VT BIOMASA PATENTES
30
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PRODUCCIÓN DE BIOETANOL POR FERMENTACIÓN DE AZÚCARES: PUBLICACIONES

En el boletín del primer trimestre de 2016, se abordó el análisis de las publicaciones científicas a nivel mundial sobre la producción de bioetanol mediante fermentación de azúcares sin limitación de horizonte temporal. En esta introducción, estudiaremos la situación de la etapa comprendida entre los años 2016 y 2018.

En este periodo se publicaron más de 4500 artículos científicos de los cuales el 25% corresponde a instituciones europeas. En la Figura 1 se muestran los países líderes, tanto a nivel mundial como a nivel europeo. China y EE.UU. se sitúan a la cabeza de las publicaciones mundiales, con el 21% y 17% del total, respectivamente. Otros países destacados son La India y Brasil. En Europa este campo está liderado por España y Suecia, con el 13% y 11% de las publicaciones europeas, respectivamente. Ambos países se encuentran también entre los *top-ten* mundiales. Inglaterra, Alemania y Dinamarca, por ejemplo, son otros países europeos con actividad en este campo.

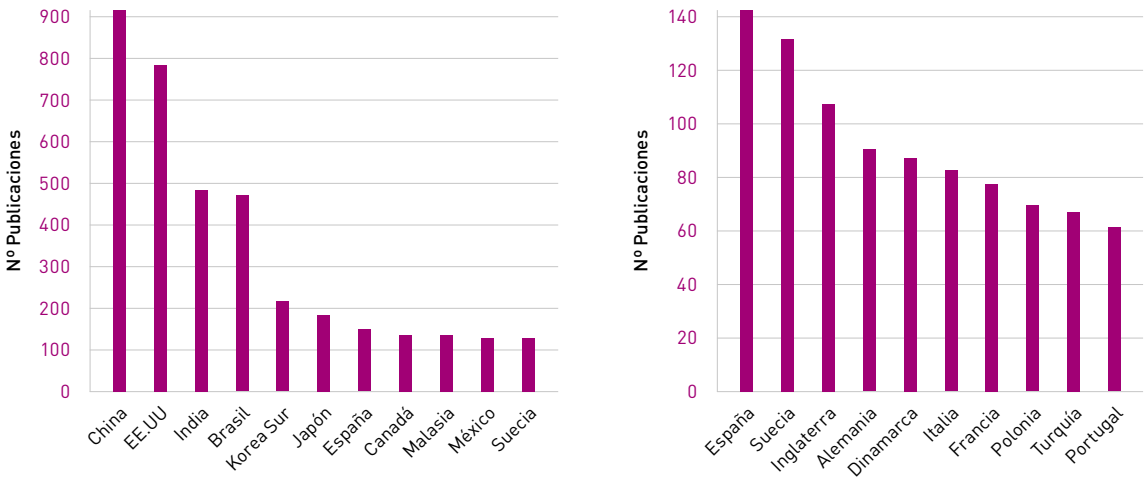


Figura 1. Países líderes en publicaciones en 2016-2018 (izda: nivel mundial, dcha: nivel europeo)

En la Figura 2 se recogen las instituciones líderes en Europa. Cabe resaltar la Universidad Técnica de Dinamarca (DTU) con el 4% de las publicaciones europeas, seguida de la Universidad Tecnológica de Chalmers, el Centro Nacional francés de Investigaciones Científicas (CNRS) y el Instituto Nacional para la Investigación Agronómica (INRA), todas ellas contribuyendo con, aproximadamente, el 3%. En España la institución más destacada es el CSIC, con el 18% de las publicaciones nacionales (Figura 3), de modo que ocho de sus centros cuentan con publicaciones en este ámbito (CIB, IRNAS, ICP, IATA, IBVF, IBMCP, IAS y CNB). Tras el CSIC se encuentra la Universidad de Jaén, con el 15% de los artículos.

Las líneas de investigación de las principales instituciones europeas recogidas a modo de palabras clave pueden visualizarse en la Tabla 1. Éstas se obtuvieron mediante la lectura detallada de los resúmenes de las publicaciones y se agruparon según la etapa del proceso a que corresponden o bien en una columna referida a los materiales de partida. Cabe destacar que son muy numerosos los artículos dirigidos a la etapa de pretratamiento para facilitar la sacarificación posterior, así como los relativos a la ingeniería metabólica de los microorganismos implicados en la etapa de fermentación. Los residuos lignocelulósicos son los principales materiales de partida.

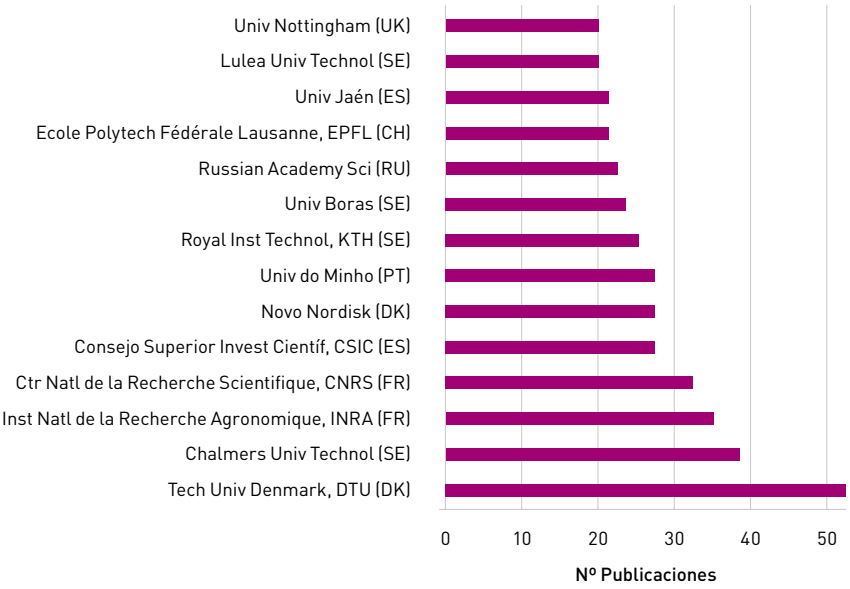
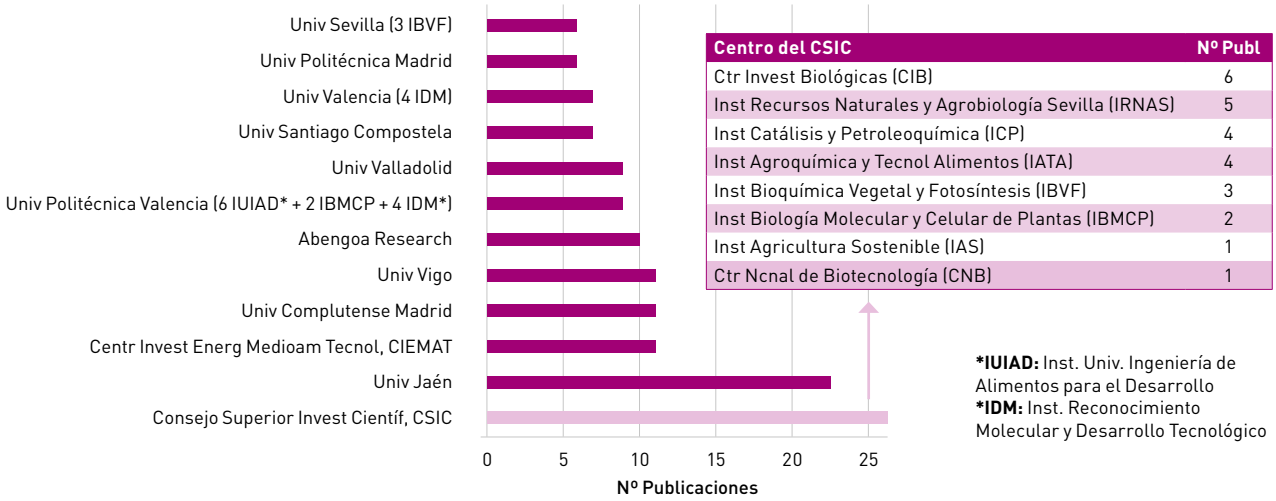


