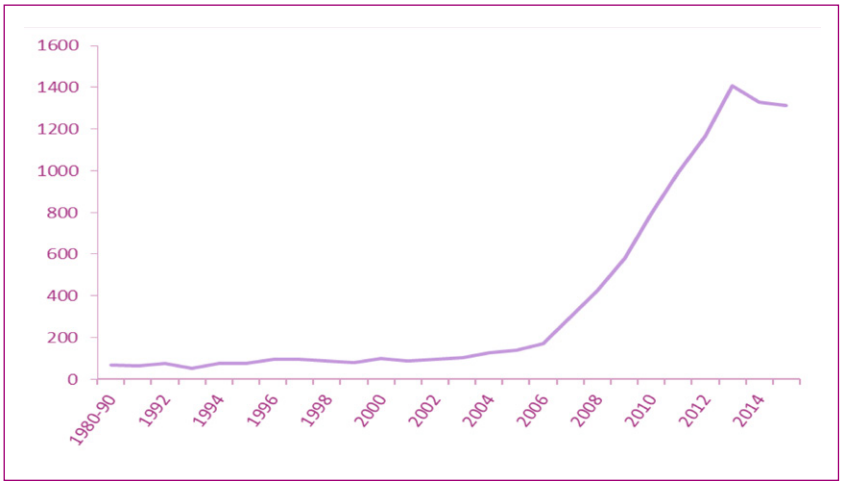

Figura 1: Distribución del número de publicaciones por años

Los países líderes en publicaciones son EE.UU. y China, con el 26.2% y 14.3% de los artículos, respectivamente. En la distancia les siguen Brasil y Japón, con el 7.1% y el 6.5% (Tabla 1). España ocupa la novena posición de liderazgo, con el 3.4%. Se han identificado sesenta y seis centros con más de 50 publicaciones y veintitrés con más de 100. Entre estos últimos se encuentran catorce centros estadounidenses y tan sólo dos chinos. En la Tabla 2 se muestran los diez situados a la cabeza. Los más destacados son el US Department of Agriculture (USDA), el US Department of Energy (DOE), la Chinese Academy of Sciences y la Lund University. A ellos corresponde el 4.7%, 4.2%, 2.3% y 2.2% de las publicaciones, respectivamente, lo que supone una aportación mayor por centro a la del total de muchos países de cabecera.

En España, los primeros artículos publicados en este campo datan de comienzos de los noventa, produciéndose el despegue a partir del año 2009. Desde entonces se han publicado el 73% del total. Se han identificado más de treinta centros españoles con publicaciones, de modo que tres de ellos superan las 50: la Universidad de Jaén, el CIEMAT y la Universidad de Vigo. El CSIC dispone de cerca de 30 publicaciones; seguido de las Universidades de Santiago de Compostela, Granada, Córdoba, Valladolid, Cádiz y Complutense de Madrid, con una media de 15. Cabe destacar la autoría conjunta de la mayoría de las publicaciones de la Universidad de Granada con la Universidad de Jaén.

Tabla1:

PAÍSES LÍDERES	
Instituciones	**Nº Publicaciones**
EE.UU	2658
China	1447
Brasil	724
Japón	655
India	560
Korea del Sur	536
Suecia	459
Canadá	438
España	344
Dinamarca	248
Alemania	248

Tabla2:

INSTITUCIONES LÍDERES A NIVEL MUNDIAL	
Instituciones	**Nº Publicaciones**
US Department of Agriculture-USDA (US)	476
US Department of Energy-DOE (US)	427
Chinese Academy of Sciences (CN)	236
Lund University (SE)	223
Universidade de Sao Paolo (BR)	199
University of California System (US)	198
National Renwable Energy Laboratory (US)	157
University of Illinois System (US)	155
Technical University of Denmark (DK)	154
University of Illinois Urbana Champaign (US)	152

En lo relativo a las áreas temáticas de las publicaciones, el 65% utiliza biomasa celulósica como producto de partida para la obtención de bioetanol, de modo que el 60% de éstas se refiere a métodos físico-químicos (hidrólisis ácida, hidrólisis alcalina, solventes, explosión de vapor, etc.) y biológicos (hongos de putrefacción blanca, por ejemplo) de pretratamiento dirigidos a aumentar la susceptibilidad de los sustratos a la hidrólisis enzimática, disminuyendo la producción de sustancias inhibidoras de los microorganismos responsables de la fermentación. El 47% del total de publicaciones se centra en el proceso de sacarificación (hidrólisis enzimática) y el 11% en el de sacarificación y fermentación simultáneas, donde ambas etapas tienen lugar en el mismo biorreactor. El 15% de los artículos trata sobre la modificación genética de hongos y bacterias para, entre otros objetivos, lograr la sacarificación y fermentación simultánea en un mismo microorganismo y elevar el rendimiento en la producción de bioetanol.

ANÁLISIS DE PATENTES

Durante el primer trimestre de 2016 se han identificado en la base de datos WPI (World Patent Index) 1800 familias de patentes sobre tecnologías de conversión de la biomasa para la producción de energía (Tabla 3). El 54.1% de las referencias encontradas están relacionadas con las tecnologías bioquímicas. La tecnología de digestión anaeróbica es la que cuenta con mayor número de resultados, 48.2% del total, seguida de la gasificación/pirolisis, con el 20.4%.

Tipos de tecnologías de conversión de la biomasa	1er trimestre 2016
Tecnologías termoquímicas	709
Combustión directa	342
Gasificación/pirólisis	367
Tecnologías bioquímicas	972
Digestión anaeróbica	867
Fermentación de azúcares	105
Tecnologías químicas (transesterificación, Fischer-Tropsch síntesis de metanol)	119
Nº TOTAL FAMILIAS DE PATENTES	1800

Tabla 3. Número de familias de patentes clasificados por tecnologías

En la Tabla 4 se muestran los países que han publicado más de 15 documentos de patentes en este trimestre. El país líder es China, con 1337; en segundo lugar, y con gran diferencia, le siguen las solicitudes internacionales (PCT), con 156. En tercero y cuarto lugar se encuentran EE.UU. y Corea, con 113 y 68 documentos, respectivamente. En España, en el periodo analizado, se han publicado 7.

	País	Nº referencias
1	China	1337
2	PCT	156
3	EE.UU.	113
4	Corea	68
5	Japón	37
6	Alemania	34
7	EP	27
8	India	17
9	Rusia	17

Tabla 4. Ranking por países.

