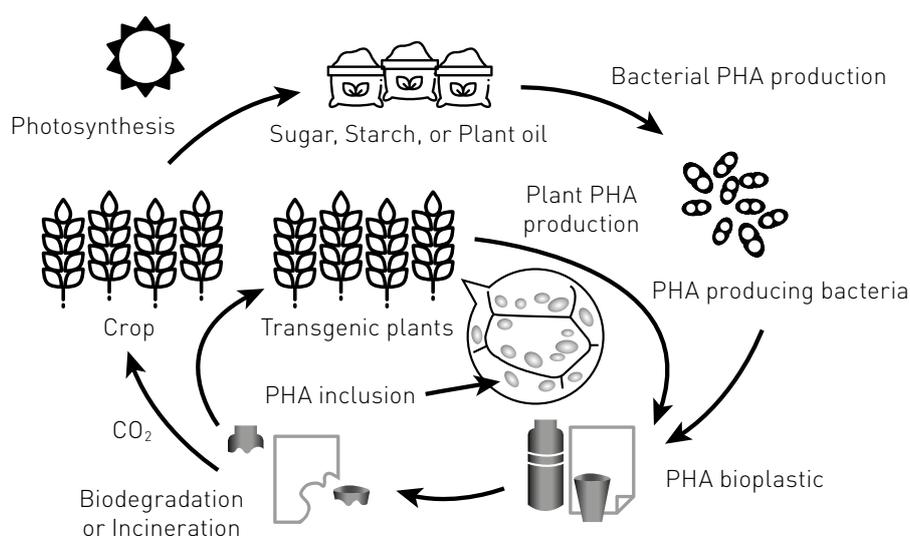


## BIOPLÁSTICOS: ANÁLISIS DE PATENTES

Los polihidroxicanoatos (PHAs) son biopolímeros naturales del tipo poliésteres lineales sintetizados intracelularmente por una amplia diversidad de microorganismos. Son productos biocompatibles y biodegradables sustitutos alternativos de los polímeros plásticos derivados del petróleo (sintéticos y no biodegradables) como el polipropileno, poliestireno y polietileno. Entre los distintos PHAs cabe destacar el polihidroxibutirato (P3HB), el poli-3-hidroxivalerato (P3HV) y el poli-3-hidroxihexanoato (P3HHx).

La composición monomérica de los PHAs es muy variada y depende de la ruta metabólica por la que se sintetizan y de la fuente de carbono externa utilizada como materia prima. Esencialmente, provienen de tres rutas metabólicas principales: la degradación de azúcares mediante la obtención de acetil CoA, la degradación de ácidos grasos ( $\beta$ -oxidación) y/o la biosíntesis de ácidos grasos. Los PHAs se sintetizan en forma de gránulos por la acción de las PHA sintetasas y bajo ciertas condiciones de estrés, cuando en el medio hay abundancia de carbono y déficit de elementos como nitrógeno, fósforo y magnesio. Su degradación se produce mediante hidrólisis por medio de depolimerasas en distintos ambientes incluyendo aerobios, anaerobios, salinos, marinos y otros.

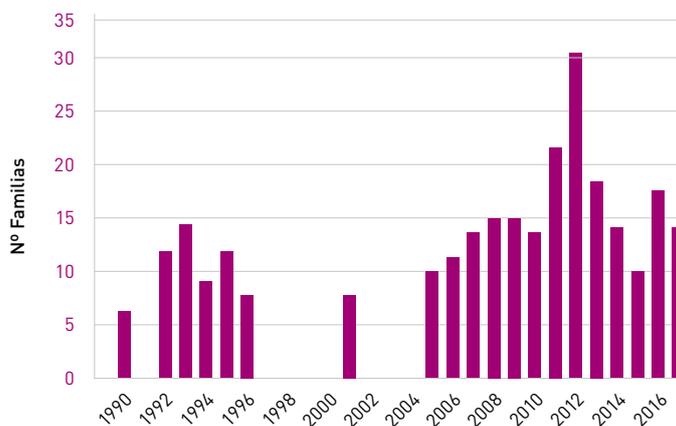
Se han reportado cerca de 150 monómeros diferentes formadores de PHAs, derivándose de su diversidad sus múltiples propiedades y aplicaciones. Se emplean en empaquetamiento/envoltura de elementos de aseo y alimentos. Asimismo, al ser biocompatibles, se utilizan en biomedicina y biofarmacia en bioapósitos, injertos, hilo para sutura, sustitutos pericárdicos y sistemas de liberación de medicamentos, entre otros.



**Figura 1.** Ciclo de producción/degradación de los PHAs (Fuente: C.T. Nomura, Appl Microbiol Biotechnol 73: 969-979, 2007)

Dado el interés que está suscitando en los últimos años el desarrollo y la utilización de estos bioproductos, en este estudio se va a realizar un breve análisis para explorar la situación actual de las patentes de empresas europeas en el campo de los polihidroxicanoatos del tipo P3HB, P3HV y P3HHx. Para ello, se hará uso de la herramienta Global Patent Index con acceso a las bases de datos de la EPO (Oficina Europea de Patentes), diseñándose las ecuaciones de búsqueda adecuadas.

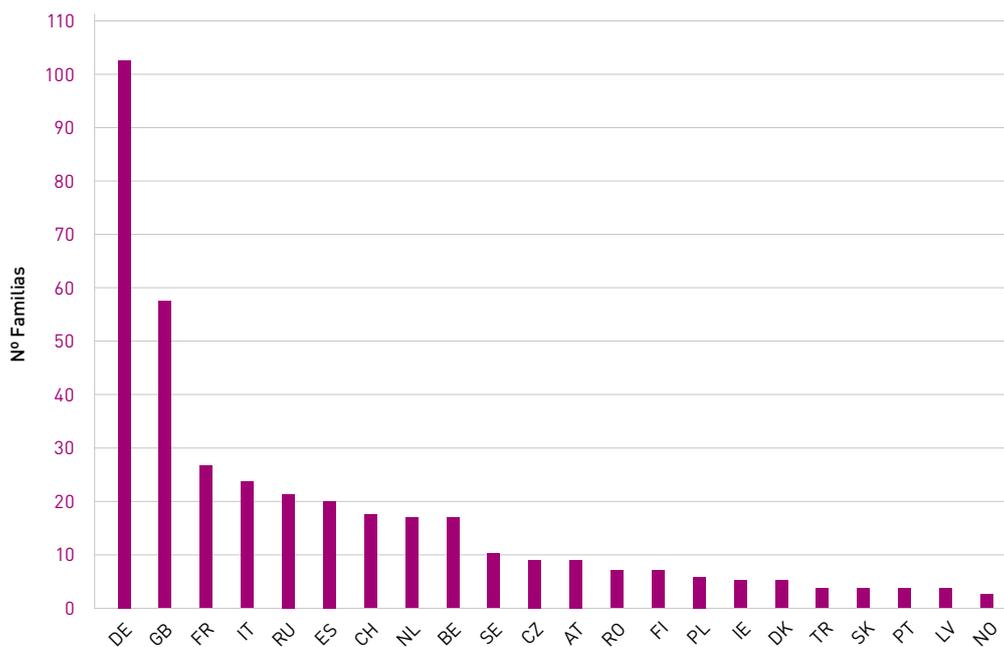
En este estudio, se identificaron 335 familias de patente (invenciones) pertenecientes a solicitantes europeos. El 61% se registraron por vez primera a partir del año 2005 (Figura 2).



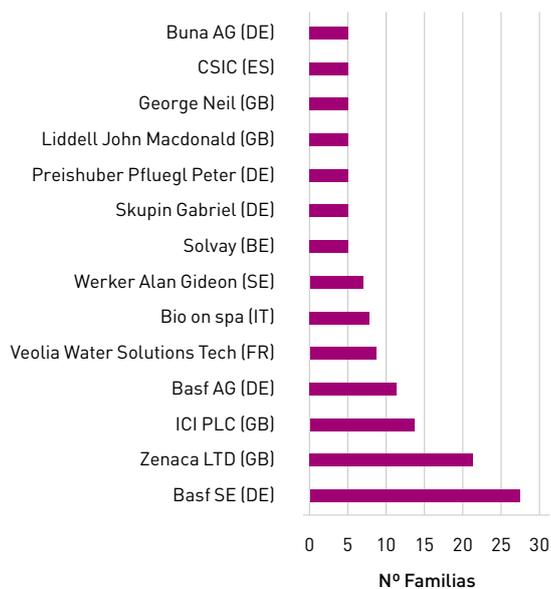
**Figura 2.** Distribución del número de familias por año de prioridad

En la Figura 3 se recoge el número de familias en función de la nacionalidad de los solicitantes europeos. Puede observarse que los más prolíficos son los alemanes, con el 31% de las familias, seguidos de los ingleses, a los que corresponde el 17%. Otras empresas con patentes en este ámbito proceden de Francia, Italia, Rusia, España, etc.

Los solicitantes más representativos se ilustran en la Figura 4. La empresa alemana Basf SE y la británica Zeneca ocupan las primeras posiciones, con el 8.4% y 6.6% de las familias, respectivamente. Tras ellos se sitúan las empresas Imperial Chemical Industries (ICI), Basf AG y Veolia Water Solutions.

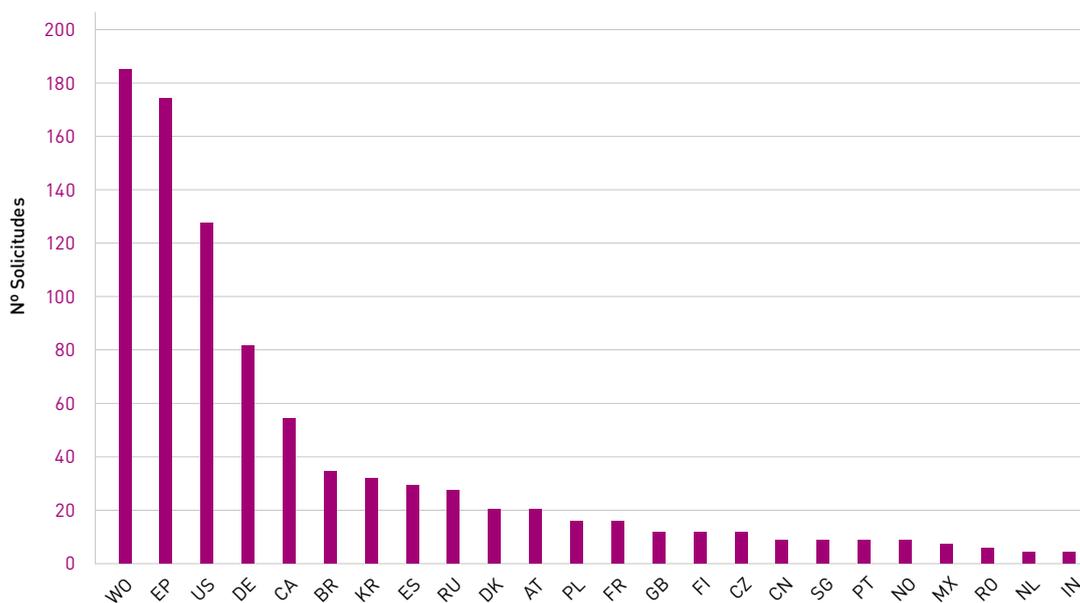


**Figura 3.** Distribución del número de familias por país europeo de origen del solicitante



**Figura 4.** Principales solicitantes europeos (≥5 familias)

Como se muestra en la Figura 5, los solicitantes europeos tienden a utilizar las vías internacional (WO) y europea (EP) para proteger sus invenciones. Así, el 19% y 18% de las solicitudes, respectivamente, siguen estas rutas de protección. Los países donde se protegen más invenciones europeas son, además, EE.UU., Alemania y Canadá.



**Figura 5.** Distribución del número de solicitudes por oficina de publicación (≥5 solicitudes)

En la Tabla 1 se recogen las áreas de investigación de las principales empresas solicitantes identificadas a través de los códigos IPC (International Patent Classification) de sus patentes. En ella se recogen las empresas implicadas en los procesos de producción, extracción y purificación de los PHAs, así como aquéllas que dirigen sus investigaciones a los distintos tipos de microorganismos productores y a las técnicas de ingeniería genética empleadas para aumentar el rendimiento en la síntesis y acumulación de PHAs.