Figura 2. Instituciones líderes en Europa en 2016-2018



Centro del CSIC	Nº Publ
Ctr Invest Biológicas (CIB)	6
Inst Recursos Naturales y Agrobiología Sevilla (IRNAS)	5
Inst Catálisis y Petroleoquímica (ICP)	4
Inst Agroquímica y Tecnol Alimentos (IATA)	4
Inst Bioquímica Vegetal y Fotosíntesis (IBVF)	3
Inst Biología Molecular y Celular de Plantas (IBMCP)	2
Inst Agricultura Sostenible (IAS)	1
Ctr Ncnal de Biotecnología (CNB)	1

***IUIAD:** Inst. Univ. Ingeniería de Alimentos para el Desarrollo
***IDM:** Inst. Reconocimiento Molecular y Desarrollo Tecnológico

Figura 3. Instituciones líderes en España en 2016-2018 (detalle del CSIC)

Tabla 1. Líneas de investigación de las principales instituciones europeas

Institución	Palabras clave			
	Material de partida	Pretratamiento	Sacarificación	Fermentación
DTU (DK)	• Sugarcane bagasse • Rapeseed straw • Sugarcane molasses • Synthetic molasses • Corn stover • Brewer's spent grain • Brown seaweed • Loblolly pine • Wheat straw and spruce • Spent coffee grounds	• Hydrothermal pretreatment • Acid sulfite pretreatment • Dilute acid pretreatment • Phosphoric acid pretreatment • Hydrodynamic cavitation • Ionic liquid (IL), 1-ethyl-3-methylimidazolium acetate • SO2-catalyzed steam pretreatment • Enzymatic delignification. Glucuronoyl esterases • Combination of the L. buchneri ensiling and C. subvermispora	• Endoxylanases (Cellic (R) HTec2) • Aldehyde decarbonylase • Fungal enzymes • Enzyme recovery and recycling	• Saccharomyces cerevisiae. Metabolic engineering • Antifoam agents • Spathaspora passalidarum • Clostridium beijerinckii DSM-6422 • Lactobacilli and pediococci. Metabolism and genetic tools • Strain UFMG-CM-Y260 • Dekkera bruxellensis • Lactococcus lactis strain
Chalmers Univ Technol (SE)	• Birch, spruce • Wheat straw • Sugarcane • Softwood residues • Oil palm empty fruit bunch	• Delignification, organosolv treatment • Steam explosion • Hybrid organosolv- steam explosion method • Carbocation scavengers, concentrated acid hydrolysis • Lacasse systems as delignificators and detoxificators • Sodium hydroxide	• Lytic polysaccharide monooxygenases, catalases • High gravity multifeed simultaneous saccharification and co-fermentation	• Saccharomyces cerevisiae, weak organic acids stress, metabolism reprogramming • S.cerevisiae, antifoam agents impact • S.cerevisiae, fatty alcohols • Synthetic yeast cell factories
INRA (FR)	• Grass • Starch • Poplar • Lavender-and lavandin-distilled straws • Sugarcane molasses • Sugarcane bagasse • Macroalgal biomass • Phytoremediation-borne biomass • Miscanthus • Mutated cereal crop by-products • Breeding maize	• Bioextrusion • Twin-screw extrusion • Hot water and ionic liquid pretreatment • Mechano-enzymatic pretreatment • Organosolv pretreatment • Mechanical pretreatment/milling • Chemomechanical activation	• Sugar/inhibitor separation by nanofiltration • Lytic polysaccharide monooxygenases	• Pichia fermentans • Simultaneous detoxification and fermentation by activated-pyrochar addition • Fusarium oxysporum metabolic engineering • Candida shehatae
CNRS (FR)	• Starch • Macroalgal biomass • Hemp hurds • Phytoremediation-borne biomass • Carob waste • Sugarcane bagasse • Potato peel residues • Breeding maize	• Bioextrusion • Mid-infrared laser • Combined H2SO4 acid-catalyst and thermomechanical process • Organosolv pretreatment • Alkaline and biological pretreatment (Pycnoporus sanguineus) • Hydrothermal, alkaline and acid • Lacasse systems as delignificators and detoxificators	• Enzymatic hydrolysis optimization • Aspergillus niger and Trichoderma reesei culture • Trichoderma citrinoviride AUKAR0 • Lytic polysaccharide monooxygenases	• Saccharomyces cerevisiae, weak organic acids stress, metabolism reprogramming • Candida guilliermondii, Scheffersomyces stipitis, Kluyveromyces marxianus and S. cerevisiae • S. cerevisiae, submerged and solid-state fermentations • Bacillus amyloliquefaciens; S. cerevisiae; Zygosaccharomycesrouxii; very high gravity fermentation • Candida shehatae
CSIC (ES)	• Cereal straw • Solid residues from aromatic plant distillation: lavender-and lavandin-distilled straws • Chlorella vulgaris • Barley straw • Corn stover • Sugarcane straw • Microcrystalline cellulose	• Ionic liquid pretreatment • Laccase-based pretreatment • Addition of polyethylene glycol (PEG4000) • Alkaline pretreatment. With or without anthraquinone • Dilute acid pretreatment	• Saccharification method. IAS method • Hemicellulases using ruminal liquid • 1,4-beta-glucosidase • Talaromyces amestolkiae • Myceliophthora thermophile • Enzymatic cocktails • Endo-beta-1,4-xylanase Xyl2 from Fusarium oxysporum • Simultaneous saccharification and fermentation • Presaccharification, saccharification, and fermentation	• Cellobiose permease • S. cerevisiae-S. kudriavzevii hybrids

ANÁLISIS DE PATENTES

En el cuarto trimestre de 2018 se han identificado en la base de datos WPI (World Patent Index) 219 familias de patentes sobre tecnologías de conversión de la biomasa para la producción de energía, excluyéndose las invenciones con ámbito de protección exclusivamente asiático. Cabe señalar que el 67.1% de las familas se refiere a tecnologías termoquímicas. El 24.2% y el 15.1% hacen referencia a tecnologías bioquímicas y químicas, respectivamente. La tecnología de pirólisis/gasificación es la que cuenta con mayor número de resultados, 40.6% del total, seguida de la de combustión, con el 30.1% (Tabla 2).

Tabla 2. Número de familias de patentes clasificados por tecnologías

Tipos de tecnologías de conversión de la biomasa	Nº Familias
Tecnologías termoquímicas	147
Combustión directa	66
Gasificación/pirólisis	89
Tecnologías bioquímicas	53
Digestión anaeróbica	24
Fermentación de azúcares	31
Tecnologías químicas (transesterificación, Fischer-Tropsch, síntesis de metanol)	33
Nº TOTAL FAMILIAS DE PATENTES	**219**

Nota: Alguna invención puede incluirse en más de una tecnología

En la Tabla 3 se muestra la distribución de documentos por ámbitos de protección. En el primer lugar del ranking se encuentran las solicitudes internacionales (PCT), con 83 documentos; en segundo lugar se encuentra EE.UU, con 58. En tercer lugar y a gran distancia, se encuentra Indonesia, con 21 documentos. En España, en el periodo analizado, se publicaron 3. En la Tabla 4 se recogen los ámbitos de protección más representativos de las invenciones correspondientes a las distintas tecnologías.