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

TECNOLOGÍAS TERMOQUÍMICAS
Patentes

COMBUSTIÓN DIRECTA		
Nº Publicación	Solicitante (País)	Contenido técnico
WO201603296	Heuchling Frederick (US)	**A collapsible secondary-burn biomass stove and associated embodiments.** A portable, collapsible, secondary combustion biomass stove which maintains the environmental and efficiency benefits of a secondary-burn biomass stove while removing the need for the weight and volume of permanent insulation. The stove can be quickly and easily assembled or disassembled without the use of tools for storage and transport. The outer housing of the stove provides stability while shielding the user from the high temperatures of secondary combustion within the chimney and combustion chamber, and collapses for stove transport. Insulation may be added to the stove using material indigenous to most campsites, whereby stove operating temperature and efficiency increases while toxic gas release and fuel consumption decrease.
ES1149413	Supersilo Spain SL (ES)	**Alimentador neumático para estufas de biomasa.** 1. Alimentador para estufas de biomasa que comprende un receptor caracterizado por un tamaño y diseño apropiados para ser instalado en el interior del depósito de almacenamiento de biocombustible de las estufas de biomasa, y una unidad de control y aspiración que permite automatizar el proceso de alimentación de las estufas de biomasa.
ES2557413	Talleres de Carpinteria Metalica los Tigres SL (ES)	**Estufa de combustión.** Estufa de combustión, que comprende: - una cámara de combustión, - una cámara de postcombustión desarrollada a lo largo del recorrido de evacuación de los gases procedentes de la cámara de combustión, - un primer aireador para la cámara de combustión, - una división entre la cámara de combustión y la cámara de postcombustión provista de, al menos, un paso de gases procedentes de la cámara de combustión, - un segundo aireador para la cámara de postcombustión, - una chimenea de la cámara de postcombustión, donde la cámara de postcombustión comprende una envolvente con partes transparentes y/o translúcidas.
WO2016020559	Inerco Ingeniería Tecnología y Consultoría SA (ES)	**System for optimizing the combustion for pulverized solid fuel boilers and boiler incorporating such system.** The invention relates to a system for optimizing combustion for pulverized solid fuel boilers, comprising: groups of main burner; main mills corresponding to the groups of main burners; main transport lines connecting the main mills with the groups of main burners; an auxiliary mill in parallel with each group of main burners; and an auxiliary transport line comprising: an ascending section connected to the auxiliary mill; a descending section; a transitional section connecting the ascending section and the descending section; a distributor at the end of the descending section; and descending distribution lines from the distributor to each corresponding main transport line (22). The invention provides differential fuel input patterns and improved solid fuel transport, with versatility and a simplified structure.
EP2988067	Messer Austria GmbH (AT)	**Heating of an oven area using a multiple material burner.** For heating a furnace space, in particular a rotary tubular kiln, multi-fuel burners are used, which are equipped with feed lines for a primary oxidizing agent and for a primary fuel and having at least one feed pipe for the pneumatic conveyance of a secondary fuel. To improve the efficiency of combustion of the secondary fuel in the furnace according to the invention is proposed to supply the secondary fuel stream in the region of the burner mouth an oxygen-rich gas stream; the supply takes place via a gas supply line, which is opens from below into the feed line for the secondary fuel stream and simultaneously directed obliquely forward. ; The oxygen-rich gas leads to an early start of the implementation of the particles of the secondary fuel and at the same time an extension of the trajectory in the furnace chamber.

COMBUSTIÓN DIRECTA

Nº Publicación	Solicitante (País)	Contenido técnico
EP2985527	Pellasx Spólka Z O O Spólka Komandytowa (PL)	**The aeration mechanism of the combustion chamber in a pellet burner.** An aeration mechanism of a combustion chamber in a pellet burner concerns a burner comprising a steel body with an inlet hole for pellets and a rotary combustion chamber, surrounded by a cylindrical, fixed cover permanently connected with the body, in addition, a space between the combustion chamber and the cover is a ring-shaped duct (conduit) supplying air to the combustion chamber throughout the inlet holes and/or inflating nozzles placed on its circumference. In a solution according to the invention the rotary combustion chamber has several longitudinal diaphragms arranged in a form of shutters swingably mounted on the outer surface of the combustion chamber and obscuring the inlet holes of air, working together with a fixed control ring situated perpendicularly to the longitudinal axis of the chamber around its rear part, in addition, an inner surface of the control ring has a shape of arcs of two radius (R, r) connected with each other by short, straight segments and functions as a cam pressing the diaphragms to the combustion chamber surface or releasing them in accordance with a sequence of the preset phases. The combustion chamber has a form of a prism or a truncated pyramid a base of which is a regular polygon. The diaphragms are arranged in twos on either side wall of the combustion chamber .
WO2015195441	Biomass Energy Enhancements LLC (US)	**A system for co-firing coal and beneficiated organic-carbon-containing feedstock in a coal combustion apparatus.** A co-firing process is described using coal and processed biomass to reduce adverse by-products in a coal combusting apparatus. The coal feedstock is selected from coal, a coal substitute processed biomass, or an aggregate blend of coal and processed biomass. The biomass feedstock comprises processed biomass pellets. The total energy density is predetermined and can be similar to the coal component or higher than the coal component. The intracellular salt in the processed biomass is at least 60 wt% less for the processed organic-carbon-containing feedstock used to make the processed biomass pellets than that of the starting un-processed processed organic-carbon-containing feedstock.
WO2015195530		**A system and process for combusting coal and beneficiated biomass feedstock.** A coal combustion process is described using coal and processed biomass to reduce adverse by-products in a coal combusting apparatus including the reduction of carbon dioxide by at least 50 volume %. The coal feedstock is selected from coal, a coal substitute processed biomass, or an aggregate blend of coal and processed biomass. The biomass feedstock comprises processed biomass pellets. The total energy density is predetermined and can be similar to the coal component or higher than the coal component. The intracellular salt in the processed biomass is at least 60 wt% less for the processed organic-carbon-containing feedstock used to make the processed biomass pellets than that of the starting un-processed processed organic-carbon-containing feedstock.
WO2015193450	IFP Energies Nouvelles (FR); et al	**Process and apparatus for chemical looping redox combustion with control of the heat exchanges.** The invention relates to a process and an apparatus for chemical looping redox combustion of a hydrocarbon-based feedstock, in which the heat exchanges are controlled by a variation of the level of a dense fluidized bed of particles of active mass in an external heat exchanger (E1,E2), positioned on a line for transporting the particles circulating between a reduction zone and an oxidation zone respectively for reducing and oxidizing the particles in the chemical loop. The variation of the level of the bed is permitted by the controlled application of a pressure drop over an outlet of the fluidizing gas in the heat exchanger, said pressure drop being compensated by the variation of the level of a bed of particles of active mass in a reservoir zone located in the circuit of the particles in the chemical loop.