**Tabla 1.** Principales áreas de investigación de las principales empresas solicitantes europeas (>5 familias)

<b>Códigos ICP: Significado</b>	<b>Solicitantes</b>
<b>Compuestos macromoleculares orgánicos</b>	
<b>A61K8/85:</b> Cosméticos o preparaciones similares para el aseo que contienen compuestos orgánicos macromoleculares. Poliésteres	BIO ON SPA (IT)
<b>B32B27/36:</b> Productos estratificados compuestos esencialmente de resina sintética con poliésteres	BASF SE (DE)
<b>C07C51/09:</b> Preparación de ácidos carboxílicos o sus sales, haluros o anhídridos a partir de lactonas o de ésteres de ácidos carboxílicos	SOLVAY (BE)
<b>C07C51/48:</b> Separación, purificación y estabilización de ácidos carboxílicos o sus sales, haluros o anhídridos por tratamiento líquido-líquido	BUNA AG (DE)
<b>C07C59/10:</b> Ácidos polihidroxicarboxílicos	BUNA AG (DE)
<b>C07C69/675:</b> Ésteres de ácidos carboxílicos saturados	SOLVAY (BE)
<b>C08J5/18:</b> Fabricación o modelado de películas/ hojas que contienen sustancias macromoleculares	BASF SE (DE)
<b>C08L67/04:</b> Poliésteres derivados de ácidos hidroxicarboxílicos, p. ej. lactonas	BASF SE (DE) ZENECA LTD (GB) ICI PLC (GB)
<b>C08L67/02:</b> Poliésteres derivados de ácidos dicarboxílicos y compuestos dihidroxi	BASF SE (DE)
<b>C08L101/16:</b> Compuestos macromoleculares biodegradables	BASF AG (DE)
<b>C12P7/42:</b> Ácidos hidroxicarboxílicos	ICI PLC (GB) BUNA AG (DE)
<b>C12P7/62:</b> Ésteres de ácidos carboxílicos	ZENECA LTD (GB) ICI PLC (GB) VEOLIA WATER SOLUTIONS TECH (FR) BIO ON SPA (IT) SOLVAY (BE) CSIC (ES) BUNA AG (DE)
<b>C08G63/06:</b> Procedimientos de preparación de poliésteres derivados a partir de ácidos hidroxicarboxílicos	ZENECA LTD (GB) BASF AG (DE)
<b>C08G63/82:</b> Procedimientos de preparación de compuestos macromoleculares obtenidos por reacciones que forman un enlace éster carboxílico en la cadena principal de la macromolécula caracterizados por el catalizador empleado	BASF AG (DE)
<b>C08G63/89:</b> Tratamiento de pospolimerización. Recuperación del polímero	VEOLIA WATER SOLUTIONS TECH (FR)
<b>C08G63/90:</b> Tratamiento de pospolimerización. Purificación, Secado	BUNA AG (DE)
<b>Tratamiento biológico del agua, agua residual o de alcantarilla</b>	
<b>C02F3/12:</b> Procesos aerobios por fangos activados	VEOLIA WATER SOLUTIONS TECH (FR)
<b>C02F3/34:</b> Caracterizado por los microorganismos utilizados	VEOLIA WATER SOLUTIONS TECH (FR)

Microorganismos o enzimas. Cultivo o conservación, técnicas de mutación o de ingeniería genética	
C12N1/06: Lisis de microorganismos	CSIC (ES)
C12N9/04: Oxidorreductasas que actúan sobre grupos CHOH como dadores	ICI PLC (GB)
C12N9/10: Enzimas. Transferasas	ICI PLC (GB)
C12N15/52: Genes que codifican enzimas o proenzimas	ZENECA LTD (GB)
C12N15/82: Vectores o sistemas de expresión especialmente adaptados a huéspedes eucariotas para células vegetales	ZENECA LTD (GB)
Microorganismos. Bacterias o actinomicetos	
C12R1/05: Alcaligenes	ICI PLC (GB) SOLVAY (BE)
C12R1/065: Azotobacter	ICI PLC (GB)
C12R1/40: Pseudomonas putida	CSIC (ES)

Otras fuentes: J. Serrano Riaño, Teoría y Praxis Investigativa Vol. 5, No. 2 [2010]

## PATENTES BIOENERGÍA

Biocombustibles sólidos (pellets, biochars, bio RDFs, bio SRFs, etc.)		
Nº Publicación	Solicitante (País)	Contenido técnico
EP3532569	Akbev Group Llc (US)	<b>High protein organic materials as fuel and processes for making the same.</b> A process of making a fuel product from a non-combustible high protein organic material such as a biological by-product or waste material. The moisture content of the high protein organic material is mechanically reduced and dried to reduce the moisture content to less than ten percent (10%). The high protein organic material is pulverized to a particle size of less than about 2 mm. The high protein organic waste material is fed into a combustion chamber and separated during combustion such as by spraying of the high protein organic waste material within the combustion chamber. Temperature and nitrogenous hydrocarbon combustion reactions within the combustion chamber are also controlled by injection of steam within the combustion chamber.
EP2368031	Ares Turbine AS (NO)	<b>Gas turbine with external combustion, applying a rotating regenerating heat exchanger.</b> The invention relates to a gas turbine for transforming thermal energy, for example from coal, biomass or the like, to mechanical work, comprising a compressor unit, a turbine unit, a combustion chamber and a heat exchanger with associated pipe system. The gas turbine is configured in such way that the heat is supplied to the air flow between the compressor unit and the turbine unit by means of hot flue gas from the combustion chamber and is brought into a compression chamber arranged between the compressor unit and the turbine unit.
WO2019145854	Bellintani Claudio, et al. (IT)	<b>System for optimizing the combustion process of a stove/boiler, particularly a pellet-fired one.</b> A system for optimizing the combustion process of a stove/boiler, particularly a pellet-fired one, comprising a stove/boiler which comprises a combustion chamber, provided with a front glazing unit, and an air intake pipe, the stove/boiler being associated with a remote processing device connected to a telematic device operated by a user by means of a telematic communication network; the stove/boiler comprises at least one flame sensor which is arranged outside the combustion chamber and at the front glazing unit, the flame sensor being configured to detect at least one mass of a flame, and to provide at least one value of the mass of the flame to a usage data collection module comprised in the remote processing device; the remote processing device is configured to perform a first comparison between the at least one value of the mass of the flame and at least one reference value of the mass of the flame comprised in reference data storage means comprised in the remote processing device, and to adjust the combustion process of the stove/boiler on the basis of an outcome of the first comparison, driving a screw feeder motor, an air intake and exhaust gas discharge motor and a hot air delivery motor which are comprised within the stove/boiler.

Nº Publicación	Solicitante (País)	Contenido técnico
EP3535521	Demirel Hayri (TR)	<b>Multi chamber incinerator for turbulent combustion of solid and biomass fuel.</b> The present invention relates to a multi chamber incinerator for turbulent two-stage combustion of fuel, such as coal or biomass fuel, with increased efficiency and low emission. The present invention more particularly relates to a turbulent combustion incinerator comprising of a main combustion chamber and a secondary combustion chamber being separated by a heat collecting dome for turbulent combustion of fuel. The secondary combustion chamber comprises a first division and a second division, which are separated by a further heat collecting dome.
EP3280785	Demmer Johannes Jozef (DK)	<b>Method and system for conversion of wet biomass to high-grade fuel pellets.</b> System for conversion of wet biomass into high-grade fuel pellets. The system comprises a module for basic reduction of the ingredients of the biomass into coarse chips, a module for wet milling the coarse chips into wet fine chips, a module for drying of the wet fine chips into dry fine chips. A module provides for splitting of the dry fine chips into different fractions I, II, III, IV having different cross sections. Particles < 1 mm (fraction I) are discharged, particles of 2 - 4 mm (fraction II) are allowed through, particles of 1 - 2 mm (fraction III), are further sorted in a sorting module based on their density (sub-fractions IIa, IIb, IIc) and particles > 4 mm (fraction IV) are fed to a reduction module. A pellet press compresses the stored dry fine chips into pellets, which are suitable, after cooling, to be used as a high-grade fuel having a high EN+ quality.
EP3527648	Escobar Farago Javier (BR)	<b>Method for removing chlorine and inorganic components from eucalyptus ssp. Wood for producing solid biofuel, in the form of "pellets" or some other form.</b> Eucalyptus produced in tropical regions tends to contain higher concentrations of chlorine and other inorganics in levels higher than those allowed by international standards, such as Enplus and similar, for the production of solid biofuels. The present invention relates to the removal of chlorine and other inorganic compounds using mechanical and chemical pretreatment processes, including milling and leaching, prior to the production of biofuels in the form of pellets or another form. This method allows the reduction of toxic gases such as dioxins and corrosive gases resulting in the combustion of solid biofuels.
US2019201830	Jiangsu Jiulang High Tech Co Ltd et al. (CN)	<b>Membrane method processing system and process for high-concentration salt-containing organic waste liquid incineration exhaust gas.</b> A membrane method processing system and process for a high-concentration salt-containing organic waste liquid incineration exhaust gas is described. The system consists essentially of a waste liquid incinerator, a gas-solid separator, a heat exchanger, an air blower, an anti-caking agent storage tank, a membrane method dust cleaner, an induced draft fan, a check valve, and a desulfurization tower. The present invention introduces the dust collecting membrane into the tail gas treatment system and utilizes the small pore size and high porosity of the dust collecting membrane to prevent inorganic salt particles from entering the internal of the filter material and agglomerating there. When the humidity of the gas entering the dust collector increases during the dust removing process, the anti-caking agent is also introduced into the tail gas treatment system to change the surface structure of the inorganic salt crystal to prevent the crystal from agglomeration.
EP2695931	Mitsubishi Hitachi Power Sys (JP)	<b>Apparatus and method for producing semi-carbonized fuel of biomass, and method for using semi-carbonized fuel in a power generation system.</b> Provided are a device and a method for manufacturing a semi-carbonized fuel of a biomass, which do not require an external heat source and are capable of suppressing adhesion of tar, condensed water or the like to a pipe. The device for manufacturing a semi-carbonized fuel of a biomass includes a drying device for heating and drying a biomass, a pyrolysis device for pyrolytically decomposing the biomass dried by the drying device, and a combustion device for supplying heat to the drying device and the pyrolysis device for heating. The pyrolysis device is configured to be supplied with a part of a combustion exhaust gas generated in the combustion device, directly mix the supplied combustion exhaust gas and the biomass to heat and pyrolytically decompose the biomass, and supply a mixed gas of a generated pyrolysis gas and the combustion exhaust gas used for heating to the combustion device. The combustion device is configured to be supplied with an air for combustion, combust the supplied mixed gas, and generate the combustion exhaust gas.

Nº Publicación	Solicitante (País)	Contenido técnico
US2019234611	Morgan State Univ (US)	<b>System and method for biomass combustion.</b> Disclosed is a system and method for the combustion of biomass material employing a swirling fluidized bed combustion (SFBC) chamber, and preferably a second stage combustion carried out in a cyclone separator. In the combustion chamber, primary air is introduced from a bottom air box that fluidizes the bed material and fuel, and staged secondary air is introduced in the tangential direction and at varied vertical positions in the combustion chamber so as to cause the materials in the combustion chamber (i.e., the mixture of air and particles) to swirl. The secondary air injection can have a significant effect on the air-fuel particle flow in the combustion chamber, and more particularly strengthens the swirling flow, promotes axial recirculation, increases particle mass fluxes in the combustion chamber, and retains more fuel particles in the combustion chamber. This process increases the residence time of the particle flow. The turbulent flow of the fuel particles and air is well mixed and mostly burned in the combustion chamber, with any unburned waste and particles being directed to the cyclone separator, where such unburned waste and particles are burned completely, and flying ash is divided and collected in a container connected to the cyclone separator, while dioxin production is significantly minimized if not altogether eliminated. The system exhaust is directed to a pollutant control unit and heat exchanger, where the captured heat may be put to useful work.
DK2998650	Pellax Spolka ZOO Spolka Komandytowa (PL)	<b>Pellet burner with a rotary combustion chamber.</b> The subject of the invention is a cover of the combustion chamber in the pellets burner, having a housing with an inlet whole for pellets and rotary combustion chamber surrounded with a cylindrical cover, connected with the housing, in addition, a space between the combustion chamber and the cover is a ring-shaped duct supplying air into the combustion chamber circumferentially placed on it. The ring-shaped duct supplying air into the combustion chamber is closed in front of the cover with its flange ring directed towards inside of the chamber and a sealing ring operating together with it, connected permanently with the outer surface of the combustion chamber. According to the invention, a rear part of the cover is permanently connected with a compensatory plate, a surface of which is perpendicular to the longitudinal axis of the cover whereas, the compensatory plate is elastically connected with the burner housing.
EP3516011	Schirrhofer Leo (AT)	<b>Process for producing biocoal and plant therefor.</b> Process and plant for producing biocoal in which biogenous starting material located in retorts is pyrolyzed and the flammable pyrolysis gases formed by the pyrolyses are burned for to generate hot flue gases, wherein the retorts are introduced consecutively into at least one reactor chamber and by means of the flue gases the pyrolyses are performed therein. The retorts are at least largely closed toward entry of hot flue gases and the heating of the starting materials located in the retorts by means of the flue gasses is effected only indirectly via the heating of the retorts.

## Syngas

Nº Publicación	Solicitante (País)	Contenido técnico
US10351777	All Power Labs Inc (US)	<b>Simultaneous pyrolysis and communiton for fuel flexible gasification and pyrolysis.</b> A biomass thermal conversion system including a fixed bed drying zone; a fixed bed pyrolysis zone fluidly connected to the drying zone; a combustion zone fluidly connected to the pyrolysis zone by a material path; and a comminution mechanism arranged across the material path between the pyrolysis zone and the combustion zone, configured to grind char off a pyrolyzed surface of solid biomass and reduce a dimension of the solid biomass below a threshold size.
DE112011102289	Babcock & Wilcox MEGTEC, Llc (US)	<b>Reduced fossil fuel in an oxidizer downstream of a biomass furnace.</b> Method of extracting syngas between the zone in a furnace where oxygen-starved combustion of biomass occurs and the zone in the furnace where secondary air is added to complete combustion, conditioning and cleaning the extracted syngas, and delivering it in a metered amount to the oxidizer or upstream of the oxidizer to reduce or eliminate the need for additional fossil fuels once the oxidizer has achieved its operating temperature. The gasifier or furnace burns solid waste and produces a syngas containing relatively high levels of CO, which is extracted from the furnace, conditioned, and introduced into an RTO as a fuel source. In certain embodiments, no extraction of syngas from the furnace takes place; the furnace conditions are manipulated so that normally undesirable levels of CO and other VOC's remain in the process stream. The heat from the furnace is used as intended (e.g., to heat a dryer), the stream is conditioned, and ultimately proceeds to a downstream RTO. Since the gas stream remains rich in CO and VOC's, its fuel value in the RTO is substantially higher than otherwise would be the case.