Tabla 3. Ranking por países

	País	Nº Documentos
1	PCT	83
2	EE.UU. (US)	58
3	Indonesia (ID)	21
4	Alemania (DE)	16
	Rusia (RU)	16
5	Brasil (BR)	15
6	EP	10
	Polonia (PL)	10
7	Francia (FR)	5
8	Japón (JP)	4
	México (MX)	4

Tabla 4. Ámbitos de protección más solicitados por tecnologías

Tipos de Tecnología (Nº Documentos)			
	Termoquímicas	Bioquímicas	Químicas
PCT	57	21	12
EP	5	5	0
Alemania (DE)	11	4	1
Brasil (BR)	7	5	4
EE.UU. (US)	44	12	11
España (ES)	1	2	0
Francia (FR)	3	2	0
Indonesia (ID)	9	8	4
Japón (JP)	4	0	0
México (MX)	1	0	3
Polonia (PL)	9	1	0
Rusia (RU)	15	0	1

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
WO2018199738	Bin Halim Rasip Amin (MY)	**Reaction chamber for exothermic and endothermic reactions.** An apparatus for simultaneous exothermic and endothermic reactions comprising a generally cylindrical outer chamber having a top opening, a bottom discharge outlet, at least one gas outlet, and a throat near the bottom discharge outlet; a cylindrical inner chamber having perforations in its side and bottom, the inner chamber coaxially disposed within the outer chamber; and a plurality of interconnected pipes between the inner and outer chambers and having at least one gas inlet and at least one gas outlet, each pipe having a top charging inlet and a bottom discharge outlet, wherein, in use, the inner chamber is charged with carbonaceous materials for the exothermic reaction while the pipes are pre-loaded with carbon-coated pellets for the endothermic reaction, the pipes absorb heat released from the exothermic reaction in the inner chamber.
PL420711	Figiela Krzysztof Bio Mix (PL)	**Body of the central heating water boiler fired with coal, coke and wood, equipped with the separable attachment assembly intended for feeding its combustion chamber with pellets.** The body of the central heating boiler for coal, coke and wood, equipped with a detachable unit supplying pellets its combustion chamber is characterized in that in the filling hole of the body of this boiler a seated unit is mounted, consisting of a rectangular or square steel plate a carrier, fastened to its inner surface, around its girth circumference of the gasket, fixed inseparably in the through-hole of the support plate of the pipe stub and two elastic steel strip elements, releasably connected to this supporting plate , located on both sides of this pipe stub, where the stub is the lower member with removal, at the end of its upper surface located obliquely towards the lower side of the support plate at an angle? = 30 ° - 50 ° and a second member connected to the outer end at an angle ß = 40 ° - 70 ° with respect to the longitudinal axis of the lower member (12), while the two strip elements of the side view have the shape of an open isosceles trapezoid whose arms are offset outward from the threaded central part at an angle?_= 12 ° - 20 °.
US2018327683	Fuel Tech Inc (US)	**Controlling Slagging and/or Fouling in Furnaces Burning Biomass.** The description relates to controlling slagging and/or fouling in biomass burning furnaces. Combustion of such a biomass the fuel with air produces combustion gases containing sodium and/or potassium compositions, and the combustion gases are treated by contacting the combustion gases with kaolin and aluminum hydroxide. At least one of the kaolin and aluminum hydroxide can be introduced with the fuel, in a combustion chamber, with reburn fuel or with overfire air. For fuels also high in zinc and/or heavy metals, magnesium hydroxide is introduced into the combustion chamber or following heat exchangers.
WO2018193568	IHI Corp (JP)	**Fuel production device and fuel production method.** This fuel production device is provided with: a sorting unit that sorts a biomass raw material BG0 into a first biomass raw material BG1 having a predetermined size or greater, and a second biomass raw material BG2 that is smaller than the predetermined size; a heating furnace that heats the second biomass raw material BG2 to a predetermined temperature; and a contact unit that causes a volatile gas VG produced by the heating furnace to come into contact with the first biomass raw material (pellets PT).
DE202017004608	Kaiser Thomas (DE) et al.	**Fire place for burning the wood and similar combustibles.** Fireplace for burning wood and similar fuels, with a largely trough-shaped fire bowl, which is supported in the burning position of a lower part, characterized in that the fire bowl in the burning position at the upper end of the lower part, in particular in a rounded indentation rests and the fire bowl is removable, in particular to cover in overhead position the lower part.

Nº Publicación	Solicitante (País)	Contenido técnico
WO2018189846	Kowa Co (JP)	**Biomass thermoelectricity supply system.** In this biomass thermoelectricity supply system, a combustion device and a stirling engine are connected via a flue duct. The combustion device has: a main body cylinder with a double structure; a combustion cylinder connected to the distal end of the main body cylinder; and an air passage. The main body cylinder and combustion cylinder are inclined upward with respect to a horizontal plane, and the air passage supplies air in a predetermined ratio to each of the internal spaces of the main body cylinder and combustion cylinder. The stirling engine is of a free piston variety wherein an engine body and heat-receiving section are coaxially disposed. A rotational axis (α1) of the main body cylinder in the combustion device and a central axis (α2) of the stirling engine are disposed so as to be coaxial, and the heat-receiving section of the stirling engine directly faces the internal space of the combustion cylinder.
WO2018207559	Mitsubishi Hitachi Power Sys (JP)	**Solid fuel burner and combustion device.** This solid fuel burner is provided with: a venturi tube in which a channel for mixed fluid in a fuel nozzle narrows toward the center in the channel cross section; a fuel concentrator that imparts, to the mixed fluid, a velocity component away from the center of the fuel nozzle; and a channel separation member that separates the channel of the fuel nozzle into an internal side and an external side; wherein the channel separation member is shaped in such a way that the cross sectional area of an external channel is larger at the downstream end (S2) than at the upstream end (S1), and the upstream end (C1) of the fuel concentrator is located between the upstream end (V3) and the downstream end (V4) of an expanded portion of the venturi tube. This solid fuel burner prevents solid fuel particles, which is ground biomass fuel, from adhering and depositing inside the nozzle.
DE102017009381	Richarts & Schlitt GbR (DE)	**Method for the production of electrical energy from biomass.** Many different technical processes are currently used for the generation of electricity from biomass. These range from combustion and steam power and ORC plants to wood gasification and pyrolysis and combustion engines to fermentation with biogas production and electricity generation. All of these methods have z. T. same, z. T. also different features that adversely affect the application. In the steam power and ORC processes, the high investment costs and the low efficiencies complicate the application. In gasification and pyrolysis plants, the fuel gases usually harmful ingredients that require a complex conditioning. In addition, there are restrictions on the usable biomass. For fermentation only selected, z. T. high-quality, elaborately produced biomass species are used. Another disadvantage of wet fermentation is the extraction of biomass on agricultural land, where then no food can be obtained.The solution proposed here is based on an atmospherically operated adiabatic combustion chamber in which the biomass is burned at a high temperature level with a high excess of air. The hot gas thus obtained is converted into electricity in a hot gas turbine process. By a suitable choice of the design and operating parameters for the combustion and the power plant low investment and maintenance costs, high efficiencies and a high flexibility in terms of usable biomass, plant size and mode of operation, so that almost all previous disadvantages of biomass power generation can be avoided. The large power range, the broad spectrum of usable biomass and the low investment and maintenance costs allow a wide use of this technology. The flexible power generation operation is an ideal complement to the volatile wind and solar power and leads to a sustainable improvement in the supply of a fluctuating power load.In addition to pure power generation, the thermal process can also be combined with combined heat and power generation, which results in a significant increase in the efficiency of biomass utilization.
WO2018187716	Sundrop Fuels Inc (US)	**Integrated biofuels process configurations, employing a 2-stage bio-reforming reactor system, in which renewable carbon content of gasoline and diesel are optimized for value.** A bio-reforming reactor receives biomass to generate chemical grade syngas for a coupled downstream train of any of 1) a methanol-synthesis-reactor train, 2) a ethanol-to-gasoline reactor train, and 3) a high-temperature Fischer-Tropsch reactor train, that use this syngas derived from the biomass in the bio-reforming reactor. A renewable carbon content of the produced gasoline, jet fuel, and/or diesel derived from the coupled downstream trains of any of 1) the methanol-synthesis-reactor train, 2) the methanol-to-gasoline reactor train, or 3) the high-temperature Fischer-Tropsch reactor train are optimized for recovery of renewable carbon content to produce fuel products with 100% biogenic carbon content and/or fuel products with 50 - 100% biogenic carbon content. A carbon-dioxide gas feedback loop cooperates with a CO2 separation unit to supply a fraction of the CO2 gas that is removed from the chemical grade syngas produced from the reactor output of the BRR to supply extracted CO2 gas to the biomass feed system.