COMBUSTIÓN DIRECTA

Nº Publicación	Solicitante (País)	Contenido técnico
EP2957828	Domusa Calefaccion S Coop (ES)	**Burner that uses a granular-type solid biomass fuel.** Burner that uses a granular-type solid biomass fuel, comprising a combustion chamber where combustion takes place, and an unburned fuel discharge device for discharging the unburned fuel generated during combustion. The unburned fuel discharge device forms the base of the combustion chamber, said unburned fuel discharge device comprising at least three discharge plates arranged parallel to one another, at least two of said discharge plates being movable and at least one of said discharge plates being fixed, the movable discharge plates and the fixed discharge plates being arranged in an alternating manner, each of the discharge plates comprising at least one hole, said holes being arranged and the movable discharge plates; being moved such that the passage of an air stream through the discharge device is prevented.
WO2015193029	Kümmel Joachim (DE)	**Method and device for burning fuel material from waste or biomass.** The invention relates to a method for burning fuel material from waste and/or biomass on a rigid stepped grate of a boiler installation, and to a device for carrying out this method. It also is provided to connect the rigid stepped grate rigidly and in an airtight manner to the surrounding boiler installation, and to equip the individual grate steps with terminating edges in order to loosen and rotate the fuel material. At the same time, the individual steps of the stepped grate are arranged with a positive angle of inclination β and an active, loosening transport of the fuel material takes place by means of transport slides, wherein the supply of combustion air is effected via multiple different airways. The stepped grate is in this case formed of welded finned tubes, wherein the boiling water used as the coolant for the stepped grate is connected to the water circulation system of the boiler installation.

PIRÓLISIS/GASIFICACIÓN

Nº Publicación	Solicitante (País)	Contenido técnico
ES2557492	Univ Leon (ES); et al	**Pirolizador móvil y autotérmico.** Pirolizador móvil y autotérmico. La invención se refiere a un pirolizador móvil y autotérmico que comprende una cámara vertical de pirolisis donde se produce la reacción del material a pirolizar caracterizado porque comprende una carcasa de material refractario dispuesta de manera concéntrica y separada de la cámara vertical de pirolisis, definiendo entre ambas una cámara de combustión que proporciona el calor para llevar a cabo la pirolisis sin aporte externo de energía térmica.
WO2016038724	Chugoku Electric Power (JP)	**Biomass gasification system and biomass gasification method.** When gasifying biomass, whenever, due to a crushing pump that is for pre-crushing biomass supplied from an adjustment tank and to be hot water-treated by a pre-treatment device, circulation piping that is installed between the adjustment tank and the crushing pump and is for circulating biomass crushed by said crushing pump to the adjustment tank, and an open/close valve that is provided on a flow channel outlet of the crushing pump and is for opening and closing an outlet of said crushing pump, crushed biomass fragments remaining in the crushing pump accumulates in excess of the processing volume thereof, the present invention closes the open/close valve. After a given time has elapsed, the open/close valve is opened and said crushed biomass fragments are circulated to the adjustment tank via the circulation piping. As a result, blockage due to accumulation of crushed fragments of gasification starting material in the crusher is avoided and fuel gas such as methane or hydrogen can be generated more efficiently from biomass.

PIRÓLISIS/GASIFICACIÓN		
Nº Publicación	Solicitante (País)	Contenido técnico
WO2016030001	Ecoloop GmbH (DE)	**Method for cracking carbon- and hydrogen-containing substances.** A method is used to thermally crack carbon- and hydrogen-containing substances in a vertical process chamber under formation of synthesis gas. The substances are combined with bulk material, which does not gasify during the process, into a mixture which is guided from top to bottom through a pyrolysis zone in which the mixture is heated to an intrinsic temperature of above 300 DEG C in the counterflow of hot gases under formation of coke, and subsequently the formed coke is guided together with the bulk material through an oxidation zone located therebelow under at least partial oxidation of the coke and under generation of temperatures of above 700 DEG C. In order to counteract a temperature drop toward the middle of the cross-section, in particular in the region of the pyrolysis zone and the oxidation zone, it is proposed that the mixture is guided through an annular cross-section, at least in the region of the pyrolysis zone.
WO2016029093	Simple Approach Systems Inc (US)	**Apparatus, system, and method for converting varied source industry waste into energy.** An apparatus, system, and method for processing hydrocarbon-containing wastes are described. The system and method include the use of a gasification apparatus comprising a rotary kiln reactor and a gas distributor. The rotary kiln reactor and gas distributor are configured to generate multiple reaction environments within the gasification apparatus. Each of the reaction environments has unique temperature reaction conditions to suit various physical and chemical properties associated with processing of the varied-source hydrocarbon-containing wastes.
WO2016024447	Mitsubishi Hitachi Power Sys (JP)	**Integrated gasification combined cycle power generation facility and method for operating integrated gasification combined cycle power generation facility.** Provided is an integrated coal gasification combined cycle power generation facility equipped with: a gasification furnace that generates combustible gas from pulverized coal; a gas cooler; gas turbine equipment; an auxiliary fuel supply unit that supplies an auxiliary fuel to the gas turbine equipment; a waste heat recovery boiler; steam turbine equipment; generators; and a circulation line unit that circulates cooling water. The waste heat recovery boiler has a first medium-pressure coal economizer and a second medium-pressure coal economizer. When the combustible gas generated from the pulverized coal is burned, a serial heat exchange line is formed wherein cooling water passes through the first medium-pressure coal economizer, the second medium-pressure coal economizer, and the gas cooler. When the auxiliary fuel is burned, separate heat exchange lines are formed, wherein the cooling water separately passes through the first medium-pressure coal economizer and the second medium-pressure coal economizer.
WO2016016241	Commissariat Energie Atomique (FR)	**Facility for drying and roasting biomass with improved energy efficiency.** The invention relates to a facility for drying and roasting biomass comprising: - a drying reactor and a roasting reactor, - a first burner and a second burner, distinct from the first burner, - a heat recuperation element, connected to the outlet of the first burner and designed to recuperate at least some of the heat available in the combustion gas emanating from the first burner and transfer it to the drying gas in order to heat the latter before it enters the drying reactor, - a first heat exchanger, designed to recuperate at least some of the heat available in the gas emanating from the drying after it is has passed through the drying reactor and transfer it to the combustion air in order to preheat the same before it enters the first burner.