Nº Publicación	Solicitante (País)	Contenido técnico
EP3527531	Delmas Michel (FR)	<b>A lignocellulosic biomass based process for production of lignins and syngas, and electricity production efficient syngas.</b> The invention proposes a process for production of lignins and synthetic gas comprising the steps of extracting lignins and hemicellulose by putting solid Lignocellulosic Raw Material in contact with a mixture of water and formic acid at atmospheric pressure and at a temperature between 80° C and 110° C; fractionating, the primary solid fraction (PSF) and the primary liquid fraction (PLF); separating the lignins from the intermediate liquid fraction (ILF); and gasifying at least part of said primary solid fraction (PSF) and / or at least part of said residual liquid fraction (RLF) for producing synthetic gas. The syngas produced according to this process is a highly efficient syngas for production of electricity.
WO2019138339	Lazzari Daniele, et al. (IT)	<b>Biomass pyrogasification plant.</b> A pyro-gasification plant comprising the following components: at least one system for storing and feeding chip material, at least one pyro-gasifier, at least one system for recovering the gas flowing out of said pyro-gasifier, at least one power cogeneration unit. A control system is also provided, which control system is in communication with one or more of said components, such that said control system manages the operation of said one or more components, a network of sensors being further positioned in the one or more components and in communication with said control system.
WO2019151461	Mitsubishi Gas Chemical Co (JP)	<b>Biomass Gasification Power Generation System And Power Generation Method.</b> A biomass gasification power generation system which is provided with: a gas generation device which generates a combustible gas from a biomass and a gasification agent; an internal combustion engine which generates power from a fuel gas that contains the combustible gas which is generated by the gas generation device; and an electric generator which generates electric power from the power that is generated by the internal combustion engine. This power generation system is additionally provided with a water electrolysis device which generates oxygen and hydrogen by means of water electrolysis; the gasification agent contains oxygen that is generated by the water electrolysis device; the fuel gas contains hydrogen that is generated by the water electrolysis device; and the oxygen concentration in the gasification agent is from 22% by volume to 40% by volume (inclusive).
US2019249870	Pyroheat Oue (EE); et al.	<b>Pyrolysis Boiler.</b> Heat and power engineering, specifically being heating devices includes a pyrolysis boiler, in which, wood is subjected to high-temperature gasification and pyrolysis with subsequent burning off of pyrolysis gases. A stable and controllable gasification of wood with a natural high moisture content is achieved, and at the same time, a highly efficient transfer of combustion heat to a liquid heat-transfer agent is obtained. A gasification chamber is positioned between two compartments of a pyrolysis gas combustion chamber of the pyrolysis boiler, while the external wall of the combustion chamber is used as a heat-transfer surface, and at the same time, neither the fuel bunker nor the gasification chamber are in contact with water.
WO2019155373	Spa Curti Costruzioni Meccaniche (IT)	<b>Gasification Plant.</b> A gasification plant for producing combustible gas by pyrolysis and combustion of biomass comprises a reactor supplied with said biomass, said reactor comprises a reactor body which is supplied with said biomass through a supply opening, said reactor body comprising a first pyrolysis zone in which said biomass is subjected to a pyrolysis treatment, a second combustion zone, in which the products of said pyrolysis treatment are subjected to combustion under oxygen shortage conditions, a third reduction zone in which the combustion products are subjected to reduction and a fourth unloading zone from which combustion solid residues and synthesis gas are discharged into a discharge conduit; said second combustion zone comprises a truncated cone element, that narrows downwards to an outlet port having a diameter D and communicating with said third reduction zone, which comprises a first truncated cone portion followed by a cylindrical portion having a diameter D1, a ratio between said second diameter D1 and said first diameter D being not lower than 2.5, a ratio between a volume V1 of said third reduction zone and a volume V of said second combustion zone being not lower than 3.5; said reactor body is made of a very low porosity refractory material, such as to minimize air infiltrations from the outside into said reactor body and an exit of vapours, gases and fumes from said reactor body to the outside, through walls of said reactor body; said fourth unloading zone comprises an unloading device for solid materials that are residues of the combustion of biomass and of synthesis gas produced in the reactor, said unloading device comprising an internally hollow body, the inside of which communicates with said discharge conduit, said body being able to rotate around a longitudinal axis (B) of the reactor, said body having a truncated cone shape or truncated pyramid shape on a side surface of which slits are made.

Nº Publicación	Solicitante (País)	Contenido técnico
EP3146024	Topsoe Haldor AS (DK)	<b>Reduction or removal of oxygenated hydrocarbons in syngas conditioning.</b> 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.
WO2019137056	Univ South China Tech (CN)	<b>Oxygen carrier/carbon carrier-based biomass chemical looping gasification method and device.</b> An oxygen carrier/carbon carrier-based biomass chemical looping gasification method and device. The device comprises an air reactor, a second separator, a calcination reactor, a first separator, and a gasification reactor connected in sequence. The top of the calcination reactor is communicated with an air inlet of a third cyclone separator. A solid particle discharge port on the bottom of the third cyclone separator is communicated with the calcination reactor. An exhaust pipeline of the third cyclone separator is communicated with the air inlet on the bottom of the calcination reactor by means of a valve. An air outlet of the gasification reactor is communicated with the air inlet of a first cyclone separator. The solid particle discharge port of the first cyclone separator extends into the bottom in the gasification reactor by means of the pipeline. The air outlet of the gasification reactor is communicated with the air inlet of a second cyclone separator. By combining respective advantages of the chemical looping gasification and CaO absorber methods, the method optimizes the existing chemical looping gasification process, improves the energy utilization efficiency of a biomass, and effectively separates CO <sub>2</sub> generated by a reaction.
US10336955	Wuhan Kaidi General Research Inst of Engineering & Tech Co Ltd (CN)	<b>Fixed bed gasifier and method of gasification of biomass using the same.</b> A gasifier, including a vertically disposed furnace body, a monitoring unit, and a microwave plasma generating device. The furnace body includes a material and fuel inlet, a syngas outlet, an oxygen/vapor inlet, and a slag outlet. The furnace body has a clearance zone in an upper part thereof and a fixed bed zone in a lower part thereof. The slag outlet is disposed at the bottom of the furnace body. The monitoring unit is disposed close to the syngas outlet. At least one microwave plasma generating device is disposed on the furnace body.

## Biogás

Nº Publicación	Solicitante (País)	Contenido técnico
ES2720064	Episome Biyoteknolojik Ueruenler Sanayi Ve Ticaret Anonim Sirketi (TR)	<b>Use of a cellulose hydrolysate for biogas production.</b> The present invention proposes a cellulose hydrolysis method including contacting a fermentation medium comprising paper sludge as carbon source with cellulase obtained on site from cellulase bacteria, until the mean glucose monomer number of cellulose molecules in the fermentation medium is decreased to a range between 5 and 500. The present invention further proposes a high-yield and low-cost method of biogas recovery from paper sludge.
EP2919888	Evonik Fibres GmbH (AT)	<b>Control of the gas composition of a gas separating plant with membranes.</b> The invention relates to a method for controlling a gas separation system comprising membrane separation stages, a system controlled by said method and use of said system for separation of gas mixtures, in particular in the preparing of biogas or natural gas or synthesis gas.
EP2390235	Holzer Andre (RU); et al.	<b>Method and plant for the treatment of liquid organic waste material.</b> The invention relates to a method and a plant for the treatment of an organic waste material in a liquid form comprising subjecting the liquid to anaerobic fermentation in a biogas reactor resulting in a digestate and subjecting the digestate to ultrafiltration and reverse osmosis wherein the digestate from the biogas reactor is centrifuged in a centrifugation step resulting in a centrifugate liquid fraction that shows a content of dry matter lower than 3%, and a centrifugate concentrate fraction, before being subjected to ultrafiltration and in that the centrifugate concentrate fraction is returned to the biogas reactor.

Nº Publicación	Solicitante (País)	Contenido técnico
WO2019132423	Korea Electric Power Corp et al. (KR)	<b>High-purity methane production system and production method which use two-phase anaerobic fermentation.</b> A high-purity methane production system and production method which use two-phase anaerobic fermentation are disclosed. The high-purity methane production system can comprise: a waste storage tank for storing organic waste; a seed incubator comprising a first incubator, which receives the organic waste from the waste storage tank, and makes hydrogen-producing bacteria for hydrogen production become dominant by using the organic waste and cultures the same, and a second incubator, which makes methanogens for methane production become dominant by using the organic waste and cultures the same; a hydrogen production reactor for receives the organic waste received from the waste storage tank and the hydrogen-producing bacteria cultured in the first incubator, and produces hydrogen, carbon dioxide and an organic acid; a first methane fermentation tank receiving the hydrogen, the carbon dioxide and the organic acid, which were produced in the hydrogen production reactor, so as to produce methane; and a second methane fermentation tank receiving hydrogen and carbon dioxide, which remain after methane production, from the first methane fermentation tank and the methanogens cultured in the second incubator, so as to produce methane.
EP3508457	Metawater Co Ltd et al. (JP)	<b>Organic wastewater treatment method and organic wastewater treatment device.</b> Provided are an organic wastewater treatment method and treatment device with which it is possible to reduce the size of a methane fermentation tank, increase the amount of gas generated, and minimize cost. This treatment method includes a raw sludge removal step, a raw sludge concentration step, a biological treatment step, an excess sludge separation step, an excess sludge concentration step, a sludge mixing step, and a methane fermentation treatment step. The treatment method further includes a sterilization step for heating and sterilizing the concentrated excess sludge upstream of the sludge mixing step. At least one among: the temperature to which the concentrated excess sludge is heated in the sterilization step, the concentration of concentrated raw sludge in the raw sludge concentration step and/or the concentration of the concentrated excess sludge in the excess sludge concentration step, and the mixture ratio between the concentrated raw sludge and the concentrated excess sludge in the sludge mixing step is adjusted according to the fluctuation in the amount of raw sludge generated and the amount of the excess sludge generated, and the temperature of the mixed sludge is controlled to a temperature suited for methane fermentation.
CO2019005531	Mustang Sampling Llc (US)	<b>Biogas blending and verification systems and methods.</b> A biogas blending and energy content verification system and method for controlled enhancement of a biogas feedstock stream energy content profile by selective sampling and analysis of the biogas feedstock stream and controlled injection of a refined gas of a known, higher energy content into the biogas feedstock stream to produce a blended biogas having an augmented energy content profile meeting or exceeding a pre-established minimum to meet end user requirements.
WO2019149891	Niederbacher Michael (IT)	<b>Biogas plant fermenter tank, service device for mounting on a biogas plant fermenter tank and method for operating a biogas plant fermenter tank.</b> The invention relates to a biogas plant fermenter tank comprising an essentially liquid substrate accommodated in the container inner chamber and at least one stirring device arranged in the container inner chamber. According to the invention, an injection device having at least one delivery pump which extracts the injection fluid, and at least one injection nozzle element which is fluidically connected to the at least one delivery pump, is provided. The injection liquid can be injected into the fermenter container by means of said injection device in such a way that the injection liquid is injected as a liquid jet from above onto the surface of a floating layer of the substrate and wets the latter.
EP2844617	Red Patent BV (NL)	<b>Biomass conversion method and system.</b> The invention pertains to a process for converting biomass into biogas and renewable agricultural fertilizer, said process comprising anaerobic microbial digestion of biomass, producing a gaseous methane-comprising effluent, and an aqueous effluent comprising phosphorous-containing compounds, magnesium ions, ammonia, carbon dioxide and methane gas, subjecting said aqueous effluent in a struvite-forming step to low pressure, discharging a gaseous stream comprising carbon dioxide and methane gas from said struvite-forming step, thus forming struvite-solids, separating and collecting said struvite solids, to obtain an aqueous struvite-poor effluent, which struvite-poor effluent is subjected to aerobic microbial nitrification, thus converting ammonia into ammonium nitrate, therewith producing at least a first renewable agricultural fertilizer composition, and wherein said fertilizer composition is collected and transferred to storage. The invention also pertains to a system for performing the above process.

Nº Publicación	Solicitante (País)	Contenido técnico
US2019256391	Univ California (US)	<b>Clarifying water and wastewater with fungal treatment/bioflocculation.</b> Anaerobic digestion is a widely used biotechnology for converting food, agricultural, and other organic wastes into biogas energy but produces nutrient-rich liquid effluent (digestate) that often requires costly disposal. Using digestate and similar wastewaters to produce microalgae for biodiesel or biochemical production can provide many economic and environmental benefits by offsetting fossil fuels. However, two aspects of microalgal production severely hinder the sustainability of the technique especially in arid regions: high energy use associated with the harvest of small microalgal cells and large volumes of water required to reduce concentrations of inhibitory compounds such as ammonia. We have compared the nutrient removal and pelletization potential of an easily harvested biofilm of robust and protective fungi evolved to high ammonia environments (ammonia fungi) with less resilient oleaginous microalgae for high strength wastewater treatment and biodiesel production. Preliminary calculations suggest that the ammonia fungi-algae pellets will require less dilution water and pH adjustment for growth in high-strength food waste digestate over the control fungi ( <i>Aspergillus</i> sp.)-algae pellets. Impacts of pH on the surface charge (zeta potential) and pelletization of the fungi and microalgae will be compared among species and discussed in relation to impacts on pelletization potential.
EP2739577	Univ Washington State (US)	<b>Processing biomass using thermochemical processing and anaerobic digestion in combination.</b> Systems and methods for integrating thermo chemical processing of biomass and anaerobic digestion are provided. Light oxygenated organic compounds are produced as byproducts of thermochemical biomass processing e.g. by torrefaction and/or pyrolysis, and are converted to methane by anaerobic digestion. Thermochemical processing units may or may not be co-located with the anaerobic digestion units, with co-location providing benefits for e.g. rural agricultural enterprises.