Nº Publicación	Solicitante (País)	Contenido técnico
EP3410010	Swiss Krono Tec AG (CH)	**Burner for combustion of fuel in the form of a wood disintegration product, in particular fine material.** The invention relates to a burner for burning combustible material in the form of a wood comminution product, in particular of fine material, with (a) a combustible feed for feeding the combustible material, (b) a screw conveyor for Conveying the combustible material, (c) a combustion region, wherein the screw conveyor for conveying the combustible material from the combustible material supply to the combustion region is arranged, (d) an air supply for supplying air to the combustion region and (e) a burner port for exhausting combustion gases from the combustion region.
EP3399252	TMA di Bogliari Srl (IT)	**An international combustion stove, in particular of an improved type.** The present invention relates to an internal combustion stove, particularly of the improved type, comprising a supporting structure which forms at least one combustion chamber of a combustible material for generating heat and at least one flue pipe for the external discharge of the combustion fumes produced by the combustion of the combustible material. The peculiarity of the invention is that it comprises an external combustion engine, which is associated to the supporting structure and the hot part of which is arranged along said flue pipe for the transfer of the heat of the combustion fumes to said hot part so as to convert at least part of the thermal energy possessed by the combustion fumes into mechanical energy by means of the operation of the external combustion engine.

PIRÓLISIS/GASIFICACIÓN

Nº Publicación	Solicitante (País)	Contenido técnico
US2018339903	Chaoyang Univ of Technology (TW)	**Low temperature carbonized material.** A low temperature carbonized material and the method for making the same, wherein polyester polymer material, biomass material, and phosphorous catalyst are used as raw materials for making low temperature carbonization material, the phosphorous catalyst catalyzes polyester polymer fracture to produce alcohol group and acid group, which forms a catalytic chain reaction to further catalyze the carbonization reaction of the biomass material. Besides, the catalytic chain reaction can also effectively lower the carbonization temperature, which allows the carbonization process to be completed within 30 minutes at a temperature of 170 to 250° C., and the obtained product can be more easily processed into desired shaped or pressed into films.
RU2668423	Federalnoe Gosudarstvennoe Avtonomnoe Obrazovatelnoe Uchrezhdenie Vysshego Obrazovaniya Rossijskij G (RU)	**Catalyst for hydrothermal liquefaction of plant biomass.** Invention relates to catalysts for hydrothermal liquefaction of plant biomass and can be used in the preparation of alternative liquid motor fuels. Catalyst is in fluorinated and/or sulphated form and comprises, wt. %: strontium oxide or titanium oxide or tin oxide, or a mixture thereof 1-50, a finely dispersed alumina-containing oxide carrier comprising phosphates or aluminum arsenates being the rest, up to 100. Technical result is the increased catalyst activity due to its greater specific surface area and the presence of an isomerizing component. High value of the specific surface area of the catalyst leads to an increased content of a gasoline component, and the isomerizing function of the catalyst used under the conditions of the hydrothermal liquefaction reaction leads to the increased octane number of the gasoline fraction contained in the resultant bio oil.
RU2672363	Kolesnikov Viktor Yurevich (RU)	**Waste pyrolysis plant.** Invention relates to the utilization of wastes containing substances of organic origin and can be used in chemical, petrochemical, metallurgical, municipal, agricultural and other branches of the economy. Waste pyrolysis plant comprising a waste bin connected in series, an extruder with a filter, an air intake, a fan, a container of contaminated water and a pump, throttle, reactor, electric heater, connected by means of an electrical network with an electric generator, which has a kinematic connection with the thermal engine, a combustion chamber in the outer wall of which there are burners of pyrolysis gas, generator gas, pyrolysis hydrocarbon liquid, the exhaust connection and the flue gas outlet that is connected to the flue gas filter, the reactor is equipped with a vent and vapor outlet of the pyrolysis products that is connected to the distillation column, which, in turn, is connected to the capacities of pyrolysis liquid, divided into fractions, and a pump, a pyrolysis water tank with a pump, and thanks to the compressor, with the gas holder, the gateway-dispenser of the discharge of pyrocarbon, connected to the gas generator and the pyrocarbon bunker, and the gas generator is connected to the hopper of the ash. Moreover, the reactor is made in the form of a cylinder with a supporting ring inside, bearing bearings with horizontal axes of rotation rest on the support ring and the reactor wall and rolling bearings with vertical axes of rotation fixed on a helical activator mounted rotatably with respect to the vertical axis of the reactor, the helical activator is provided with rigid and flexible working elements, as well as a pyrocarbon withdrawal screw, which is kinematically connected via a ratchet with a hydraulic actuator of the activator, the combustion chamber, whose upper wall is simultaneously the bottom of the reactor, is made in the form of a spiral channel, in the bottom of the reactor there is an electric heater and a gateway-dispenser for discharge of pyrocarbon, made in the form of a pipe coaxial with the auger for the removal of pyrocarbon, and passing through the combustion chamber.

Nº Publicación	Solicitante (País)	Contenido técnico
WO2018191066	Kuwait Institute for Scient Research et al. (KW)	**Pyrolysis reactor system for the conversion and analysis of organic solid waste.** The pyrolysis reactor system for the conversion and analysis of organic solid waste is a dual gas-liquid separation system, allowing for the conversion of organic solid waste, as well as analysis of the conversion products. A pyrolysis reactor is provided for converting the organic solid waste into a solid product and a gas-liquid product mixture through pyrolysis. A source of carrier gas is in fluid communication with the pyrolysis reactor for degrading the organic solid waste. A first gas-liquid separator is in fluid communication with the pyrolysis reactor and receives the gas-liquid product mixture therefrom, separating a portion of gas therefrom. A second gas-liquid separator is in fluid communication with the first gas-liquid separator and receives the gas-liquid product mixture therefrom and separates the remainder of the gas therefrom.
US2018291292	Llt Int Ireland Ltd (IE)	**Systems and methods for gasification of carbonaceous materials.** Carbonaceous-containing material including biomass, municipal solid waste, and/or coal and/or contaminated soil, and/or other carbonaceous materials may be gasified at low temperatures utilizing a reactor designed to generate shockwaves in a supersonic gaseous vortex. Preprocessed waste may be introduced into the reactor. A gas stream may be introduced substantially tangentially to an inner surface of a chamber of the reactor to generate a gaseous vortex rotating about a longitudinal axis within the chamber. The gas stream may be introduced using a nozzle that accelerates the gas stream to a supersonic velocity, and may impinge on an impactor positioned within the reactor chamber. A frequency of shockwaves emitted from the nozzle into the gaseous vortex may be controlled. The processed waste discharged from the reactor, which may include a gas component and at least a solid component, can be subjected to separation, and at least some of the gas component and at least one solid component (i.e., tars) may be fed back to the feeding device so that the solids from the processed waste condense on preprocessed waste contained in the feeding device and are reprocessed within the reactor. The gas component from the feeding device may be cleaned after the solids have been condensed out in the feeding device.
RU2666347	Lurij Valerij Grigorevich (RU)	**Installation of thermochemical processing of carbon-containing raw material (variants).** Group of inventions relates to the means of processing of carbon-containing raw materials and can be used in municipal economy, agriculture, wood processing, mining and petrochemical industries. In the method, the thermochemical processing plant of the carbonaceous feedstock contains a reactor for the pyrolysis of raw materials, a device for loading raw materials and technological additives to be pyrolyzed in the reactor, a gas generator for producing a gaseous heat carrier, equipped with feeders and ash unloading devices, connected to the reactor cavity by a gas outlet for supplying the reactor with the resulting heat carrier, whose outlet is connected to the cavity of the gas generator by the pipeline, as well as the purification device of the combined-cycle gases produced in the reactor, connected with its outlet to the gas outlet channel of the reactor, the steam-gas separation apparatus. Further, the installation is characterized in that it is equipped with a heat exchanger, an input connected with the outlet for the purification device of the combined-cycle gases produced in the gas-vapor reactor, while its is connected to the input of a steam-gas separation apparatus to the output of which a smoke exhauster is connected, through the heat exchanger the pipeline of air supply from the blower to the gas generator passes, the reactor is made in the form of a shell and the upper and lower shells covering the shell along its ends, the shell is installed obliquely and is equipped with a mechanism of its rotation with respect to the housings fixed from rotation, the upper housing has channels for introducing raw materials and technological additives into the reactor cavity, as well as coolant, and at the bottom - channels for the removal of gas-vapor and biochar, while the reactor is equipped with agitators placed in the reactor of raw materials, made in the form of plates, attached longitudinally to the inner surface of the shell. Disclosed is a version of method