PIRÓLISIS/GASIFICACIÓN

Nº Publicación	Solicitante (País)	Contenido técnico
WO2016008460	Alpajar Group SRO (CZ)	**Method of continuous production of liquid and gaseous fuels from the part of organic substances in the waste.** Method of continuous production of liquid and gaseous fuels from the part of organic substances in the waste, in particular in the industrial, agricultural and municipal waste, including their mixtures, consists in thermic decomposition of these wastes into fuels - usable low-molecular hydrocarbons, as well as other residual inorganic or other parts intended for recycling or to any landfill, where the treated waste with a content of organic substances, especially in the form of paper, plastics, rubber, including non-crushed used tires, wooden elements, sawdust, rests of meals and fats, and their packaging, in a hermetically sealed reaction space with non-access of air thermically decomposes by the heated gaseous inert medium. By the influence of the electrostatic charge, resulting from the decomposition of organic, in particular polymeric substances, pass from them decomposed low-molecular substances in the form of hydrocarbons altogether in the mixture with gaseous inert medium as the carrier gas in the aerosol, which is then further conducted to its cooling, precipitation and the mutual separation in it contained gaseous, and liquid low-molecular hydrocarbons. After the decomposition of all of the parts of organic substances from the hermetically closed reaction space, all the residual inorganic or other parts of the processed waste are gradually being removed.
WO2016004958	Univ Aarhus (DK)	**A method and apparatus for producing biofuel in an oscillating flow production line under supercritical fluid conditions.** The invention discloses a method for producing bio-fuel (BF) from a high-viscosity biomass using thermo-chemical conversion of the biomass in a production line with pumping means (PM), heating means (HM) and cooling means (CM). The method has the steps of 1) operating the pumping means, the heating means and the cooling means so that the production line is under supercritical fluid conditions (SCF) to induce biomass conversion in a conversion zone (CZ) within the production line, and 2) operating the pumping means so that at least part of the production line is in an oscillatory flow (OF) mode. The invention is advantageous for providing an improved method for producing biofuel from a high-viscosity biomass. This is performed by an advantageous combination of two operating modes: supercritical fluid (SCF) conditions and oscillatory flow (OF).
EP2957619	Marchesin Mauro (IT); et al	**600 DEG C methanizer for the treatment of organic compounds.** The present patent application, modifies the traditional processing of pyrolysis of waste in general, organic and inorganic compounds, and introduces new systems to greatly improve process reaction speed, improve the cleaning of generated gas and improve the introduction/expulsion of the compound to be treated, obtaining an anoxic cycle (total absence of oxygen except of course for that present in the waste itself) and a continuous cycle, without flues or chimney stacks. The improvements we have introduced allow the process to thermally treat various types of organic (tannery sludge, manure, vegetable/animal biomass, undifferentiated urban solid wastes, leachate etc.) and inorganic (metals, oxides etc.), because the wastes in the particular conditions of molecular dissociation occurring at a set temperature, associated with the introduction of hydrogen which has a 'cicatrizing effect' on the previously dissociated molecules (dioxins, furans), facilitate the formation of natural gas. The process also allows for the recovery of 'dreaded' fine particles which are not airborne but captured in the siphoning liquid and in the water of the final distillation of natural gas. At present, many attempts are being made to try to solve and improve the problem of waste disposal by means of incineration, thermal valorisation and various forms of gasification, with the up-draft fixed-bed, down-draft fixed-bed, fluidized-bed, entrained-flow and entrained-bed gasifiers or with plasma gasifiers etc., but to date the problem has not solved in a definitive manner by such techniques.

PIRÓLISIS/GASIFICACIÓN		
Nº Publicación	Solicitante (País)	Contenido técnico
WO2015200642	Saudi Arabian Oil Co (AS); et al	**Energy efficient gasification-based multi generation apparatus employing energy efficient acid gas removal plant-directed process schemes and related methods.** Energy-efficient gasification-based multi-generation apparatus, facilities, or systems, and methods of modifying existing gasification-based multi-generation apparatus and the various conventional thermal coupling arrangements, are provided. An exemplary gasification-based multi-generation apparatus comprises an acid gas removal system configured to remove acidic contaminants from a raw syngas feed to thereby provide a treated syngas feed and an acid gas removal plant or facility; a gasification system configured to generate the raw syngas feed from a carbon-based feedstock and comprising a gasification plant or facility; and a condensate polishing plant or facility. The acid gas removal system comprises an acid gas contaminant absorber, a solvent regenerator, a contaminant hydrolysis reactor, and an acid gas removal system energy management system. The acid gas removal system energy management system comprises a sixth acid gas removal system process-to-process heat exchanger unit positioned to receive at least a portion of a polished cold condensate stream from the condensate polishing plant or facility to provide heat energy to the at least a portion of the polished cold condensate stream. The gasification system comprises a gasification reactor and a gasification system energy management system. The acid gas removal plant or facility is integrated with the condensate polishing plant or facility through the at least a portion of the polished cold condensate stream received by the sixth acid gas removal system process-to-process heat exchanger unit.
WO2015194978	Handerek Adam (PL)	**Method for thermal decomposition of plastic waste and/or biomass and apparatus for process management.** The invention relates to a method for thermal decomposition of plastic waste and/or biomass, characterised in that plastic waste and/or biomass are subjected to a thermal treatment in the reactor in the presence of loose, process temperature-resistant spatial elements having a distinct intrinsic surface area. The invention further relates to apparatus for process management.
WO2015177034	Haldor Topsöe AS (DK)	**Reduction or removal of oxygenated hydrocarbons in syngas conditioning.** A process for the conversion of one or more oxygenic compounds to one or more hydrocarbon compounds, wherein the oxygenic compounds are contacted with a catalyst comprising Co and Mo, Ni and Mo or Mn and Mo. The process may be used for the conditioning of syngas, including the reduction of tar formation for the process of preparing syngas from the gasification of coal, waste or biomass.