<b>Bioalcoholes (bioetanol, biometanol, etc.)</b>		
Nº Publicación	Solicitante (País)	Contenido técnico
EP2675778	Cellulosic Ethanol Tech LLC (US)	<b>Process and system for producing ethanol from a byproduct of an ethanol production facility.</b> A process of producing ethanol from whole stillage, includes obtaining a supply of whole stillage from an ethanol production facility after ethanol has been extracted therefrom; pre-treating the whole stillage to convert hemicellulose portions of the whole stillage into sugars; adding enzymes to the whole stillage to convert cellulose portions of the whole stillage to sugars; fermenting the whole stillage to create a beer mixture; and distilling the beer mixture to separate ethanol therefrom. The pre-treating step may include adding acid to the whole stillage to decrease its pH level; heating and pressurizing the whole stillage; holding the whole stillage under pressure and heat for a dwell time; removing pressure from the whole stillage to cause flashing; and cooling the whole stillage before the enzymes are added.
CA2810455	Compagnie Ind de la Matiere Vegetale, CIMV (FR)	<b>Process for producing bioethanol by enzymatic hydrolysis of cellulose.</b> The invention concerns a process for producing bioethanol comprising the steps of pretreatment (consisting in destructuring the lignocellulosic vegetable raw material by placing it in the presence of a mixture containing formic acid, acetic acid and water, then in separating cellulose), of enzymatic hydrolysis and of alcoholic fermentation, characterized in that it comprises, prior to the enzymatic hydrolysis, a step of partial elimination of the lignins so as to obtain a residual overall level of lignins (T), expressed as percentage by weight, which is non-zero and which is included in a range determined by a lower limit, and an upper limit Bsup, respectively equal to 0.30% and 4%. In order to obtain conditions of acidification before the enzymatic hydrolysis step, the process comprises a step for re-acidification of the mixture, which is carried out by means of an acid, or of a mixture of acids, of determined pKa, and in particular by means of weak organic acids such as acetic acid and/or formic acid.

Nº Publicación	Solicitante (País)	Contenido técnico
EP3012894	Hitachi Shipbuilding Eng Co (JP)	<b>Energy saving method in combination system having bioethanol manufacturing device and solid oxide fuel cell combined therein.</b> The present invention is to provide, in a combined system of a bioethanol producing device and an SOFC, a method that is capable of further enhancing the electric power generation efficiency of the SOFC, and is also capable of achieving further reduction of the energy required for distillation of the fermented liquid. A part of an anode off-gas is refluxed to the water-containing ethanol vapor line from the mash column to the reforming device at a reflux ratio ((flow rate of reflux gas) / (flow rate of (anode off-gas) - (reflux gas))) of from 1 to 2. The ethanol concentration of the water-containing ethanol vapor is controlled by refluxing, to a range of from 25 to 35% by weight with water contained in the anode off-gas of the solid oxide fuel cell.
WO2019083244	Industry Academic Cooperation Foundation Keimyung Univ (KR)	<b>Method for pretreatment and saccharification of biomass for production of biofuels or bioplastics.</b> The present invention relates to a method for pretreatment and saccharification of biomass for production of biofuels or bioplastics. According to the present invention, the incubation treatment of biomass with novel fibrinolytic mold fungus KPYBE10 before physical and chemical pretreatment can produce a saccharification liquid having the same glucose concentration despite the use of a low sulfuric acid concentration, a low temperature, a short time, and a small amount of a diastatic enzyme. In addition, physical and chemical conditions of the present invention reduce the generation of fermentation inhibiting substances, such as furfural and hydromethylfurfural, thereby providing an incidental effect that a decontamination process is unnecessary. The pretreatment method using acid hydrolysis of the present invention can drastically reduce pretreatment and saccharification costs and high-pressure steam and electricity costs, which account for 53%, more than half of the conventional second-generation bioethanol direct production costs. A low-cost saccharification liquid prepared by the above method can be used as a microorganism medium for industrial fermentation for the production of second-generation biofuels and bioplastics, and therefore the method is a novel, cheap and environmentally friendly method capable of rapidly realizing commercial-scale production.
US10385345	Lallemand Hungary Liquidity Man LLC (HU)	<b>Yeast expressing saccharolytic enzymes for consolidated bioprocessing using starch and cellulose.</b> The present invention is directed to a yeast strain, or strains, secreting a full suite, or any subset of that full suite, of enzymes to hydrolyze corn starch, corn fiber, lignocellulose, (including enzymes that hydrolyze linkages in cellulose, hemicellulose, and between lignin and carbohydrates) and to utilize pentose sugars (xylose and arabinose). The invention is also directed to the set of proteins that are well expressed in yeast for each category of enzymatic activity. The resulting strain, or strains can be used to hydrolyze starch and cellulose simultaneously. The resulting strain, or strains can be also metabolically engineered to produce less glycerol and uptake acetate. The resulting strain, or strains can also be used to produce ethanol from granular starch without liquefaction. The resulting strain, or strains, can be further used to reduce the amount of external enzyme needed to hydrolyze a biomass feedstock during an Simultaneous Saccharification and Fermentation (SSF) process, or to increase the yield of ethanol during SSF at current saccharolytic enzyme loadings. In addition, multiple enzymes of the present invention can be co-expressed in cells of the invention to provide synergistic digestive action on biomass feedstock. In some aspects, host cells expressing different heterologous saccharolytic enzymes can also be co-cultured together and used to produce ethanol from biomass feedstock.
EP3526336	Novozymes AS (DK)	<b>Methods of reducing foam during ethanol fermentation.</b> The invention relates to methods of reducing foam during ethanol fermentation by adding a phospholipase A and/or a phospholipase C during fermentation.
EP3532625	Valmet OY (SE)	<b>Method for producing ethanol and ethanol producing system.</b> The invention relates to a method for producing ethanol comprising providing biomass, supplying yeast to the biomass, reducing the size of the biomass, fermentation of the biomass at a solid content of above 20%, and distilling the fermented biomass. It also relates to an ethanol producing system comprising biomass providing arrangement, a yeast supplying device for supplying yeast to the biomass, a biomass size reducing device configured to reduce the size of the biomass, a fermentation device configured to ferment the biomass at a solid content of above 20% and a distilling device.

Nº Publicación	Solicitante (País)	Contenido técnico
EP2900690	VIB vzw et al. (BE)	<b>Mutant yeast strain with decreased glycerol production.</b> The present invention relates to the use of a mutant SSK1 gene encoding a truncated ssk1protein for the construction of a mutant yeast strain with decreased glycerol production, when compared to the wild type strain. It relates further to the use of such strains for high yield bioethanol production, especially in high osmotic media, or on cellulosic hydrolysates, where normal yeast strains do produce a significant amount of glycerol.
EP2526181	Xyleco Inc (US)	<b>Method and system for saccharifying and fermenting a biomass feedstock.</b> Biomass feedstocks (e.g., plant biomass, animal biomass, and municipal waste biomass) are processed to produce useful products, such as fuels. For example, systems are described that can convert feedstock materials to a sugar solution, which can then be fermented to produce ethanol. Biomass feedstock is saccharified in a vessel by operation of a jet mixer, the vessel also containing a liquid medium and a saccharifying agent.
US10399059	Xyleco Inc (US)	<b>Processing material with ion beams.</b> Materials such as biomass (e.g., plant biomass, animal biomass, and municipal waste biomass) and hydrocarbon-containing materials are processed to produce useful products, such as fuels. For example, systems are described that can use feedstock materials, such as cellulosic and/or lignocellulosic materials and/or starchy materials, or oil sands, oil shale, tar sands, bitumen, and coal to produce altered materials such as fuels (e.g., ethanol and/or butanol). The processing includes exposing the materials to an ion beam.

## Biodiésel

Nº Publicación	Solicitante (País)	Contenido técnico
EP3514222	Argent Energy UK LTD (GB)	<b>Process for producing biodiesel and related products.</b> There is described a process for producing biodiesel and related products from mixtures. There is also described a process for producing precursors and feedstock materials for producing biodiesel and related products. The processes use esterification and trans-esterification, separation and purification. Other process steps such as acidification and distillation can also be used.
US10336965	EniSPA (IT)	<b>Process for the extraction of lipids and sugars from algal biomass.</b> Process for the extraction of lipids and sugars from algal biomass, which comprises: —producing an aqueous suspension of algal biomass; —bringing the pH of said aqueous suspension of algal biomass to a value higher than or equal to 10, preferably ranging from 10.2 to 12, obtaining an aqueous suspension of algal biomass at basic pH; —adding at least one anionic flocculant to said aqueous suspension of algal biomass at basic pH obtaining a concentrated algal biomass; —recovering said concentrated algal biomass; —subjecting said concentrated algal biomass to extraction of the lipids obtaining: (i) an organic phase comprising lipids; (ii) a semi-solid phase comprising a residue of said algal biomass; —subjecting said semi-solid phase (ii) to hydrolysis obtaining sugars. The lipids thus obtained can be advantageously used in the production of biodiesel or green diesel which can be used as such, or in a mixture with other fuels for motor vehicles. The sugars thus obtained can be advantageously used as carbon sources in fermentation processes for the production of lipids and also for the production of alcohols (e.g., ethanol, butanol). Said alcohols can be advantageously used as biofuels for motor vehicles or as components that can be added to fuels for motor vehicles.

Nº Publicación	Solicitante (País)	Contenido técnico
EP2198955	Eni SPA (IT) et al.	<p><b>Process for the production of hydrocarbons, useful for motor vehicles, from mixtures of a biological origin.</b> The present invention describes a process for producing, in a single step, hydrocarbon fractions useful as diesel fuel or as a component of diesel fuel, from a mixture of a biological origin containing esters of fatty acids, and possibly also containing aliquots of free fatty acids. The process comprises the contemporaneous hydrodeoxygenation and hydroisomerization of the mixture of a biological origin, with the formation of linear and branched paraffins. The process is carried out in the presence of a catalytic composition comprising: A) an amorphous carrier of an acidic nature, selected from: (1) an amorphous silica-alumina having a SiO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub> molar ratio higher than or equal to 5, (2) a porous solid comprising silicon, aluminium, phosphorus and oxygen bonded together so as to form an amorphous mixed oxide forming a single phase, characterized by a Si/Al atomic ratio ranging from 15 to 250, a P/Al ratio of at least 0.1, but lower than 5, preferably ranging from 0.3 to 3.5, a total pore volume of between 0.5 and 2.0 ml/g, an average pore diameter of between 3 nm and 40 nm and a specific surface area ranging from 200 to 1,000 m<sup>2</sup>/g, preferably from 300 to 900; B) a metallic component containing one or more metals of group VIII, possibly in a mixture with one or more metals of group VIB. If a catalytic composition consisting of a silica-alumina of type (1) and Pt, is used, the composition is pretreated by means of a hydrocarbon containing 7 to 16 carbon atoms, when the silica-alumina is a completely amorphous, micro-mesoporous silica-alumina (1a) having a SiO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub> molar ratio comprised between 30 and 500, a surface area greater than 500 m<sup>2</sup>/g, a pore volume comprised between 0.3 and 1.3 ml/g, an average pore diameter smaller than 40 Å.</p>
US10335761	Louisiana Eco Green L L C et al. (US)	<p><b>Method of manufacturing bio-diesel and reactor.</b> A reactor and process for the production of bio-diesel. The reactor includes one or more coiled reaction lines. The lines are positioned within a tank containing a heat transfer media such as molten salt, maintained at about 750° F. A pump circulates the media within the tank. An emulsion of alcohol; refined feed stock, including glycerides and/or fatty acids; and preferably water is pumped through the reaction lines at temperatures and pressures sufficient to maintain the alcohol in a super-critical state. The curvature of the coils, pump pulsing, and the flow rate of the emulsion keep the emulsion in a turbulent state while in the reactor, ensuring thorough mixing of the alcohol and feed stock. The alcohol reacts with the glycerides and fatty acids to form bio-diesel. The reaction is fast, efficient with regard to energy input and waste generation, and requires minimal alcohol.</p>
EP3031932	Magri Michael (IT)	<p><b>A new microalgae chlorella for production of vegetal oil for biodiesel and cogeneration power units.</b> The present invention relates to the field of renewable bioenergy, and particularly addresses a novel method of producing biodiesel through two-stage culture of microalgae derived from Chlorella Vulgaris; those are cultivated under phototrophic and heterotrophic conditions, hence in two stages; phototrophic growth is obtained by exposing the microalgal culture to light and supplying it with CO<sub>2</sub>; in order to sustain heterotrophic growth, the microalgal culture obtained in the phototrophic stage is concentrated (by centrifugation) and added with organic carbon in the form of glucose; this second technique is used to increase lipid accumulation and reduce lipid accumulation and large-scale vegetable oil and biodiesel production costs.</p>
WO2019125317	Maysa Yag Sanayi Anonim Sirketi (TR)	<p><b>Production method of biodiesel (methyl ester) in EN14214 Norm from high FFA oils&amp;fats, fatty acids, sulfuric acid oil which is byproduct of refining of oils.</b> The present invention relates to a process which enables to produce biodiesel in EN14214 norm from high FFA oils&amp;fats [%5-100 FFA], fatty acids, sulfuric acid oils [%5-100] which are byproducts of refining of oils. The objective of the present invention is to utilize raw materials with lower cost for the production of biodiesel in EN14214 norm from high FFA oils&amp;fats [%5-100 FFA], fatty acids, sulfuric acid oils [%5-100] which are byproducts of refining of oils, and to recover these products which are affecting environment/health into economy.</p>