Nº Publicación	Solicitante (País)	Contenido técnico
WO2018213474	Massachusetts Institute of Tech (US)	**Biomass conversion reactors and associated systems and methods.** Systems and methods associated with biomass decomposition are generally described. Certain embodiments are related to adjusting a flow rate of a fluid comprising oxygen into a reactor in which biomass is decomposed. The adjustment may be made, at least in part, based upon a measurement of a characteristic of the reactor and/or a characteristic of the biomass. Certain embodiments are related to cooling at least partially decomposed biomass. The biomass may be cooled by flowing a gas over an outlet conduit in which the biomass is cooled, and then directing the gas to a reactor after it has flowed over the outlet conduit. Certain embodiments are related to systems comprising a reactor and an outlet conduit configured such that greater than or equal to 75% of its axially projected cross-sectional area is occupied by a conveyor. Certain embodiments are related to systems comprising a reactor comprising an elongated compartment having a longitudinal axis arranged substantially vertically and an outlet conduit comprising a conveyor.
US10077454	National Tech & Engineering Solutions of Sandia Llc (US)	**Tandem biochemical and thermochemical conversion of algal biomass.** The present invention relates to methods and system configured to convert algal biomass into biofuels, alcohols, nutrients, biochar, chemical building block compounds, and/or other useful by-products. Exemplary methods include an integrated biochemical and thermochemical process that provides high purity biofuels and mixed alcohols, while minimizing waste and/or maximizing efficiency.
RU2667985	Obshchestvo s Ogranichennoj Otvetstvennostyu Novye Tekh (RU)	**Method of processing solid wastes.** Invention relates to the complex processing of solid waste and can be used for utilization of organic solid household and other solid waste. Complex contains a module for preliminary preparation and supply of solid waste, a turbo-vortex thermal reactor module, a synthesis gas purification module and a power converter module. Module for preliminary preparation and supply of solid waste is made up of a sorting complex, a drying crusher and a storage hopper, dried to a predetermined level of a solid waste mixture, which is arranged to subsequently feed the dried solid waste mixture to the turbo vortex thermal reactor module. Module for preliminary preparation and supply of solid waste is equipped with a device for tearing packages and a magnetic separator and is adapted to select non-flammable fractions. Turbo-vortex thermal reactor module is made up of a turbo-vortex thermal reactor and a combustion chamber proper. Turbo-vortex thermal reactor contains a coaxially located reaction chamber, the walls of which are made of heat-resistant material, an external thermal circuit chamber, the walls of which are also made of heat-resistant material, and an activator device for creating a vortex effect. Reaction chamber has a circular shape in the cut along the diametrical plane, and in the cross section there is an oval shape, the internal volume of the reaction chamber is 0.3-0.5 m. Activating device is coaxially located inside the reaction chamber. Chamber of the external thermal circuit is made in the form of a hollow jacket surrounding the reaction chamber, which is insulated from the external environment, wherein the outer thermal circuit chamber is installed in such a way that it does not completely cover the side portions of the surface of the reaction chamber. Chamber of the external heat circuit contains the heat supply pipes connected to the combustion chambers and the flue gas outlet. Reaction chamber on the side has feed pipes for the prepared raw material and a discharge port for the products of processing, the external thermal circuit chamber is connected to the drying-crushing machine of the module for preliminary preparation and supply of solid waste. Synthesis gas purification module is equipped with a flue gas cleaning unit, which contains a related afterburner, a cyclone and a scrubber.
US2018291274	Reed Frank (US)	**Pyrolysis systems.** Systems and methods are disclosed for pyrolysis of waste feed material. Some systems include a main retort and a secondary retort. Syngas is produced by pyrolysis in the main retort, and is then mixed with combustion air and ignited, in some cases to produce energy. Carbon char travels to the secondary retort and is exhausted from the system through an airlock.
US2018273867	River Basin Energy Inc (US)	**Post torrefaction biomass pelletization.** A process for torrefaction of biomass is provided in which biomass are passed into a fluidized bed or a non-fluidized bed reactor and heated to a predetermined temperature in an oxidizing environment. The dried biomass is then fed to a cooler where the temperature of the product is reduced to approximately 100 degrees Fahrenheit.
WO2018204411	Univ Nevada System Higher Education (US)	**Method for conversion of wet biomass to energy.** Disclosed herein is a method of converting waste, such as wet biomass, to a clean product and energy, including heat, and/or power. The disclosed method combines hydrothermal processing, also known as anaerobic hydrothermal carbonization, followed by wet air oxidation, adding sufficient oxygen to ensure rapid and complete destruction of organics.