TECNOLOGÍAS BIOQUÍMICAS
Patentes

DIGESTIÓN ANAERÓBICA		
Nº Publicación	Solicitante (País)	Contenido técnico
US2016041538	Buckenham N Ross (US)	**Bioenergy storage and management system and method.** A bioenergy management system and method for generating and supplying on-demand auxiliary electrical power is disclosed. The system/method includes a biogas generation unit (BGU) that produces biogas from dairy farm manure and stores the biogas in a biogas storage unit (BSU). An stored energy electric generation unit (SEGU) converts the stored biogas to electricity. A biogas control unit (BCU) measures the quality and quantity of biogas stored in the BSU and calculates available electric power (AEP) from this information. Depending on auxiliary electrical power requirements, a utility control unit (UCU) initiates an on-demand request for electric power (REP) to the BCU using a producer communication device (PCD)/utility communication device (UCD) data link. The BCU processes the REP from the UCU and negotiates electrical power (NEP) quantity. The BCU may electrically connect the SEGU to an electric transmission grid (ETG) to allow instantaneous/scheduled NEP delivery to the ETG.
EP2982740	Microbenergy GmbH (DE)	**Method for generating methane.** A process for the production of methane is described comprising the steps of a) providing a plant for the production of biogas, the plant at least one device for supplying a substrate, at least one device for the removal of fermentation residues and at least one outlet for the system to produce biogas produced methane and carbon dioxide-containing biogas, b) providing a bioreactor 14 to produce a methane-enriched gas, the bioreactor 14 at least one device for feeding the extracted from the plant for the production of biogas fermentation residue, at least one device for feeding the resulting in the plant to produce biogas methane and carbon dioxide-containing biogas, at least one device for supplying hydrogen ,; at least one outlet for the produced in the bioreactor methane-enriched gas and at least one temperature control device 18, c) production of methane and carbon dioxide-containing biogas in the plant to produce biogas, wherein the producing of methane and carbon dioxide-containing biogas is carried out under mesophilic conditions, d) converting at least a portion of a extracted from the plant for the production of biogas fermentation residue in the bioreactor 14, e) conversion of in step c) methane produced and carbon dioxide-containing biogas into the bioreactor 14, f) supplying hydrogen into the bioreactor 14, g) producing methane-enriched gas in the bioreactor (14), wherein the transferred in step d), extracted from the plant for the production of biogas digestate as Methanisierungsmedium used ,; and wherein producing the methane-enriched gas in the bioreactor (14) takes place under thermophilic conditions, h) removing the formed in the bioreactor 14 methane-enriched gas from the bioreactor.
WO2016013918	Univ Hassan 1er De Setta et al. (MA)	**Biological accelerators of organic waste methanization.** The present invention relates to a process for treating organic waste by anaerobic digestion allowing the production of methane at high yield and in a reduced period of time which begins from the second week of fermentation, using biological accelerators of the fermentation process. The invention also relates to the preparation and the conditioning of an active mixed microbial culture with the various agricultural effluents.

DIGESTIÓN ANAERÓBICA		
Nº Publicación	Solicitante (País)	Contenido técnico
EP2982739	S & B Service und Betr GmbH (DE)	**Combined hydrolysis fermentation apparatus.** The invention relates to a combined hydrolysis-fermentation apparatus for the spatially separated realization of process steps hydrolysis and methane fermentation in bioenergy plants by wet fermentation. The apparatus consists of at least one heated, with circulation devices and, if necessary, ventilated container combination with a corrosion resistant equipped hydrolyzing vessel (1) in an at least in the gas chamber (20) also resistant to corrosion equipped containers for fermentation substrates (2) is arranged centrally, the wall structure of hydrolysis reator (4) is at least partially designed as a flow-through system for heating water heating surface (5), the hydrolysis tank (1) exhaust side to the gas chamber (7) of the surrounding container for fermentation substrate (2) is connected and for the ventilation of hydrolysis reator (1) compressed air lances (15); and / or equipment used for air supply via the circulation technology (11) formed vortex (16) are arranged.
WO2016012309	Airpack Holding B V (NL)	**Method for upgrading biogas and production of ammonium sulphate.** The present invention relates to a method for upgrading biogas and production of ammonium sulphate, comprising the steps of : condensing a biogas by contacting the biogas with cooling medium to produce biogas with a reduced water content; pressurizing the biogas with a reduced water content to a pressure of about 5 to 25 bar to produce pressurized biogas; leading the pressurized biogas over a molecular sieve to separate hydrogen sulfide and to produce pseudo gas; leading the separated hydrogen sulfide to an incinerator / quencher and heating the hydrogen sulfide to a temperature above 700 DEG C and quenching the heated hydrogen sulfide with water to produce sulphuric acid; and bringing the sulphuric acid in contact with ammonia to produce ammonium sulphate.
WO2016005832	Univ Warszawski (PL)	**Consortium and preparation of microorganisms for catalyzing cellulose hydrolysis, preparation for methane fermentation supplementation, combination preparation, use thereof and method using the same.** The invention relates to a consortium of microorganisms capable of hydrolyzing cellulose, preferably lignocellulosic biomass, which comprises the following mixtures of bacterial strains: Bacillus sp. KP7, KP20 and Ochrobactrum sp. KP8 (the mixture deposited in PCM under the no. B/00064), Providencia sp. KP14; Bacillus sp. KP6 and KP16 (the mixture deposited in PCM under the no. B/00065), Bacillus sp. KP4, KP5, KP17 and KP22 (the mixture deposited in PCM under the no. B/00066), Providencia sp. KP10; Bacillus sp. KP1 and KP19 (the mixture deposited in PCM under the no. B/00067), Ochrobactrum sp. KP13; Bacillus sp. KP9 and KP12 (the mixture deposited in PCM under the no. B/00068), as well as a preparation for hydrolyzing cellulose comprising this consortium, a supplement preparation, a combination preparation, and use and method of using the same.
EP2980203	Fomento de Construcciones y Contratas SA (ES)	**Anaerobic digester for the treatment of organic waste.** Anaerobic digester and method for the treatment of organic waste which comprises 3 equally sized spherical chambers (1, 2 and 3) positioned at the same height and joined by interconnecting pipes (4, 5 and 6). Each chamber houses a mixing mechanism consisting of a horizontally rotating propeller with two flat paddles that are symmetrical to the axis of rotation and coplanar with each other and this axis. Each of the spherical chambers has an outlet on the top for extraction of biogas, an outlet on the bottom for totally draining the chamber, two connection points for the interconnecting pipes (4, 5 and 6) and an outlet for treated digestate on the bottom half of the chamber. Two of the chambers (1 and 2) also have a loading inlet connected to the tubes (15) from the storing tank (16) for treatable waste.