Nº Publicación	Solicitante (País)	Contenido técnico
PL3225682	Mexicano Inst Petrol (MX)	<p><b>Use of heterogeneous acid catalysts based on mixed metal salts to produce biodiesel.</b> SUMMARY OF THE INVENTION The present invention relates to the use of heterogeneous acid catalysts primarily Lewis in nature to produce biodiesel by the transesterification of triglyceride esters, preferably by transesterification of fresh, refined or wasted vegetable oils or oils and fats of animal origin, with alcohols in heterogeneous phase, in batch reactor or continuous flow systems with yields higher than 80%, at the following operating conditions: temperature from 0 to 300°C, residence time from 20 minutes to 20 h, space velocity of 0.1 to 10 h<sup>-1</sup>, pressure of 25-100 kg/cm<sup>2</sup> (24.5-98.07 bar), methanol/oil molar ratio of 10 to 40 and catalyst concentration of 0.001 to 20 weight % based on tri-, di- or monoglyceride. More specifically, we refer to the use of heterogeneous acidic catalysts primarily Lewis in nature to produce biodiesel in the preparation of alkyl esters of alkyl by transesterification of tri-, di- or mono-glycerides, such as those derived from vegetable oils or animal origin, in particular palm, jatropa, castor, soybean and sunflower oils, wherein the R groups of the alcohoxyls R 1 O, R 2 O and R 3 O of the glycerides are from C 1 to C 24 and a C 1 -C 4 alcohol, such as methanol, in an alcohol ratio:oil from 3:1 to 50:1. On the other hand, a primary reason for effecting the heterogeneous phase transesterification reaction to produce biodiesel is to avoid loss of catalyst, contaminating liquid effluents and eliminate undesirable side reactions such as the hydrolysis of triglycerides, diglycerides and monoglycerides into free fatty acids; in addition, in the case of catalysts of a basic nature, saponification could generate soaps.</p>
FI128062	Neste OYJ (FI)	<p><b>Method for producing ketones for fuel and oil applications.</b> The present invention relates to a method for producing ketones, suitable for manufacture of base oil or diesel fuel components, from a feedstock of biological origin comprising fatty acids and/or fatty acid derivatives, and being at least partly in liquid form, by subjecting the feedstock to a catalytic ketonisation reaction, wherein the ketonisation reaction is carried out in a system comprising one or more ketonisation reactor(s) (A', B') each comprising at least one ketonisation catalyst bed (G'), further comprising that:• the feedstock (1') is introduced into a ketonisation reactor together with a carrier gas stream comprising CO(5');• gas comprising CO(8', 10') is separated from the effluent (2', 4') exiting a ketonisation reactor whereby the effluent comprising ketones is used either as a feedstock (2') for a further ketonisation reactor or for recovery (4') of ketones from the effluent; and• the separated gas comprising CO(8', 10') is recycled and used in the carrier gas stream in a ketonisation reactor (A', B').The invention further relates to a system for producing ketones in one or more ketonisation reactor and the use of a gas comprising COand produced in the ketonisation reactors as a carrier gas.</p>
US10385277	SK Innovation Co Ltd et al. (KR)	<p><b>Catalyst for producing hydrogenated biodiesel and method of producing the same.</b> Disclosed herein is a catalyst for producing biodiesel, including a carrier having water resistance and an active component supported on the carrier and used in a hydrotreating reaction or a decarboxylation reaction. Since the catalyst for producing biodiesel includes a carrier having strong water resistance, the deactivation of the catalyst due to the water produced through a process of producing HBD can be prevented, thus remarkably improving the long term stability of a catalyst.</p>
EP3473696	Tangshan Jinlihai Biodiesel Corporation Ltd (CN)	<p><b>Device and method for producing ultra-low sulfur biodiesel.</b> Provided is a device for producing ultra-low sulfur biodiesel. The device for producing ultra-low sulfur biodiesel is a two-stage processing device, comprising a two-stage purification unit, a two-stage enzyme reaction unit, a two-stage distillation unit, and a decompression rectification unit. The present invention is green and environment-friendly, effectively and completely removing sulfur-containing impurities from the raw material, eliminating the attack of a sulfur-containing group in the synthesis process on fatty acids, and providing sufficient conditions for obtaining ultra-low sulfur content methyl esters in the product section.</p>

## Bio-jet fuels

Nº Publicación	Solicitante (País)	Contenido técnico
US10351782	Council of Scient and Industrial Research (IN)	<b>Process to produce aromatics rich aviation fuel along with other C1-C24 hydrocarbons.</b> A single step catalytic process for the preparation of aromatic rich aviation fuel from renewable resource in the presence of a hydrogen stream, and one or more hydroprocessing catalysts, under operating conditions for hydroconversion reactions, as defined herein, with mixed hot and cold streams of the renewable feed and getting desired product after separation of water, lighter hydrocarbon gases and carbon oxides, the said product comprising of hydrocarbons C6-C24, rich in aromatic content in the aviation fuel range, including kerosene range.
WO2019129928	Neste OYJ (FI)	<b>Preparation of an aviation fuel composition.</b> A method is disclosed for preparing an aviation fuel composition, the method comprising subjecting a feedstock (101) of biological and/or recycled origin to cracking in a cracking unit (102) and to fractionation in a fractionation unit (104) to obtain a kerosene fraction (105). The obtained kerosene fraction (105) is subjected to hydrotreatment in a hydrotreatment unit (106) to form a first jet fuel component (107). The formed first jet fuel component (107) is mixed with a further jet fuel component (109) to form a fuel composition (110) having a wear scar diameter of 10 0.78 mm or less, as measured with BOCLE lubricity test method according to ASTM D5001. The feedstock (101) contains one or more of tall oil pitch (TOP), a mixture of sludge palm oil, palm fatty acid distillate and animal fat (FATS), and used lubricant oil (ULO).
US2019276758	Reg Synthetic Fuels LLC (US)	<b>Biorenewable kerosene, jet fuel, jet fuel blendstock, and method of manufacturing.</b> The present technology provides compositions that include at least about 98 weight percent ("wt %") n-paraffins which, among other surprising features, may be suitable for use as a diesel fuel, an aviation fuel, a jet fuel blendstock, a blendstock to reduce the cloud point of a diesel fuel, a fuel for portable heaters, and/or as a charcoal lighter fluid. The composition includes at least about 98 wt % C7-C12 n-paraffins, where at least about 10 wt % of composition includes n-decane, at least about 20 wt % of the composition includes n-dodecane, and at least about 75 wt % of the composition includes even carbon number paraffins. The composition also includes less about 0.1 wt % oxygenates and less than about 0.1 wt % aromatics. The composition may be produced by a process that includes hydrotreating a biorenewable feedstock comprising at least one of palm kernel oil, coconut oil, babassu oil, microbial oil, or algal oil.
BRPI0811967	Solazyme Inc (US)	<b>Production of oil in microorganisms.</b> The invention provides methods and compositions useful for the production of oil, fuels, oleochemicals, and other compounds in microorganisms. In particular, the invention provides oil-bearing microorganisms and methods of low cost cultivation of such microorganisms. The invention also provides microbial cells containing exogenous genes encoding, for example, a lipase, sucrose transporter, sucrose invertase, fructokinase, a polysaccharide-degrading enzyme, fatty acyl-ACP thioesterase, fatty acyl-CoA/aldehyde reductase, fatty acyl-CoA reductase, fatty aldehyde reductase, fatty aldehyde decarboxylase, and/or an acyl carrier protein. The invention also includes methods of manufacturing transportation fuels such as renewable diesel, biodiesel, and renewable jet fuel.
US2019233751	Xyleco Inc (US)	<b>Processing biomass.</b> Techniques for processing biomass are disclosed herein. A method of preparing cellulosic ethanol having 100% biogenic carbon content as determined by ASTM 6866-18, includes treating ground corn cobs with electron beam radiation and saccharifying the irradiated ground corn cob to produce sugars. The method also includes fermenting the sugars with a microorganism. In addition, an unblended cellulosic-biomass derived gasoline with a research octane number of greater than about 87, as determined by ASTM D2699 is disclosed.

## Otros biocombustibles (bio-hidrógeno, bio-oils, biopropano, etc.)

Nº Publicación	Solicitante (País)	Contenido técnico
GB2517360	Chevron USA Inc (US)	<b>Process for producing ketones from fatty acids.</b> The invention relates to a process for producing ketones or hydrocarbon base oil from fatty acids preferably derived from a biological origin or other renewable source. The process is directed at making an aliphatic ketone or a mixture of aliphatic ketones having 14 to 52 carbon atoms, comprising a ketonization reaction of a fatty acid in a vapor phase with a decarboxylation-coupling catalyst to provide ketones, which can be deoxygenated to give saturated hydrocarbons, unsaturated hydrocarbons, and mixtures thereof. Base oils and transportation fuels may be produced from the process herein.
US10351879	Greenfield Specialty Alcohols Inc (CA)	<b>Method and system for electro-assisted hydrogen production from organic material.</b> A method for producing hydrogen from organic material. Organic material and hydrogen-producing microorganisms are provided in a completely mixed bioreactor for breaking down the organic material into H <sub>2</sub> , CO <sub>2</sub> , fatty acids, and alcohols. H <sub>2</sub> , CO <sub>2</sub> , and a first liquid effluent are recovered from the completely mixed bioreactor. The first liquid effluent includes hydrogen-producing microorganisms, fatty acids, and alcohols. The first liquid effluent is provided into a gravity settler for separating the first liquid effluent into a concentrated biomass (including hydrogen-producing microorganisms) and a second liquid effluent (including at least a portion of the fatty acids and the alcohols). The concentrated biomass is provided into the completely mixed bioreactor. An input voltage is applied to at least one of the completely mixed bioreactor and the gravity settler for facilitating an electrohydrogenesis process therein.
US10407327	Korea Inst Energy Res (KR)	<b>Bioelectrochemical system having polyvalent ion removing function.</b> The present invention provides a bioelectrochemical system for removing a polyvalent ion present in seawater etc., capable of producing electricity. The bioelectrochemical system according to the present invention comprises: an anode chamber comprising an anode which accommodates an electron produced when treating an organic material in wastewater with a microorganism; a cathode chamber comprising a cathode receiving the electron from the anode, for producing a hydroxide ion by reacting the electron with oxygen and water provided from the outside, and depositing the polyvalent ion inside an electrolyte by using the hydroxide ion; and an anion exchange membrane for blocking the polyvalent ion inside the electrolyte from moving to the anode chamber. Also, the present invention provides the bioelectrochemical system capable of removing the polyvalent ion present in seawater etc., and simultaneously producing hydrogen. The present invention comprises: the anode chamber, provided with the anode to which electrochemically active bacteria are attached, for producing the electron by having organic wastewater, as a substrate, injected thereto; the cathode chamber, provided with the cathode, for removing the polyvalent ion and simultaneously producing a hydrogen gas by having seawater, as an electrolyte, injected thereto; the anion exchange membrane for separating the anode chamber and the cathode chamber and preventing the polyvalent cation in seawater from moving to the anode chamber; and a power source connected between the anode and the cathode.
US10377953	Phillips 66 Co (CA)	<b>Fluidized upgrading/hydrostabilizing of pyrolysis vapors.</b> The present disclosure relates to processes and systems that convert biomass to stable intermediate hydrocarbon products that having a greatly decreased oxygen content. This stabilized intermediate hydrocarbon product may be easily be stored for an extended period of time, further refined into liquid transportation fuels (either alone or mixed with petroleum-derived hydrocarbons), or blended with petroleum-derived blendstocks to produce a finished liquid transportation fuel.
GB2571413	Univ Coventry (GB)	<b>Methods of manufacturing hydrogen.</b> A method of manufacturing hydrogen comprises the steps of: (a) converting urea from the excreta of livestock into ammonia; and/or providing human sewage and/or food waste containing ammonia; and/or converting urea from human sewage and/or food waste into ammonia; (b) stripping ammonia from the livestock excreta, human sewage and/or food waste; and (c) converting the ammonia to hydrogen via electrolysis. Preferably, the livestock is pigs. A ureolytic enzyme, such as urease 12, may be used to convert urea to ammonia. The human sewage and/or food waste can comprise ammonia in the form of ammonium ions in solution. The ammonia may be stripped in step (b) using a desorption process. The electrolysis may comprise electrooxidation of ammonia coupled with electrolysis of water. The electrolysis may be performed in an electrolyser 24 comprising a metal oxide film anode and a steel-based or nickel-based cathode. The electrolyser can be connected to a micro fuel cell 30, wherein the fuel cell may be capable of converting hydrogen produced in the electrolyser into electricity 32 and heat 34.