TECNOLOGÍAS BIOQUÍMICAS
Patentes

DIGESTIÓN ANAERÓBICA		
Nº Publicación	Solicitante (País)	Contenido técnico
ES1216519	Biela Pamies Javier (ES)	**Planta de biogas.** 1. Planta de biogás (1), destinada a la producción de biogás a partir de desechos y de materia orgánica, tal como por ejemplo, subproductos de la industria agroalimentaria y/o residuos orgánicos de depuradoras de aguas residuales o de desechos urbanos orgánicos, a efectos de producción de biogás destinado a la producción de grafeno y/o de recubrimiento film de diamante, que comprende al menos un digestor (2) anaeróbico para la obtención del biogás a partir de dicha materia orgánica de desecho (3) caracterizada porque comprende además: - al menos, un reactor (4) de síntesis de grafeno (20), y - un suministro (5) de biogás como fuente de carbono para dicho reactor (4), procedente del digestor (2) en donde: - el reactor (4) comprende un horno de túnel (40) con una cámara de deposición (41) sobre un sustrato (42), al menos una fuente de gas (43) y un suministro (5) de biogás, siendo el gas proporcionado por la fuente (43) uno o más seleccionados entre hidrógeno y argón; - incluyendo además controladores de flujo (45) insertados en el suministro (5) de biogás y en la fuente de gas (43), con anterioridad a la entrada al reactor (4).
DE102017109733	Digitanalog Hard und Software GmbH (DE)	**Operating bioreactor system used for producing gas.** A method for the biological treatment of organic waste containing impurities consisting of non-biodegradable materials, comprising: • a first step of wet mechanical separation of the non-biodegradable materials present in the abovementioned organic waste in order to obtain a purified organic fraction, • a second step of dehydrating said purified organic fraction in order to obtain a dehydrated purified organic fraction and an effluent, • a third step of dry anaerobic biological treatment of the dehydrated organic fraction in order to obtain organic residues.
EP3398913	Hochschule für Angewandte Wss Hof (DE)	**Method and apparatus for increasing anaerobic decomposition by extending or adapting the preliminary acidification stage.** The present invention relates to a device for pre-acidification, a method for pre-acidification and the uses of the device and the method in the production of biogas or other anaerobic degradation products based on organic starting substrates or in the wastewater and sludge treatment.
EP3382030	Ignaciuk Henryk et al. (PL)	**Method and installation for biogas and hydrogen production, and fertilizers containing chelates obtained by this method.** The object of the invention is a process of biogas and hydrogen production. The method of biogas production in the methane fermentation process is characterized in that it is performed in three stages, wherein each stage runs in a separate chamber and the chambers are connected to each other and form a linear system. Moreover, in the first stage, the substrate is mixed, homogenized and therein the batch is formed, which is vaccinated with a bacterial inoculum. The bacterial inoculum is derived from the digestate obtained in the process and contains bacteria of hydrolysis, acidogenesis and acetaneogenesis and prior to vaccination is subjected to aerobic treatment. The duration of the first stage is between 90 and 180 minutes and the process is carried out in the inoculum and mixing chamber (1). Subsequently, in the second stage, the batch obtained in the first stage is fed with high dynamics to the acid-hydrogen fermentation chamber (2) and the process runs at pH 2.5 to 4.5 and overpressure between 100 and 200 mbar. Duration of the second stage is 6 to 24 hours. Afterwards, in the third stage, the batch obtained in the second stage is cyclically fed to a methane fermentation chamber (3) having a longitudinal shape through which the pulp is moved in one direction only from the beginning of the chamber (3) to its end, the process is conducted in the pH range 7.2 to 7.5 at the start of the chamber (3) to pH value 7.8 to 8.2 at the end of the chamber (3) and overpressure between 3 and 200 mbar, preferably between 100 and 200 Mbar, and the pulp flow time ranges from 20 to 25 days. The object of the invention is also a method for hydrogen production and installation for performing the process, as well as a production method of a fertilizer containing chelate minerals and a fertilizer itself obtained by this method.
EP3398913	Kanu Ifeyinwa Rita (GB)	**Anaerobic digester.** The present invention relates to a device for pre-acidification, a method for pre-acidification and the uses of the device and the method in the production of biogas or other anaerobic degradation products based on organic starting substrates or in the wastewater and sludge treatment.
EP3381575	Sas Adour Methanisation (FR)	**Biodegradable organic waste processing system and associated apparatus.** The subject of the invention is a method for treating organic waste which comprises the following steps: a step of mechanical deconditioning in order to produce a raw organic soup (26); a step of heating the raw organic soup (26) so as to producing a heated organic soup (50); - a phase separation step of the heated organic soup (50) by passing it through a screw press to obtain a final organic soup (64), and - A step of methanization of the final organic soup (64) to produce a biogas and a methanization digestate.

Nº Publicación	Solicitante (País)	Contenido técnico
WO2018206634	Suez Groupe (FR)	**Method for dry biological treatment of organic waste.** The invention relates to a method for operating a bioreactor system, comprising the steps of supplying substrate to an anaerobically operated first bioreactor, withdrawing digestate from the first bioreactor, separating undecomposed solids from the fermentation residues to obtain an aqueous first phase, supplying the second phase to an aerobically operated second bioreactor, feeding second biomass from the second bioreactor containing biomass-containing second phase to a settler, indirectly or immediately feeding settler water withdrawn from the settler to the second bioreactor and indirectly or immediately feeding it Sediment removed from the sedimentation basin to the first bioreactor, the introduction of oxygen into the second bioreactor being effected as a function of the redox value in the second bioreactor.
WO2018169986	Univ Colorado Regents (US)	**Sequestration of macronutrients from anaerobic wastewater treatment with iron- and steel-making slags.** Residuals, such as slag particles, from iron- and/or steel-making, and/or water- leached eluates thereof, are added directly to a conventional or multi-staged anaerobic digester or other sewage sludge or biosolid handling process. The slag particles or other residuals sorb, sequester, immobilize, or otherwise promote the removal of phosphorus and/or sulfur from wastewater, sludge, or biosolids being treated, such that the associated aqueous phase concentrations of phosphorus and sulfur are significantly reduced.
US2018282770	Univ Columbia (US)	**Methods and systems for converting volatile fatty acids to lipids.** Methods and systems for simultaneously enhancing the production of both methane and volatile fatty acids in an anaerobic digestion bioreactor are disclosed. In some embodiments, the methods include: providing a stream of organic feedstock; providing a plurality of anaerobic digester bioreactors, each of the plurality of anaerobic digester bioreactors connected in series; step-feeding predetermined percentages of the stream of organic feedstock to two or more of the plurality of anaerobic digester bioreactors; feeding effluent from each of the plurality of anaerobic digester bioreactors to a subsequent one of the plurality of anaerobic digester bioreactors; and anaerobically digesting at least one of the stream of organic feedstock and the effluent from each of the plurality of anaerobic digester bioreactors to develop a final effluent stream including methane and volatile fatty acids. The volatile fatty acids are then microbially converted to lipids in an aerobic bioreactor.
BR202017001543	Univ Federal Fluminense (BR)	**Methods and systems for converting volatile fatty acids to lipids.** The present invention discloses devices used for biogas production, to be used primarily for the treatment of organic waste through the biodigestion process. These devices comprise a set of upright bars that are intended to facilitate access and management thereof, with improved assembly and reallocation of biogas producing assemblies. specifically, the present invention pertains to the field of mechanical equipment and biodigesters.
WO2018183234	Veolia Water Solutions & Tech (FR)	**System and process for biologically treating wastewater and producing biogas that is converted to a supplemental carbon source used in the biological treatment of the wastewater.** The present invention relates to a biological treatment process where the influent to the biological treatment unit is deficient in carbon. Sludge is recovered from the wastewater stream and subjected to anaerobic digestion which produces biogas. The biogas is converted to syngas through an internal combustion engine reformer. Through a synthesis process, the syngas is converted to a carbon containing liquid stream that is utilized as a supplemental carbon source in the biological treatment process.

FERMENTACIÓN DE AZÚCARES

Nº Publicación	Solicitante (País)	Contenido técnico
WO2018185450	Abengoa Bioenergía Nuevas Tecnologías SA (ES)	**Method for preparing monosaccharide sugars from solid urban waste.** The invention generally relates to systems and methods for forming monosaccharides from a mixture of solid waste. An integrated process is provided for classifying a mixture of solid waste in order to generate a number of flows rich in recyclable materials, including one or more flows of plastic and a flow of bio-waste enriched with cellulosic compounds and comprising unfermentable components. The flow of bio-waste is pre-treated in pressurised conditions and at an increased temperature, and same is then brought into contact with a source of enzymes comprising cellulase, in which a certain portion of the unfermentable material present in the mixture of solid waste is removed from the process using wet classification methods during or after the enzymatic hydrolysis.