DIGESTIÓN ANAERÓBICA		
Nº Publicación	Solicitante (País)	Contenido técnico
EP2977440	Agroittica Acqua e Sole SPA (IT)	**Process and system for the recycling in agriculture of the nutrients coming from the food chain.** A description is given of a process for the recovery of nutrients and for the preparation of fertilisers from organic substrates from waste coming from the cycle of production and consumption of foodstuffs comprising anaerobic digestion as a continuous process in a plurality of digesters placed in series at temperatures higher than the pasteurisation temperature,with production of a digestate (fertiliser 1) and of biogas and extraction as a continuous process of ammonia to produce an ammonium salt (fertiliser 2). A description is also given of a system comprising a plurality of digesters placed in series, means for the recirculation as a continuous process of part of the fluid present in the digesters and means for the injection of steam, first and second Venturi scrubbers , tanks for storage of fertilises 1 and 2 and a series of service gas lifts or pipes distributed along the perimeter of the digesters for the transfer of the digestate from the base into the ceiling of each respective digester.
EP2965800	Airbus DS GmbH (DE)	**Method and device for gas processing.** A method for gas processing, in particular for processing biogas of a biogas plant in which in one method step a membrane process or a reactive process is executed, and in at least one further method step an adsorption and/or absorption process is executed.
WO2016001156	IFP Energies Nouvelles (FR)	**IBE fermentation method.** The present invention relates to a method for producing an aqueous mixture comprising isopropanol, n-butanol and ethanol, comprising a step in which an aqueous solution containing C5 and/or C6 sugars and acetate is strictly anaerobically fermented in the presence of a fermentation microorganism of the genus Clostridium and in which said aqueous solution has an acetate concentration of between 0.5 and 10 g/L and the mass ratio of acetate to the sum of the C5 and/or C6 sugars is between 0.005 and 0.35 g/g.
EP2975112	Eisenmann SE (DE)	**Fermenter, plant and method for generating biogas.** The present invention relates to a fermenter (2) for producing biogas by anaerobic fermentation organic substrate having at least one fermentation chamber (10) and having at least one feed device (3) which is formed for the insertion of substrate, in particular solid substrate in the fermentation chamber (10) is, at least one steam injector (7) for introducing steam (43) in the fermentation chamber (10) is provided, and wherein the feeding means (3) and the steam injector (7) are so mutually arranged that the registered substrate, in particular solid substrate, and the introduced steam (43) mix in the spatial vicinity of the feed device (3). One advantage of the invention is that the substrate, in particular solid substrate, thermal energy is supplied directly, where losses can be reduced. The invention also relates to a corresponding system (1) for producing biogas (54, 55) as well as a process for the production of biogas (54, 55).
WO2016007659	Coskata Inc (US)	**Processes for controlling the concentration of co-produced oxygenated organics in anaerobic fermentation broths for the bioconversion of syngas to product oxygenated organic compound.** Processes are disclosed for economically and effectively removing co-produced oxygenated organic compound from an anaerobic, aqueous fermentation broth used for the bioconversion of syngas to product oxygenated organic compound. The processes involve subjecting a portion of the aqueous fermentation broth after recovery of the product oxygenated organic compound to anaerobic organic bioconversion, and recycling the broth for use in the bioconversion of syngas.

DIGESTIÓN ANAERÓBICA

Nº Publicación	Solicitante (País)	Contenido técnico
US2016002582	Lin Chiu-Yue et al. (TW)	**High efficiency biometric device for producing hydrogen and methane.** A high efficiency biometric device for producing hydrogen and methane mainly uses a two-stage anaerobic fermentation device to transform an organic wastewater mixed solution into hydrogen, methane, carbon dioxide and a removal liquid, and then uses a solid liquid separation tank to filter and separate the removal liquid to reduce the sludge and obtain the treated water with a good property. The characteristic lies in that the two-stage anaerobic fermentation device comprises a first anaerobic fermentation tank, a neutralization tank, a feeding tank and a second anaerobic fermentation tank composed of anaerobic fermentation tanks disposed in parallel. The biometric device can increase the removal rate and the methane recovery, and also has a generator for combusting the recycled gas to advantageously have the low energy consumption. Thus, the organic waste contamination is decreased, and the green energy production pathway is also increased.

FERMENTACIÓN DE AZÚCARES

Nº Publicación	Solicitante (País)	Contenido técnico
US2016040152	Lallemand Hungary Liquidity Man Llc (HU)	**Chimeric polypeptides having xylose isomerase activity.** There is provided chimeric polypeptides capable of converting xylose to xylulose, engineered host cells that express the chimeric polypeptides, methods of creating chimeric polypeptides, and methods of fermenting cellulosic biomass to produce biofuels, including ethanol.
US2016040139	Shell Oil Co (US)	**Pentose fermentation by a recombinant microorganism.** The present invention provides methods and compositions suitable for use in the conversion of xylose to xylitol and xylulose, including nucleic acid constructs, recombinant fungal host cells, and related materials.
US2016040145	Novozymes Inc (US)	**Polypeptides having cellobiohydrolase activity and polynucleotides encoding same.** The present invention relates to isolated polypeptides having cellobiohydrolase activity and polynucleotides encoding the polypeptides. 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.
WO2016020101	Direvo Ind Biotechnology GmbH (DE)	**Dewatering methods in fermentation processes.** Dewatering whole stillage in a fermentation process, comprises: saccharifying a cellulosic material with an enzyme composition; fermenting the saccharified cellulosic material with a fermenting organism to produce a fermentation product, where the fermentation medium comprises a xylanase and a pectinase; distilling the fermentation product to form the whole stillage; and separating the whole stillage into thin stillage and wet cake, by which more liquid phase is transferred to the thin stillage.