Nº Publicación	Solicitante (País)	Contenido técnico
EP3532568	UOP LLC (US)	<b>Processes for producing a fuel from a renewable feedstock.</b> Processes for the production of transportation fuel from a renewable feedstock. A catalyst is used which is more selective to hydrodeoxygenate the fatty acid side chains compared to decarboxylation and decarbonylation reactions. A gaseous mixture of carbon monoxide and hydrogen can be supplied to the conversion zone. Water may also be introduced into the conversion zone to increase the amount of hydrogen.
US10407304	UPM Kymmene OYJ (FI)	<b>Use of methanol in the production of hydrogen and fuel, processes and plants for the production of hydrogen and fuel.</b> The invention relates to the use of biomethanol from the pulp industry in the production of biohydrogen. The preferred biomethanol comprises purified biomethanol derived from black liquor. The invention also relates to a process for the production of biohydrogen from crude biomethanol recovered from black liquor and to a process for producing hydrocarbon biofuel using such biohydrogen as a hydrogen source. The invention further relates to a biofuel production facility for producing fuel from biohydrogen and biohydrocarbon, and to biofuel so produced. The invention makes it possible to produce a biofuel, wherein 100% of the raw material stems from non-fossil sources.
US10370605	V Grid Energy Systems (US)	<b>Coaxial gasifier for enhanced hydrogen production.</b> Embodiments of the invention are directed toward a coaxial gasifier for enhanced hydrogen production, comprising: downdraft gasifier comprising a hot zone for converting biomass to synthesis gas; and a coaxial gas converter disposed within the downdraft gasifier, the coaxial gas converter comprising a biochar inlet valve, a coaxial char tube, and a biochar and ash outlet valve.

# PATENTES BIOPRODUCTOS

Biomateriales (de construcción, medicina, embalaje, etc.)		
Biocomposites y biofibras		
Nº Publicación	Solicitante (País)	Contenido técnico
EP3447085	Asahi Chemical Ind (JP)	<b>Cellulose-containing resin composition and cellulosic ingredient.</b> The present disclosure relates to a resin composition that exhibits satisfactory flow properties and mechanical properties, to a cellulose formulation that is used to produce the resin composition, and to resin pellets and a molded resin formed by the resin composition. According to one aspect, the resin composition comprises a thermoplastic resin and a cellulose component, and the cellulose component comprises cellulose whiskers and cellulose fibers. According to one aspect of the invention the resin composition comprises a thermoplastic resin and a cellulose component, the coefficient of variation of the linear expansion coefficient of the resin composition being no greater than 15% and the coefficient of variation of the tensile break strength of the resin composition being no greater than 10%. According to one aspect, the cellulose formulation includes cellulose particles and an organic component. According to one aspect, the resin composition includes a thermoplastic resin, cellulose particles, an organic component and an interface-forming agent. According to one aspect, the organic component has a static surface tension of 20 mN/m or greater and a higher boiling point than water.
EP3532533	Cambond Ltd, et al. (GB)	<b>Bio-composite and bioplastic materials and methods of use.</b> A bio-composite material comprises protein-containing non-wood fibrous biomass comprising at least 6 wt% protein, and a cross-linking agent. The bio-composite material may optionally further contain wood biomass, or non-protein-containing non-wood biomass, and is formable into a bio-composite board to replace wood-based boards for a variety of applications. A bioplastic material comprises a bioadhesive, fibrous biomass and a plastic material, and is formable into a variety of products, such as a cup, using conventional plastic processing techniques. Suitable fibrous biomass may include used coffee grounds and a variety of other biomass. A method of forming a board from a bio-composite material, and a method of manufacturing a bioplastic are also provided.
EP3524730	Fiberlean Tech Limited (GB)	<b>Process for the production of gel-based composite materials.</b> A process for the production of composite materials comprising nano-fibrillar cellulose gels, by providing cellulose fibres and at least one filler and/or pigment, combining the cellulose fibres and the at least one filler and/or pigment, fibrillating the cellulose fibres in the presence of the at least one filler and/or pigment until a gel is formed, subsequently providing at least one further filler and/or pigment and combining the gel with the at least one further filler and/or pigment.
EP3356595	Granbio Intellectual Property Holdings Llc (US)	<b>Processes for producing nanocellulose, and nanocellulose compositions produced therefrom.</b> Various processes are disclosed for producing nanocellulose materials following steam extraction or hot-water digestion of biomass. Processes are also disclosed for producing nanocellulose materials from a wide variety of starting pulps or pretreated biomass feedstocks. The nanocellulose materials may be used as rheology modifiers in many applications. Water-based and oil-based drilling fluid formulations and additives are provided. Also, water-based and oil-based hydraulic fracturing fluid formulations and additives are provided. In other embodiments, polymer-nanocellulose composites are provided.
US10370778	Chemiefaser Lenzing AG (AT)	<b>Recycling of man-made cellulosic fibers.</b> A process for producing a man-made cellulosic molded body using a man-made cellulosic raw material, including the steps of forming a cellulose solution by dissolution of cellulosic raw material, the extrusion of the cellulose solution obtained to form a molded body, and coagulation and regeneration of the cellulose to obtain the man-made cellulosic molded body, wherein the man-made cellulosic raw material is mixed with a second cellulosic raw material prior to forming the cellulose solution.

Nº Publicación	Solicitante (País)	Contenido técnico
EP3524714	Infinitus China Company Ltd (CN)	<b>Preparation method for and application of antibacterial, anti-mite and mildew-proof regenerated cellulose fiber.</b> The present invention provides a method for preparing regenerated cellulose fibers having anti-bacteria, anti-mite and anti-mould functions from a fennel extract, aextract, and a thyme essential oil. The present invention also relates to the use of the regenerated cellulose fiber prepared by the above method in the field of anti-bacteria, anti-mite and mildew-resistant fabrics. The invention solves the technical defect that regenerated cellulose fibers have a single function and has poor anti-mite and anti-mould effects in the prior art.
EP3412713	Oji Holdings Corp (JP)	<b>Resin composite and method for manufacturing resin composite.</b> It is an object of the present invention to provide a resin composite that is excellent in water resistance and is capable of exerting sufficient strength even under wet conditions. The present invention relates to a resin composite comprising a resin, fibers having an ionic functional group, and a polyvalent ion. The fibers having an ionic functional group are preferably cellulose fibers having a fiber width of 1000 nm or less.
EP3526280	Shell Int Research (NL)	<b>Thermoplastic composite.</b> A reinforced composite material comprises a blend of a thermoplastic matrix and cellulosic fibers, wherein the thermoplastic matrix comprises a tarry residue fraction from a lignocellulosic biomass liquefaction process. A process for the manufacture of the reinforced composite material comprises subjecting a lignocellulosic biomass to liquefaction in the presence of a liquefaction solvent to form a liquefaction product and a tarry residue; separating the tarry residue from the liquefaction product; and blending the tarry residue with cellulosic fibers to form a recyclable reinforced thermoplastic composite material.
EP2569381	Stora Enso OYJ (FI)	<b>A composition comprising microfibrillated cellulose and a process for the production of a composition.</b> The present invention relates to a composition comprising microfibrillated cellulose, mono-, di- or oligo-saccharides and a pigment in order to achieve a composition with improved rheological properties such as a low viscosity even at high dry content. The present invention further relates to process for the production of said composition. The microfibrillated cellulose is produced by at least partly enzymatic treatment of cellulosic fibers such that even mono-, di- or oligo-saccharide is formed.
DK2155485	Unilin BVBA (BE)	<b>Method and apparatus for manufacturing laminate floor panels comprising a core containing wood/plastic composite, as well as such panels.</b> The invention relates to a method of manufacturing laminate floor panels comprising at least a core containing wood/plastic composite (WPC) and a top layer of laminate. It includes the step of providing a granulate of WPC in which natural fibres are encapsulated in polymer plastics. There is provided a layer of granulate which is melted. The melted layer is pressed for forming the core of the panels. The top laminate is attached onto the core to form a sheet (S), and the sheet is finished to form one or more panels. The laminate panel comprises a cor made of WPC, a basic layer melted to the core and a top laminate comprising at least one paper layer impregnated with impregnation material, such as melamine resin, and being attached to the basic layer through this impregnation material, or a plastic layer melted to a glass fibre basic layer.

### Bioplásticos

Nº Publicación	Solicitante (País)	Contenido técnico
ES2722748	CJ Cheiljedang Corp (KR)	<b>Process for latex production by melt emulsification.</b> A method for producing an aqueous PHA emulsion or latex comprising predominantly amorphous PHA polymers or copolymers with polymer dispersants or surfactants is described.

Nº Publicación	Solicitante (País)	Contenido técnico
WO2019155398	CSIR (ZA)	<b>Biodegradable plastic.</b> This invention relates to a biodegradable plastic and a process for producing the biodegradable plastic from bio-based polymers and agricultural by-products renewable resource based. The biodegradable plastic is produced in a process comprising melt blending a polymer blend comprising or consisting of polybutylene succinate (PBS); and at least one other bio-based polymer. The other bio-based polymer may be a biopolyester such as polybutylene adipate co-terephthalate (PBAT) or polylactic acid (PLA) or poly hydroxy butyrate (PHB) or thermoplastic starch which may be modified.
DE102011087071	Desco Co Ltd, et al. (KR)	<b>Polylactic acid composition for automobile parts.</b> Disclosed is a polylactic acid composition with improved heat-resistance and improved impact-resistance. Specifically, in the disclosed polylactic acid composition, both impact strength and heat-resistance are improved by mixing 30 to 80 wt % of polyketone and 10 to 40 wt % of modified rubber. The disclosed polylactic acid composition does not only exhibit excellent in heat resistance, chemical resistance, fuel permeation resistance, abrasion resistance, etc., but also has improved impact-resistance and improved heat resistance. Thus, it is possible to employ polylactic acid as a bioplastic in interior/exterior parts of a vehicle.
EP3527609	Kaneka Corp (JP)	<b>Method for producing polyhydroxyalkanoic acid.</b> An object of the present invention is to provide a method for producing PHA capable of providing PHA (for example, a PHA powder) having excellent thermal stability with high productivity. The present invention is a method for producing polyhydroxyalkanoic acid, the method including a step (a) and a step (b) below: step (a) of preparing an aqueous suspension liquid containing polyhydroxyalkanoic acid and polyvinyl alcohol and having a pH of 7 or less; and step (b) of spray-drying the aqueous suspension liquid prepared in the step (a).
US2015247172	Newlight Technologies Llc (US)	<b>Polyhydroxyalkanoate production method.</b> Embodiments of the invention relate generally to processes for the production and processing of polyhydroxyalkanoates (PHA) from carbon sources. In several embodiments, PHAs are produced at high efficiencies from carbon-containing gases or materials.
EP2669320	SK Chemicals Co Ltd (KR)	<b>Polylactic acid resin film.</b> The present invention relates to a polylactic acid resin film which has excellent flexibility, mechanical properties, stability, and transparency while having a specific biodegradability of the polylactic acid resin, and is useful as a packaging material. The present invention provides a polylactic acid resin film, comprising a polylactic acid resin including a hard segment comprising a specific polylactic acid repeating unit, and a soft segment comprising a polyurethane polyol repeating unit in which a specific polyether polyol repeating units are linearly linked via a urethane bond, wherein the total Young's modulus in both machine direction and transverse direction of the film is 350 to 750 kgf/mm <sup>2</sup> , and the total initial tensile strength in both machine direction and transverse direction of the film is 20 kgf/mm <sup>2</sup> or more.
EP3426490	SNP Inc (US)	<b>High energy drying method to form a continuous polyhydroxyalkanoated film.</b> Methods for applying a polyhydroxyalkanoate (PHA) film to a substrate. The substrate is coated with an aqueous PHA emulsion or dispersion to form a PHA coating. Photonic energy is then applied to the PHA coating on the substrate to remove solvent and melt the PHA to form a continuous film.

Nº Publicación	Solicitante (País)	Contenido técnico
CA2827593	Sulzer Chemtech AG (CH)	<b>Method for the manufacture of a polyhydroxy-carboxylic acid.</b> Disclosed is a method to prepare a polylactic acid comprising the steps of performing a ring opening polymerization using a catalyst and either a catalyst killer compound or an endcapping additive to obtain a raw polylactic acid of MW greater than 10,000 g/mol, purifying the raw polylactic acid by removing and separating low boiling compounds comprising lactide and impurities from the raw polylactic acid by devolatilization of the low boiling compounds as a gas phase stream, and purifying the lactide from the devolatilization and removing the impurities from the gas phase stream of evaporated low boiling compounds by means of crystallization by desublimation from the gas phase, wherein the lactide is purified and the removed impurities include a catalyst residue and a compound containing at least one hydroxyl group such that the purified lactide is then polymerized by feeding it back into the ring opening polymerization. The invention further relates to an apparatus for carrying out the method comprising a polymerization reactor for performing a ring opening polymerization to obtain a raw polylactic acid, a devolatilization apparatus for separating low boiling compounds comprising lactide and impurities from a raw polylactic acid, and a crystallization apparatus for purifying a lactide and removing impurities by means of a desublimation and a crystallization in the same crystallization apparatus.
EP2431475	Tepha INC (US)	<b>Bioabsorbable polymer containing 2-hydroxyacid monomers.</b> The present invention relates to a method of producing 2-hydroxyacid-containing polymer comprising expressing in an organism genes encoding a polyhydroxyalkanoate (PHA) synthase and at least one enzyme for the production of 2-hydroxyacyl Co-A. Preferably the method is a method of producing glycolic acid-containing polyhydroxyalkanoate polymer comprising feeding glycolic acid or a substrate converted to 2-hydroxyacid units to bacteria or plants expressing a polyhydroxyalkanoate (PHA) synthase and at least one enzyme for the production of 2-hydroxyacyl Co-A to produce the glycolic acid-containing polymer. The present invention also relates to the use of a laser to prepare a porous PHA polymer, by melt or solvent processing the PHA into a mold and performing the material with the laser to achieve the desired porosity.
US2019255817	Univ North Dakota (US)	<b>Method of fabricating lignin based polymeric systems.</b> A multi-layer bioplastic comprised of lignin and polylactic acid has increased tensile strength and displacement. The bioplastic is made through processing of individual layers of composite lignin/polylactic acid bioplastics and combining them with polylactic acid layer via lamination.