Nº Publicación	Solicitante (País)	Contenido técnico
WO2018185450	Cambridge Enterprise Ltd (GB)	**Butanol recovery method and apparatus.** The present invention relates to a method for producing a butanol-rich composition suitable for use as a fuel, the method comprising: (i) fermenting a feedstock in a fermenter to produce an aqueous fermentation broth comprising butanol; (ii) adding an organic solvent to the broth and performing a liquid/liquid extraction to recover a mixture of the butanol in said organic solvent; (iii) vaporising the organic solvent from the mixture to provide a butanol-rich composition; wherein the organic solvent comprises one or more alkanes and/or alkenes having a boiling point of less than 55°C at atmospheric pressure.
WO2018183498	Domtar Paper Company LLC (US)	**Propagation of yeast for removal of sugars from spent sulfite liquor.** Methods for production of yeast biomass and removal of sugar from red liquor by propagating yeast on sugars in red liquor byproduct of the sulfite pulping process are disclosed. Yeast are propagated using the sugars in red liquor as a carbon source, thereby consuming the sugars and producing a composition of lignosulfonates that has a reduced sugar content. Disclosed methods allow for separation of sugars from lignosulfonates in red liquor without costly ultrafiltration or nanofiltration processes and also produce valuable yeast biomass.
WO2018197051	Fiberight Ltd (GB)	**Hydrolysis.** The present invention relates generally to the field of industrial biotechnology and particularly to an improved hydrolysis method for increasing sugar production from a high solids concentration of lignocellulosic biomass, especially one derived from Municipal Solid Waste (MSW) by enzymatic hydrolysis of a lignocellulosic biomass to obtain a slurry, wherein the hydrolysis comprises aliquot additions of enzyme and lignocellulosic biomass; and removal of sugars from the slurry and washing of the residual lignocellulosic biomass.
US2018346835	Int Paper Co (US)	**Clean sugar and lignin from non-chemically pretreated lignocellulosic biomass.** Methods of producing clean (e.g., low sulfur and metal ion content, and free of fermentation inhibitors) sugar and lignin-rich streams, and downstream conversion products, from lignocellulosic biomass, may include obtaining non-chemically pretreated, milled lignocellulosic biomass, reacting the milled lignocellulosic biomass with an enzymatic agent to produce a slurry that includes converted monomeric lignocellulosic sugars and lignin-rich residuals, and separating the slurry into a sugar stream that includes the converted monomeric lignocellulosic sugars and a lignin-rich stream that includes the lignin-rich residuals. The sugar stream, not including water, includes at least 75% monomeric lignocellulosic sugar, less than 0.20% sulfur, and less than 3.0% metal ion content, and the lignin-rich stream includes at least 35% lignin and less than 0.50% sulfur. Some methods include producing fermentation products such as alcohols and/or organic acids from the sugar stream, and/or use of the lignin residuals in fuels.
WO2018191176	Locus IP Company LLC (US)	**Efficient production of bioethanol in mobile reactors.** The subject invention provides systems and methods for producing bioethanol. More specifically, the present invention includes biological reactors, equipment, and materials for converting carbohydrate sources into alcohol products for use as biofuels and/or sources of electricity in, for example, remote areas.
BR102017001865	Univ Federal de Alagoas (BR)	**Process for producing bioethanol by solid fermentation.** The present invention proposes the processing of the crown of ananas comosus (L. merril) in order to minimize the generation of residues from this fruit. The proposal consists of carrying out activities of high added value, such as the production of solid and liquid fuels. Through low-cost methodology in the pre-treatment stage, second-generation ethanol as well as briquette can be obtained, contributing to the diversification of the Brazilian energy matrix and still reducing environmental pollution. In this invention, there was obtained after 72 hours of enzymatic hydrolysis, 58.44 and 21.91 g -1 of glucose and xylose, respectively. ethanol was obtained after 4 hours of fermentation, 31.10 g.l. of second generation. The briquettes obtained through the solid residue of the hydrolysis had a calorific value of 18.41 kj.kg-1, 11.64% of humidity and 5.94% of ashes.
BR102016030305	Univ Federal do Parana (BR)	**Process for producing bioethanol by solid fermentation.** The present invention relates to a process for the production of bioethanol by solid fermentation of agro-industrial raw materials using fungi. the process is characterized by five steps: thermal substrate pretreatment, inoculation, aerobic phase cultivation, microaerophilic phase culture, and product-ethanol removal. this process advantageously utilizes the ability of some fungi to produce ethanol during fermentation in a solid state with suitable formulation of the culture medium and exploits the difference in volatility of the ethanol, water and gases involved in the fermentation for ethanol separation from gaseous effluent from the reactor.

Nº Publicación	Solicitante (País)	Contenido técnico
WO2018194092	Univ Tokyo Science Found (JP)	**Exo-ß-1,2-glucanase and method for producing sophorose.** Provided is exo-ß-1,2-glucanase which is one member selected from among: exo-ß-1,2-glucanase acting on linear ß-1,2-glucan to form sophorose; (a) a protein comprising the amino acid sequence of SEQ ID NO: 1; (b) a protein comprising an amino acid sequence derived from the amino acid sequence of SEQ ID NO: 1 by deletion of the amino acid residues at the 1-18 positions; (c) a protein comprising an amino acid sequence derived from the amino acid sequence of (a) or (b) by substitution, deletion or addition of one to several amino acid residues and having exo-ß-1,2-glucanase activity; and (d) a protein showing a 90% or more sequence identity to the amino acid sequence of (a) or (b) and having exo-ß-1,2-glucanase activity. Also provided is a method for producing sophorose with the use of exo-ß-1,2-glucanase.
US2018327704	Xyleco Inc (US)	**Dispersing feedstocks and processing materials.** 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 dispersed in a liquid medium and then saccharified.

TECNOLOGÍAS QUÍMICAS
Patentes

Nº Publicación	Solicitante (País)	Contenido técnico
WO2018191653	Aemetis Inc et al. (US)	**Methods and compositions for biodiesel production.** Method for producing a biodiesel having an ester content of at least 95%, involves (a) adding a feedstock mixture comprising feedstock having free fatty acids (FFA) and triglyceride, and enzyme into a reactor, (b) adding methanol into the reactor, (c) adding an additional methanol into the reactor, (d) testing the feedstock mixture for ester, FFA and triglycerides, (e) adding sodium hydroxide solution when the FFA concentration of the feedstock mixture is 2-4 weight/volume%, (f) transferring the feedstock mixture into an intermediate tank when the FFA concentration of the feedstock mixture is 0.2-2.5 weight/volume%, (g) transferring the feedstock mixture into a bioreactor, (h) transferring the feedstock mixture to a first settlement tank, where a light phase comprising biodiesel, methanol and moisture is separated from a heavy phase containing soap, glycerol, and water, (i) centrifuging the light phase, and (j) reducing the concentration of methanol and moisture in light phase.
MX2016016971	Alianza para el Desarrollo Tecnologico SA (MX)	**Method for producing biodiesel from oil extracted from grouper fish viscera, catalyzed by a commercial lipase and assisted by ultrasound.** The present disclosure is related to a novel method for producing biodiesel using oils extracted from fish viscera, as the raw material (commonly known as grouper). Methodologies related to the use of enzymatic catalysis have been found for the biodiesel production or, methodologies in which the use of chemical catalysis assisted by ultrasound technology is exposed. In the present application, the necessary conditions to carry out a transesterification of fish viscera oil is set forth using a commercial lipase as catalytic medium (such as N 435) solvent free, assisted by ultrasound technology with the application of low frequency of high intensity (40kHz) at atmospheric pressure, previously heating the reactive mixture at 45°C, obtaining a yield of up to 98%.
US2018327758	Corbion Biotech Inc (US)	**Recombinant microalgae including keto-acyl acp synthase.** Methods and compositions for the production of food compositions, oils, fuels, oleochemicals, and other compounds in recombinant microorganisms are provided, including oil-bearing microorganisms and methods of low cost cultivation of such microorganisms. Microalgal cells containing exogenous genes encoding, for example, a lipase, a sucrose transporter, a sucrose invertase, a fructokinase, a polysaccharide-degrading enzyme, a keto acyl-ACP synthase enzyme, a fatty acyl-ACP thioesterase, a fatty acyl-CoA/aldehyde reductase, a fatty acyl-CoA reductase, a fatty aldehyde reductase, a fatty aldehyde decarbonylase, and/or an acyl carrier protein are useful in manufacturing food compositions, and transportation fuels such as renewable diesel, biodiesel, and renewable jet fuel, as well as oleochemicals such as functional fluids, surfactants, soaps and lubricants.
WO2018178130	Eni SPA (IT)	**Integrated process for the production of fuel components from glycerin.** The present invention relates to a versatile process for the simultaneous production of biocomponents for fuels such as gasoline and diesel, essentially starting from glycerol of biological origin only, comprising a multiplicity of interconnected steps related to hydrogenation, condensation and etherification.
US2018265446	Hong Kong Polytechnic Univ Shenzhen Research Institute (CN)	**Catalyst and method for biodiesel production from unrefined low-grade oil and crude aqueous alcohols.** A catalyst for catalyzing transesterification of esters or esterification of fatty acids, the catalyst is selected from the group consisting of manganese (II) glycerolate, cobalt (II) glycerolate, iron (II) glycerolate, and any combination thereof. A method for transesterification reaction, includes: a) providing a catalyst, wherein the catalyst is selected from the group consisting of manganese (II) glycerolate, cobalt (II) glycerolate, iron (II) glycerolate, and any combination thereof; b) adding the catalyst, one or more alcohols, and a composition comprising one or more esters to a reactor to form a reaction mixture; and c) stirring while heating the reaction mixture for reaction to form transesterification products.
WO2018212049	Idemitsu Kosan Co (JP)	**Method for removing monoglyceride from biodiesel.** Provided is a method for removing a monoglyceride, which is an impurity, from a fatty acid alkyl ester composition such as a biodiesel. A monoglyceride, which is an impurity, can be crystallized and removed by stirring a fatty acid alkyl ester composition containing the monoglyceride under specific conditions.