FERMENTACIÓN DE AZÚCARES

Nº Publicación	Solicitante (País)	Contenido técnico
WO2016020468	Direvo Ind Biotechnology GmbH (DE)	**Improved batch time in fermentation processes.** Producing fermentation products involves converting starch containing material to fermentable sugars. The fermentable sugars are fermneted with a microorganism to obtain mash. The obtained material is mixed with an enzyme composition comprising a xylanase and a pectinase. The fermented product is separated from fermented mash.
WO2016012429	Dsm IP Assets BV (NL)	**Yeast cell with improved pentose transport.** A yeast cell comprising at least one functional pentose conversion pathway from pentose to fermentation product, is new. The yeast cell comprises one or more transporter construct. The transporter construct comprises DNA sequences chosen from (a) a transporter promoter, (b) an open reading frame (ORF) of a pentose transporter that replaces a hexose transporter connected to the transporter promoter in native yeast cell and, (c) a terminator. The transporter promoter is regulated by cellular regulation by SNF3- and/or RGT2-signaling. The yeast cell with improved pentose transport, is useful for improving alcohol fermentation for producing biofuel and chemicals.
ES2552603	Univ Cadiz et al. (ES)	**Procedimiento para la transformación de los cladodios de cactus Opuntia ficus-indica secos para producir bioetanol de segunda generación.** Procedimiento para la transformación de los cladodios de cactus Opuntia ficus-indica secos para producir bioetanol de segunda generación. La invención se basa en la aplicación de una serie de técnicas de pre-tratamiento mecánico, pre-tratamiento termoquímico ácido, sacarificación y fermentación alcohólica simultánea (SSF) y destilación, con el objetivo de extraer a la vez los azúcares fermentables de la matriz lignocelulósica de los cladodios de cactus y a continuación convertirlos a bioetanol de segunda generación. La invención permite la valorización de los cladodios de cactus Opuntia ficus-indica como un recurso de biomasa lignocelulósica no alimentaria, abundante y no explotada, para el desarrollo de biocombustibles de segunda generación como energía renovable y limpia, para afrontar el agotamiento notable de los recursos en energías fósiles.
US2016024531	Ecolab Usa Inc (US)	**Methods using peracids for controlling corn ethanol fermentation process infection and yield loss.** A process for the use of peracid compositions to eliminate and/or control the growth of undesirable bacteria, including contaminating bacteria, in the fermentation production of alcohol is disclosed. Beneficially, the peracid compositions and methods of use of the same do not interfere or inhibit the growth or replication of yeast and have low or no adverse environmental impact.
WO2016004482	Leaf Sciences Pty Ltd (AU)	**Methods for hydrolysing lignocellulosic material.** A method for producing a partially hydrolysed lignocellulosic material is provided including treating a lignocellulosic material with an acid and/or an alkali and then a polyol. Also provided are methods of producing a fermentable sugar or a fermentation product from said partially hydrolysed lignocellulosic material. A partially hydrolysed lignocellulosic material, a fermentable sugar and a fermentation product produced by such methods are also provided. Also provided is an apparatus for producing a partially hydrolysed lignocellulosic material, such as by the aforementioned method.
WO2016007803	Archer Daniels Midland Co (US)	**System and method for extracting ethanol from a fermentation broth.** The present invention is directed to a system and method for producing an organic compound using fermentation wherein multiple components of the system are recycled within the system. The system and method allow for extraction of a high concentration of the organic compound from the fermentation broth in a continuous system that allows recycling of the biomass, aqueous fermentation broth and extraction solvents. The system and method are particularly well adapted for producing and extracting etanol.

FERMENTACIÓN DE AZÚCARES		
Nº Publicación	Solicitante (País)	Contenido técnico
US2016017378	Kohn Richard Allen et al. (US)	**Process for producing lower alkyl alcohols from cellulosic biomass using microorganisms.** At least one isolated microorganism, which converts at least 10% by weight, and preferably 50% by weight, of cellulosic biomass to a lower alkyl alcohol by direct digestion, and which produces at least 4% by volume of the lower alkyl alcohol in an aqueous-based digestion medium.
WO2016007350	Danisco US Inc (US)	**Preconditioning of lignocellulosic biomass.** An improved process for converting lignocellulosic biomass materials into soluble sugars or fermentable products is provided, comprising a preconditioning step whereby the lignocellulosic biomass materials are preconditioned to have a pH of at least above about 5.5.
US2016002359	BP Corp North America Inc (US)	**Methods for detoxifying a lignocellulosic hydrolysate.** The present disclosure relates to methods for detoxifying a hydrolysate obtained from a lignocellulosic biomass and methods of producing ethanol from the detoxified hydrolysate. The present methods provide detoxified hydrolysates in which the quantity of compounds that are deleterious to fermenting microorganisms are substantially reduced relative to the starting hydrolysate and in which the amount of fermentable sugars loss is minimal.
WO2015193587	IFP Energies Nouvelles (FR)	**Variants of exoglucanases having improved activity and uses thereof.** The present invention relates to the expression and optimisation of enzymes involved in the breakdown of lignocellulosic biomass. The present invention specifically relates to variants of the exoglucanase 1 of Trichoderma reesei, as well as to the use of said variants with improved efficiency in methods for breaking down cellulose and for producing biofuel.

TECNOLOGÍAS QUÍMICAS
Patentes

Nº Publicación	Solicitante (País)	Contenido técnico
WO2016012116	Stamicarbon Bv DBA MT Innovation CT (NL)	**Method for treating algae.** In the present invention a method for treating algae is disclosed, which method comprises the steps of (a) providing an ionic liquid, which is a conjugate of an organic base with pKa at least 6 and an acid, (b) providing algae, (c) subjecting algae to cell lysis with the ionic liquid, whereby at least two phases are formed, including a hydrophobic phase and a hydrophilic phase, and (d) separating the hydrophobic phase containing lipids. The method provides an easy separation of water and product phase; achieves high oil extraction and high degree of transesterification.
US2016007549	Genifuel Corp (US)	**Controlled growth environments for algae cultivation.** A method for cultivating algae can include providing a body of water in a substantially enclosed system. The enclosed system can have a length of channel and a cover. The method can optionally include circulating the body of water through the enclosed system under positive pressure conditions. The positive pressure should prevent ingress of any external atmosphere or material. Further, the method can include cultivating the algae in the body of water at conditions which promote growth. Likewise, a system for cultivating algae can include a channel with a cover, water in the channel, and a pump to introduce positive pressure into the system.