## Bioproductos químicos (biofertilizantes, biocosméticos, biofarmacéuticos...)

### Biofertilizantes, bioadhesivos y biocosméticos

Nº Publicación	Solicitante (País)	Contenido técnico
WO2019138205	Agri Tech Organic Solutions Ltd (GB)	<b>A soil remediant and its method of production.</b> There is disclosed a method of producing a soil remediant from liquid organic waste material in which the liquid organic waste material is concurrently pasteurised and digested by thermophilic aerobic digestion in the liquid phase in a single digester vessel. The organic waste material in the digester is maintained continuously at a temperature of at least 70°C for at least an hour and the liquid organic waste material comprises at least 70% water and can be pumped. After a period of at least an hour a small amount of pasteurised organic waste material is removed and a corresponding amount of fresh organic waste material is added to the single digester vessel such that the temperature is maintained in a comfort zone of the thermophilic bacteria. In a preferred embodiment the thermophilic aerobic digestion is facilitated by micro-organisms including crenarchaeota. The liquid organic waste material can be combined with a microporous adsorbent. Also disclosed is a soil remediant comprising a microporous adsorbent and liquid organic waste material from the novel method. The microporous adsorbent may be a volcanoclastic sedimentary rock or diatomite or of vegetable origin such as biochar. The microporous adsorbent may be a powder or a granular material and may have particle sizes up to 2000 microns.

Nº Publicación	Solicitante (País)	Contenido técnico
EP3411054	Branch Res Llc (US)	<b>Antimicrobial compositions from prunus.</b> The foliage and stems of plant species from the family Rosacea, genus Prunus, yield natural pesticides when macerated. Hydrodistillation of macerated plant biomass yields a concentrated solution of organic volatile compounds that act synergistically as a natural pesticide, and as provided herein, also act synergistically as antimicrobial compounds. Volatile compounds liberated from Prunus biomass include 2-propanol, hexanal, trans-2-hexenal, 1-hexanol, cis-3-hexenol, mandelonitrile, benzoic acid, benzaldehyde, benzyl alcohol, hydrocyanic acid and others. These compounds may be removed from the distillate and reformulated to form a standard concentrated solution, with benzaldehyde, mandelonitrile and hydrogen cyanide being the major components. Provided herein are methods of using these pesticides as a broad-spectrum bactericide. Components of the extract may act alone or synergistically to control both gram positive and gram negative genera of bacteria.
US2019201859	Cool Planet Energy Systems Inc (US)	<b>Biochars, biochar extracts and biochar extracts having soluble signaling compounds and method for capturing material extracted from biochar.</b> A method for capturing material extracted from biochar is provided comprising the steps of: (i) providing a biochar; (ii) contacting the biochar with an extraction media, where the extraction media causes the removal of residual compounds from the pores and surface of the biochar, creating a resulting extract comprised of the extraction media and removed compounds; and (iii) collecting the resulting extract. The method also can include other steps of extraction and purification. The method further comprises the step of applying the resulting extract to seeds, plants, soil, other agricultural products, or for use in other applications. A biochar having high levels of soluble signaling compounds is also provided, where the biochar is derived from a biomass source that together with predefined pyrolysis parameters produces resulting biochar having increased levels of soluble signaling compounds that are known to increase seed germination rates and early plant growth. Such soluble signaling compounds can then be collected in a biochar extract by contacting the biochar with an extraction media.
US2019218153	Earnest Earth Agriculture Inc (US)	<b>Vermiculture bioreactor system and method of use.</b> A portable, climate-controlled, continuous flow-through, computer-operated vermiculture bioreactor and method for the treatment of organic solid wastes utilizing accelerated microbiological decomposition including composting and vermicomposting to convert materials into environmentally compatible products, including stable biofertilizer. The portable bioreactor design converts carbon-based organic waste into biofertilizer using thermophilic composting, vermicastings and vermicomposting that can be used directly for plant and farming applications.
WO2019149644	Leibniz Inst Fuer Polymerforschung Dresden EV (DE)	<b>Adhesive and method for drying and/or curing same.</b> The invention relates to the fields of physics and chemistry and relates to an adhesive, as can be used for example in the paper industry, in particular in the packaging industry (paper, paperboard and cardboard), and to a method for curing said adhesive. The invention addresses the problem of providing a bio-based adhesive having drying and curing times of < 20 seconds, and a simple and cost-effective method for drying and/or curing same. The problem is solved by an adhesive substantially containing at least 30 to 70% by mass of starch, 1 to 15% by mass of at least one dicarboxylic acid and a total water content of 70 to 98%. The problem is also solved by a method for drying and/or curing adhesive, in which method the adhesive is subjected to the effect of electromagnetic waves with a power of 800 to 1600 watts over a period of 20 to 5 seconds.
US2019241837	Nat Key Laboratory for Petrochemical and Refinery Technologies (VN)	<b>Process of producing basic biosolvents using heterogeneous catalysts and obtained basic biosolvents by this process.</b> The present invention relates to a process for the production of basic biosolvents derived from inedible vegetable oil or animal fat or waste fatty acid composition by one-pot reaction between inedible vegetable oil or animal fat or waste fatty acid, and at least one ester of short-chain organic acid having 2, 3 or 5 carbon atoms, derived from biomass, in the presence of heterogeneous catalysts. In addition, the invention also relates to basic biosolvents, comprising alkyl esters of fatty acid, trieste of glycerin, esters of short-chain organic acids having 2, 3 or 5 carbon atoms, suitable for preparing many types of biosolvents, depending on application requirements.

Nº Publicación	Solicitante (País)	Contenido técnico
EP3377084	Seiberg Consulting Llc (US)	<b>Compositions containing natural extracts and use thereof for skin and hair.</b> The present disclosure relates to compositions containing a natural extract(s) and their fraction(s) and the use of such compositions for treatment of skin, hair and nail. For example, the present disclosure relates to compositions containing an aqueous extract of (i) Yacon leave, (ii) Amor Seco leave, or (iii) Porphyridium biomass, or a combination thereof and a pharmaceutically or cosmetically acceptable carrier use on hair skin and nails for cosmetic purposes.
US10377874	Shenyang Shunfeng New Mat Co Ltd (CN)	<b>Bio-based fire retardant derived from polyacrylamide grafted starch and use thereof.</b> A bio-based fire retardant derived from polyacrylamide grafted starch and use thereof. This disclosure relates to the field of polymer additives for improving fire safety of materials. Specifically, the present disclosure is bio-based material derived from polyacrylamide grafted starch as fire retardants to polymers. Moreover, the disclosure relates to their uses in the fields of coating, adhesive, etc.
EP3519056	Soc Dexploitation de Produits pour les Industries Chimiques SEPPIC (FR)	<b>Process for preventing or slowing the appearance of unattractive signs, generated by pollutants present in the atmosphere, on the skin, the scalp, the hair or the mucous membranes.</b> Process with the aim of preventing or slowing the appearance of unattractive signs, generated by the pollutants present in the atmosphere, on the skin, the scalp, the hair or the mucous membranes, or indeed of eliminating them, comprising a step of application of a cosmetic formulation for topical use, comprising at least one cosmetically acceptable excipient and an effective amount of at least one glycolic extract (GE) of a unialgal biomass of small multicellular macroalgae originating from the Florideophyceae class. Said extract, for the use thereof in a therapeutic method for treating signs of irritation of the skin, the scalp or the mucous membranes, manifesting as redness, sensations of stinging and/or itching, signs of deterioration of the hair, manifesting as an increase in the porosity thereof, the dulling thereof, and/or the weakening thereof with regard to mechanical stresses.
EP3398607	Univ Santiago Chile (CL)	<b>Natural antibacterial and antioxidant composition of phenol extracts from aristotelia chilensis and production method.</b> The present invention relates to a natural antibacterial and antioxidant composition of an extract rich in phenol compounds obtained from seedlings of A. Chilensis, also known as maqui, cultured in vitro. Specifically, a method is described for generating plant biomass in a sustainable manner, without needing to use materials grown in natural conditions, thereby reducing the impact on the exploitation of the species. The biomass generated is used to obtain a hydroalcoholic extract having antioxidant and antibacterial properties, owing to which the composition can be added directly to food products, cosmetics, pharmaceuticals for human consumption, or a combination of same.

### Biofarmacéuticos

Nº Publicación	Solicitante (País)	Contenido técnico
EP3025593	Akademy Pharma Srl (IT)	<b>Nutraceutical compound for the treatment of excess weight and moderate hypercholesterolemia/dysglycemia.</b> A nutraceutical compound is provided for the treatment of excess weight and moderate hypercholesterolemia/dysglycemia, comprising: Berberine, Monacolin K, 1-deoxynojirimycin (DNJ).
US10376550	Dacy Tech Party Ltd (AU)	<b>Nutraceutical composition and methods of use.</b> A method of modulating inflammation in an organism, which includes administering to an organism a composition including a therapeutic amount of a hydrolyzed extract from the plant Biota orientalis. Several key components of the hydrolyzed extract of Biota orientalis have been identified that have also been shown to have an effect in dramatically reducing inflammatory responses.

Nº Publicación	Solicitante (País)	Contenido técnico
EP3530267	Dy Natural Co Ltd (KR)	<b>Composition for alleviating, preventing or treating female menopausal symptoms, containing, as active ingredient, pinitol, d-chiro-inositol or analog compounds thereof.</b> The present invention relates to a use of D-chiro-inositol, pinitol, or analog compounds thereof for preventing or treating female menopausal symptoms. The active ingredient compound of the present invention has an effect of increasing the activity of female hormones by increasing the blood concentration of 17 $\beta$ -estradiol and lowering the blood concentration of sex hormone-binding globulin. Therefore, the active ingredient compound of the present invention can be developed as a drug or a nutraceutical for preventing, alleviating or treating female menopausal symptoms. The active ingredient of the present invention is derived from a natural product, and thus, unlike an agonist of female sex hormones or chemically synthesized sex hormones, has very few side effects when applied to the human body.
US2019255036	Kariman Alexander (US)	<b>Compound and method for reducing neuropathic pain and depression.</b> The disclosed invention generally relates to pharmaceutical and nutraceutical compounds and methods for reducing neuropathic pain and depression caused by toxicity, metabolism abnormality, trauma, compression, autoimmune abnormality, congenital/hereditary abnormality, infection, abnormally activated neuronal circuits, emotional stress, chemical imbalance, mental health disorder, or other causes in subjects in need thereof. The disclosed invention further relates to naturally occurring, synthetic and semi-synthetic multifunctional compounds that exhibit antidepressant and analgesic activity where said compound contains a pharmacologically inactive substance.
US2019216734	Leukocare AG (DE)	<b>A novel method for producing low viscous and highly concentrated biopharmaceutical drug products in liquid formulation.</b> The present invention relates to a method of producing low viscous and highly concentrated biopharmaceutical drug products comprising a biomolecule of interest, the method comprising: (a) a first phase of preparing a drug substance of the biomolecule of interest, said first phase comprising at least one processing step selected from (a1) harvesting, (a2) purification, (a3) re-buffering, and (a4) enrichment, wherein said at least one processing step in this first phase is carried out in the presence of a composition comprising at least three amino acids, wherein the combination of said at least three amino acids provides at least one positively charged functional group, at least one anti-oxidative functional group, at least one osmolytic function, and at least one buffering function, and (b) a second phase of further processing the drug substance prepared in (a) to obtain a low viscous and highly concentrated biopharmaceutical drug product, said second phase comprising at least one processing step selected from (b1) re-buffering, (b2) freezing, (b3) thawing, and (b4) filling; wherein said at least one processing step in this second phase is carried out in the presence of a composition comprising (i) at least three amino acids, wherein the combination of said at least three amino acids provides at least one positively charged functional group, at least one anti-oxidative functional group, at least one osmolytic function, and at least one buffering function; and (ii) one or more sugar(s); in an amino acid:sugar ratio between 10:1 to 1:100 (w/w). The present invention further relates to a low viscous and highly concentrated biopharmaceutical drug product obtained or obtainable by the method of the invention.
EP3504309	Philip Samuel (IN)	<b>Improved method for processing and extracting oil from marine organisms. An improved method for processing and extracting krill oil from krill meal/fresh krill.</b> The proposed method for processing and extracting of krill oil from krill meal/fresh krill can be a very simple, cost effective and productive approach. The krill oil obtained herein can meet industrial standards and requirements of a wide range of applications including nutraceuticals and pharmaceutical applications. The method can be alternatively adapted to process and extract a wide range of marine oils including, but not limited to, Fish, Salmon, Shrimp, Cod and other marine product varieties.