Nº Publicación	Solicitante (País)	Contenido técnico
US2018291279	Sundrop Fuels Inc (US)	**Flexible Options for Utilizing Naphtha from a Low Temperature Fischer-Tropsch Process in a Plant Converting Biomass to Syncrude or Transportation Fuels.** A bio-reforming reactor receives biomass to generate chemical grade syngas for a coupled downstream train of a low-temperature Fischer-Tropsch reactor train that uses this syngas derived from the biomass in the bio-reforming reactor. A renewable carbon content of the produced gasoline, jet fuel, and/or diesel derived from the coupled downstream train the low-temperature Fischer-Tropsch reactor train are optimized for recovery of renewable carbon content to produce fuel products with 100% biogenic carbon content and/or fuel products with 50-100% biogenic carbon content. The low-temperature Fischer-Tropsch reactor train produces syncrude, transportation fuels such as bio-gasoline or bio-diesel, or a combination thereof.
WO2018173011	Univ do Porto (PT)	**Heterogeneous catalysts, preparation process and application thereof in fatty acid alkyl esters production process.** The present patent application describes heterogeneous catalysts, also referred to as solid acid catalysts, consisting of mixtures of aluminium/silicon (A1/Si) oxides and/or aluminosilicates having different A1/Si ratios including those of the (Na, Ca) 0.33 (A1, Mg) 2 (Si4O10) (OH) 2.nE20, A12Si2O5 (OH) 4.nH2O, Na0.33 (A1, Mg) 2 (Si4O10) (OH) 2.nH2O type, but not limited thereto, and sulfonic acid groups, as well as their preparation methods. The present technology further includes the application of the said heterogeneous catalysts in the processes for the production of fatty acid alkyl esters FAAE by esterification of free fatty acids (FFA) and transesterification of triacylglycerols (TG).
BR102016030267	Univ Federal o Ceara et al. (BR)	**Synthesizing basic biolubricant oil involves performing translational reaction of biodiesel of Orbignya speciosa, using babassu coconut as raw material.** The present invention describes the process of preparing a biolubricant base oil synthesized from the in situ biodiesel transesterification reaction of babassu coconut with trimethylolpropane and sodium methoxide as the catalyst. the subject oil of this invention presents a promising potential as it results in a good, renewable and biodegradable product which can reduce or even eliminate the major environmental impacts caused by the lubricating oils of fossil origin. therefore, the present invention has a significant relevance since it represents a strategy for the development of new bioproducts through the application of raw materials from renewable and biodegradable sources.
BR102016030895	Univ Federal Dos Vales do Jequitinhonha e Mucuri (BR)	**Producing biodiesel involves performing trans esterification reaction of heterocyclic compounds containing niobium and oxides of calcinated alkaline cations to produce catalysts from ore source and mixing with other geo-materials.** The present invention relates to a process for the production of biodiesel (monoesters of fatty acids with alcohols of short molecular chains) by transesterification reaction with heterogeneous catalysts based on natural nióbia and earth alkali cation oxide calcined with the present invention falls within the scope of transesterification processes of triacylglycerides of bio-oils or biofats, with short chain alkyl alcohol, for example methanol or ethanol, for the production of monoesters of fatty acids (biodiesel). the invention comprises a novel process for producing mono-alkyl esters of fatty acids for use as biodiesel, produced from the transesterification reaction of triglycerides from bio-oils or biofats, using a novel catalyst composed of ores of calcified nióbia or calcium oxide. the great advantage of using the new catalyst is, in addition to the ease of producing it and the use of relatively small amounts of the solid catalyst, in relation to the amount of the bio-oil or the biofuel processed, the geomateries are present in abundance in the soil Brazilian. the solid catalyst can still be suitably recovered at the end of the process, to be reused in subsequent cycles of the transesterification reaction.
US10113130	US Navy (US)	**High density/high cetane renewable fuel blends.** High density renewable diesel and jet fuels have been generated by blending multicyclic sesquiterpanes with a synthetic paraffinic kerosene (5-methylundecane). The sesquiterpanes impart high density and volumetric net heat of combustion to the blends, while inclusion of the modestly branched paraffin decreases the viscosity and increases the cetane number of the blends. A surrogate diesel fuel including 65% sesquiterpanes and 35% 5-methylundecane had a cetane number of 45.7, a density of 0.853 g/ml, and a volumetric net heat of combustion (NHOC) of 133,593 btu/gal. By increasing the amount of paraffin to 60% by volume, a jet fuel surrogate was prepared with a cetane number of 57.0, a density of 0.806 g/ml, a –20° C. viscosity of 7.9 est, and a NHOC of 124,257 btu/gal. The results show that full-performance and even ultra-performance fuels can be generated by combining bio-derived sesquiterpanes and paraffins.

Nº Publicación	Solicitante (País)	Contenido técnico
WO2018214997	3 102 735843 SRL (CR)	**Organic method for enhancing conventional diesel and biodiesel with emissions reduction.** This invention is completely new in the technical field, involving the use of an enhancer and emissions reducer based exclusively on recognised organic sources, the present product being 99% organic and zero-pollutant and producing effects of zero pollution, enhancement, zero corrosion and zero acidity in fossil-based fuel oils, which implies an improvement in the use and production of same, and applying physical and chemical principles, resulting in the enhancer and emissions reducer for diesel and biodiesel. The purpose of the invention is to achieve the best use of the energy resources of conventional diesel and biodiesel, basing these results on the application of organic enhancers, enabling carbon emissions to be reduced by 70%. This is a physiochemical process that applies organic enhancers to conventional diesel and to biodiesel, resulting in greater power and less environmental pollution.

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VT BIOMASA PATENTES

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