Nº Publicación	Solicitante (País)	Contenido técnico
US2016002566	Commw Scient Ind Res Org et al (AU)	**Processes for producing industrial products from plant lipids.** The present invention relates to methods of producing industrial products from plant lipids, particularly from vegetative parts of plants. In particular, the present invention provides oil products such as biodiesel and synthetic diesel and processes for producing these, as well as plants having an increased level of one or more non-polar lipids such as triacylglycerols and an increased total non-polar lipid content. In one particular embodiment, the present invention relates to combinations of modifications in two or more of lipid handling enzymes, oil body proteins, decreased lipid catabolic enzymes and/or transcription factors regulating lipid biosynthesis to increase the level of one or more non-polar lipids and/or the total non-polar lipid content and/or mono-unsaturated fatty acid content in plants or any part thereof. In an embodiment, the present invention relates to a process for extracting lipids. In another embodiment, the lipid is converted to one or more hydrocarbon products in harvested plant vegetative parts to produce alkyl esters of the fatty acids which are suitable for use as a renewable biodiesel fuel.
WO2016018949	Fluor Tech Corp (US)	**Configurations and method of integrating a gas to liquids (GTL) plant in a refinery.** A crude oil processing plant that comprises a Fischer-Tropsch reactor is disclosed. The crude oil processing plant comprises a crude oil processing section and a hydrogen production section. The hydrogen production section is coupled to a hydrocracker in the crude oil processing section to deliver a high purity hydrogen stream. The Fischer-Tropsch reactor receives a syngas stream from the hydrogen production section and produces a hydrocarbon stream. When light crude oil is processed, the hydrocracker typically has excess capacities to upgrade the hydrocarbon stream from the Fischer-Tropsch reactor.
WO2016022090	Fuelina Technologies Llc (US)	**Hybrid fuel and method of making the same.** A hybrid fuel and methods of making the same. A process for making a hybrid fuel includes the steps of combining a biofuel emulsion blend and a liquid fuel product to form a hybrid fuel. Optionally, the hybrid fuel can be combined with water in a water-in-oil process and include oxygenate additives and additive packages. A hybrid fuel includes blends of biofuel emulsions and liquid fuel products, including light gas diesel. Optionally, the hybrid fuel can include water, oxygenate additives, and other additive packages.
WO2016000192	Shanghai Seavit Bid Tech Co Ltd (CN)	**Bioreactor with built-in light source and microalgae culture method.** A bioreactor with a built-in light source comprises a reaction vessel, a material feeding and discharging device, a light-emitting device, a nutrient distributing device and a gas distributor, wherein the reaction vessel is provided thereon with a cover plate and serves to accommodate a culture liquid for microalgae growth; the material feeding and discharging device is in sealing connection with the reaction vessel and provided thereon with a valve and a switch, and microalgae are pumped into or out of the reaction vessel through the material feeding and discharging device; the light-emitting device is used for generating a light source required for microalgae growth; the nutrient distributing device is used for supplying nutrients required for microalgae growth into the reaction vessel; and the gas distributor is used for supplying gases required for microalgae growth into the reaction vessel. The bioreactor with the built-in light source is not affected by weather changes, can realize stage-by-stage microalgae reproduction, has high controllability, and is beneficial to realization of stable and continuous industrialized production; and due to the serial and/or parallel connection system of the bioreactor, large-scale microalgae culture becomes more efficient.
US2016010125	Menon Renewable Products Inc (US)	**Methods and systems for the simultaneous production of lipids and aromatics from cellulose feedstocks.** A system and method are provided which utilize microbes to convert biomass feedstock into a fuel. In one aspect, a method of producing lipids includes receiving a feedstock including biomass, exposing the feedstock to microbes which are capable of converting the feedstock into lipids, and extracting produced lipids.

Nº Publicación	Solicitante (País)	Contenido técnico
WO2016004473	Commw Scient Ind Res Org (AU)	**Processes for producing industrial products from plant lipids.** The present invention relates to methods of producing industrial products from plant lipids, particularly from vegetative parts of plants. In particular, the present invention provides oil products such as biodiesel and synthetic diesel and processes for producing these, as well as plants having an increased level of one or more non- polar lipids such as triacylglycerols and an increased total non-polar lipid content. In one particular embodiment, the present invention relates to combinations of modifications in two or more of lipid handling enzymes, oil body proteins, decreased lipid catabolic enzymes and/or transcription factors regulating lipid biosynthesis to increase the level of one or more non-polar lipids and/or the total non-polar lipid content and/or mono-unsaturated fatty acid content in plants or any part thereof. In an embodiment, the present invention relates to a process for extracting lipids. In another embodiment, the lipid is converted to one or more hydrocarbon products in harvested plant vegetative parts to produce alkyl esters of the fatty acids which are suitable for use as a renewable biodiesel fuel.
US2016010000	Univ Wayne State (US)	**Green diesel production from hydrothermal catalytic decarboxylation on a supported Pd-Co catalyst.** Materials and methods for converting brown grease to useful diesel fuel are described. One material is a palladium catalyst on a silicon/carbon support. A method comprises flowing fresh hydrogen over a reaction of diluted brown grease on a palladium/carbon catalyst.
WO2015196243	Univ Southern Australia (AU)	**Biodiesel production.** There is provided a process for producing C1-C6 alkyl fatty acid esters or biodiesel. The process comprises providing a reactant fluid comprising a fatty acid, fatty acid glyceride or mixture thereof; providing a catalyst fluid comprising a C1-C6 alkyl alcohol and an acid or base catalyst; contacting the reactant fluid and the catalyst fluid in a thin film tube reactor comprising a tube having a longitudinal axis, wherein the angle of the longitudinal axis relative to the horizontal is between about 0 degrees and about 90 degrees; rotating the tube about the longitudinal axis under conditions to produce C1-C6 alkyl fatty acid esters; and recovering the C1-C6 alkyl fatty acid esters or biodiesel from the reactor.
WO2015188233	Southern Biofuel Technology PTY Ltd (AU)	**A process for the preparation of fatty acid alkyl esters.** The present invention broadly relates to a process for preparing fatty acid alkyl esters from fat-containing feedstocks using sulfonated fatty acid catalysts.
US2015361006	Syngas Technology LLC (US)	**Process for producing distillate fuels from syngas.** A process for producing distillate fuels, such as a diesel fuel, from a syngas feedstream having a relatively low H2/CO ratio of greater than 1 and equal to or less than 2.0. The syngas feedstream is preferably passed to a CO2 removal zone, then to at least one Fischer-Tropsch zone, wherein the resulting Fischer-Tropsch product stream is passed to a separation zone to obtain a hydrocarbon-containing fraction that is hydroconverted to result in a distillate boiling range stream.
WO2015181308	Novozymes AS (DK)	**Production of fatty acid alkyl esters with caustic treatment.** A method for producing fatty acid alkyl esters, comprising providing a system comprising an oil phase/hydrophobic phase an a hydrophilic phase, and reacting a fatty acid feedstock present in said oil phase/hydrophobic phase with alcohol in the presence of water and one or more lipolytic enzymes.

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