Nº Publicación	Solicitante (País)	Contenido técnico
WO2019158654	Robertet (FR)	<b>Method for obtaining an extract enriched in rosmarinic acid from fresh plant matter.</b> The invention concerns a method for obtaining an extract enriched in rosmarinic acid from fresh plant matter chosen from the aerial parts, flowering heads, flowers and/or fresh leaves of plants from the family of Lamiaceae, Araliaceae, Boraginaceae, Apiaceae, Poaceae and Malvaceae. The invention is characterised in that the method comprises the successive steps of: 1) blanching said plant matter in steam; 2) continuously pressing the plant matter blanched in 1) with at least one compression screw, at a pressure between 4 and 10 bar, and recovering the juice (liquid co-product); 3) filtering the juice recovered in 2) and recovering a clarified juice; and 4) atomising the juice clarified in 3), in order to obtain a granulated or fine powder extract containing at least 5% by weight of rosmarinic acid relative to the total weight of the extract. The invention also concerns the extract obtained in this way and the compositions comprising such an extract. The compositions according to the invention are used in the food, cosmetic, nutraceutical and pharmaceutical fields.
EP3510998	Tersus Pharmaceuticals Llc (US)	<b>Compositions and methods comprising c16:1n7-palmitoleate.</b> One embodiment described herein is related to methods and compositions, such as nutraceutical formulations and dietary supplements, comprising C16:1n7-palmitoleate or derivatives thereof. The methods and compositions comprising C16:1n7-palmitoleate, or derivatives thereof, safely and effectively prevent or mitigate manifestations of cardiovascular disease, including coronary artery disease and the accumulation of cholesterol or lipid deposits in the blood vessels of a subject.
US2019240147	Universal Stabilization Tech Inc (US)	<b>Polymeric compositions containing ambient-temperature stable biopharmaceuticals &amp; methods for formulation thereof.</b> Biopharmaceuticals, such as vaccine agents and probiotics, are encapsulated in carbohydrate-glass particles and embedded in an amorphous polymer substrate to produce polymeric compositions containing ambient-temperature stable biopharmaceuticals for syringeless administration to patients such as via dissolvable films, micro-needle patches and similar medical delivery devices. The amorphous polymer substrate is soluble in both water and a volatile organic solvent, yet the carbohydrate-glass particles are insoluble in the volatile organic solvent.
US10376521	Univ South Florida (US)	<b>Nutraceutical co-crystal compositions.</b> Co-crystals comprising at least one nutraceutical compound and at least one co-crystal former with or without impurities. These co-crystals may be included in compositions (optionally also including other components such as pharmaceutically acceptable excipients, other nutritional supplements, etc.) having utility as pharmaceuticals, nutraceuticals, nutritional supplements, and foodstuffs.

## Bioaditivos alimentarios

Nº Publicación	Solicitante (País)	Contenido técnico
WO2019151002	Asahi Soft Drinks Co Ltd (JP)	<b>Beverage and method for imparting milk flavor to beverage.</b> Provided is a beverage comprising whey minerals and one or more acids (specific acids) selected from the group consisting of phosphoric acid, tartaric acid, lactic acid, and gluconic acid, wherein the pH is less than 4.6. Here, the specific acid is preferably lactic acid or gluconic acid, and is more preferably gluconic acid. The beverage also preferably further comprises a plant extract. The mass ratio of the content of whey minerals in the beverage is preferably 0.5 to 10 relative to the content of the specific acid in the beverage. The absorbance of the beverage at a wavelength of 650 nm is preferably no more than 0.06.
WO2019162509	Firmenich & Cie (JP)	<b>Composition comprising glucosylated terpene glycosides, terpene glycosides and cyclodextrine.</b> The various aspects presented herein relate to processes for preparing food ingredients, flavors and sweeteners from extracts of plants that contain terpene glycosides such as Stevia rebaudiana Bertoni, Rubus suavissimus or Siraitia grosvenorii. Also presented herein are formulations and uses of compositions made from the processes.

Nº Publicación	Solicitante (País)	Contenido técnico
US2019230965	Guilin Gfs Monk Fruit Corp (CN)	<b>Extracts from fruits of the cucurbitaceae family, and methods of preparing thereof.</b> The present disclosure relates to extracts and sweetening compositions that may be wholly derived from fruits of the Cucurbitaceae family containing mogroside V and other terpene glycosides. The extracts have a low mogroside V content. The extracts also have a low monosaccharide content, and can be spray-dried to form a spray-dried product. The extracts may be suitable for use as a bulking agent, and can be combined with a terpene glycoside powder. The extracts and sweetening compositions can be used in a food, beverage, and dietary supplement products. Provided are also methods for preparing such extracts and sweetening compositions.
EP3508069	Hayashibara Co (JP)	<b>Powdery plant extract for beverages and method for manufacturing same.</b> The present invention has objects to provide a powdery plant extract for beverages, having satisfactory flavor-retaining effect and solubility. The present invention solves the above objects by providing a powdery plant extract for beverages, comprising a plant extract for beverages and a branched $\alpha$ -glucan mixture having the following characteristics (A) to (C):(A) Being constructed by glucose molecules;(B) Having a branched structure with a glucose polymerization degree of one or more, bound linkage other than $\alpha$ -1,4 linkage to a non-reducing end glucose residue at an end position of a linear glucan with a glucose polymerization degree of 3 or higher, having a structure of binding glucose molecules $\alpha$ -1,4 linkages; and(C) Isomaltose in an amount of 5% by mass or higher, on a dry solid basis, of the hydrolysate is formed when digested by isomaltodextranase;where the mass ratio of the plant extract for beverages and the branched $\alpha$ -glucan mixture is in a range of 1:0.1 to 1:20, on a dry solid basis.
EP2773223	Just Inc (US)	<b>Eggless mayonnaise comprising plant-based egg substitute.</b> Disclosed herein are non-egg compositions that can be used as egg substitutes. The disclosure is directed to egg substitutes and methods of manufacturing the same, and compositions comprising the egg substitutes, including edible compositions such as baked goods and edible emulsions.
US2019274340	Nestec SA (CH)	<b>Meat analogs comprising thin flakes for food compositions.</b> A method of making a food product can include forming an emulsion containing a meat and a firming agent that is one or more of plasma, whole egg powder, guar gum, pea fiber, pea protein, carboxymethyl cellulose (CMC) or a modified cereal starch; directing the emulsion through a die to form a meat analog; cooking the meat analog with steam; and cutting the meat analog into thin flakes. The method can include cooling the meat analog before the cutting. The method can include mixing the thin flakes of the meat analog with jelly or gravy to form a blended food composition in which a ratio of the flakes to the jelly or gravy is about 30:70 to about 70:30.
US2019274344	Nexba IP PTY Ltd (AU)	<b>Compositions comprising natural sweetener combinations and food and beverage products comprising same.</b> Provided herein are natural sweetener combinations for use in the manufacture of ingestible products, typically foods and beverages, wherein the natural sweetener combinations comprise or consist of two or more of a stevia extract, a sugar alcohol and monk fruit extract. Also provided are ingestible products, typically foods and beverages, containing said natural sweetener combinations.
EP3504983	Red Bull GmbH (AT)	<b>Sweetening compositions.</b> The invention relates to sweetening compositions comprising a) acesulfam or aspartame, b) sucralose, stevia compounds, saccharin or cyclamate, c) neohesperidin, and d) tannin in an amount from 1 to 400 mg/l or wherein component a) is present in an amount from 10 to 50 wt-%, component b) from 15 to 65 wt-%, component c) from 0,1 to 4 wt-%, and component d) from 5 to 50 wt-%. Furthermore, the invention is about the use of said sweetening compositions for sweetening and preparing beverages, about beverages comprising said sweetening compositions and about a process for preparing such beverages.

Nº Publicación	Solicitante (País)	Contenido técnico
WO2019167934	Sunsho Pharmaceutical Co Ltd et al. (JP)	<b>Coating composition and capsule using coating composition.</b> Provided is a coating composition that is characterized by comprising a water-insoluble powder such as starch and/or a water-soluble polymer such as dextrin as a base component, and locust bean gum and/or xanthan gum as a gelling agent. This coating composition enables a novel coating composition to be obtained which can favorably form a coating without using carrageenan, has favorable properties that enable the coating composition to substitute traditional coatings that use a gelatin coating or carrageenan, and comprises a plant-derived base.
US10336795	Univ Newcastle (GB)	<b>System and method for producing phycocyanin.</b> The invention discloses microorganism cell culture conditions that result in increased cellular and media concentrations of a biological pigment. The invention has applications in use as a natural food coloring, as antioxidants in the food supplement industries, in the nutraceutical, pharmaceutical, and cosmeceutical industries, and a non-toxic ink. The method results in pigment that is relatively easy to separate from the microorganism culture.

## Bioproductos alimenticios para animales

Nº Publicación	Solicitante (País)	Contenido técnico
EP3537890	Agrivida Inc (US)	<b>Phytase production and methods of using the same.</b> Methods and compositions are described for producing a phytase in transgenic maize plants and then incorporating parts of the transgenic maize plants in animal feed. The feed phytase enzyme displays activity across a broad pH range, and tolerance to temperatures that are often encountered during the process of preparing animal feeds. Methods of producing an animal feed that incorporate the transgenic maize plants, parts thereof or plant derived phytases, as well as methods of promoting the release of inorganic phosphate from a phytic acid in an animal, producing an animal meat, or reducing the ratio of intake of an animal feed per weight of the animal meat by feeding an animal with the animal feed incorporating transgenic maize plants are provided.
EP3533339	Ajinomoto KK (JP)	<b>Feed additive composition for ruminants.</b> An object of the present invention is to provide a feed additive composition for ruminants containing not less than 30 wt% of a biologically active substance, which is of a dispersion type, has high protection in the rumen, and is also superior in dissolution in the lower gastrointestinal tract. The present invention relates to a feed additive composition for ruminants containing (A) at least one selected from hydrogenated vegetable oil and hydrogenated animal oil each having a melting point of higher than 50°C and lower than 90°C, (B) not less than 0.05 wt% and not more than 6 wt% of lecithin, (C) not less than 30 wt% and less than 65 wt% of a biologically active substance, (D) not less than 0.01 wt% and less than 0.8 wt% of a natural vegetable oil, and not less than 0.1 wt% and less than 6 wt% of water.
EP3507370	Commw Scient Ind Res Org (AU)	<b>Plants with modified traits.</b> The present invention relates, inter alia, to vegetative plant parts, such as from a Sorghum sp. and/or a Zea mays plant, which comprise a total fatty acid (TFA) content which comprises fatty acids esterified in the form of triacylglycerols (TAG) and fatty acids in the form of lipids other than TAG, wherein the vegetative plant parts comprise greatly increased levels of TFA, for example a TFA content of about 5% (w/w dry weight). The present invention also relates to the use of the vegetative plant parts as a feedstuff, and/or to produce a feedstuff, for animal consumption.
EP3393269	Cargill Inc (US)	<b>Fermented vegetable protein compositions and methods for producing the same.</b> The present invention relates to animal feed ingredients and products, methods of producing such ingredients and products, and feed diets containing such ingredients and products. In one aspect, the present invention relates to a fermented vegetable protein (FVP) ingredient or product. Accordingly, the feed ingredient or product of the present invention can include one or more organic acids and is rich in amino acids. In one aspect, the feed ingredient can be produced using a fermentation process, for example through the fermentation of a corn mill stream such as light steep water. In one aspect, the present invention relates to feed products combining the feed ingredient with other components. The feed ingredients and products described herein are particularly useful for aquaculture, such as farmed shrimp.

Nº Publicación	Solicitante (País)	Contenido técnico
EP3362573	CJ Cheiljedang Corp (KR)	<b>Bio-based n-acetyl-L-methionine and use thereof.</b> A bio-based N-acetyl-L-methionine and a preparation method thereof, a feed additive containing the N-acetyl-L-methionine, a feed composition containing the feed additive, and a method for raising animals which includes feeding a feed additive containing the N-acetyl-L-methionine or a feed composition containing the feed additive to animals.
CA2721691	Danisco US Inc (US)	<b>Buttiauxella sp. phytase variants.</b> Provided herein are variants of Buttiauxella sp. phytases that may be used in industrial applications including methods for starch liquefaction, alcohol fermentations and for enhancing phosphate digestion in foods and animal feeds.
WO2019160599	F3 Platform Biologics Inc (US)	<b>Euglena derived composition, including animal feed composition.</b> A Euglena derived composition may include a feed component for use as an animal feed composition and made from corn, soy, corn or soy derivatives or byproducts, or grains and an added whole cell Euglena biomass, including beta-1,3-glucan having at least about 90 percent linear, unbranched beta-1,3-glucan polysaccharide polymers with an average molecular weight of about 1.2 to 580 kilodaltons (kDa). Beta-glucan polymer chains have a polymer length of about 7.0 to 3,400 glucose monomers. The whole cell Euglena biomass has at least 30 percent beta-1,3-glucan and residual media remaining from a heterotrophic fermentation process and is about 0.0001 to 0.0124 percent of the composition. It is possible to add a Euglena lysate.
WO2019147044	Hemas Co Ltd (KR)	<b>Composition for animal feed comprising phlorotannin as active ingredient and product for animal.</b> The present invention relates to a composition for animal feed having antioxidation and anti-inflammatory properties comprising phlorotannin extracted from brown algae and, particularly, to a composition and a product capable of safe applications on a daily basis by means of using raw materials of natural origins and having a function of improvements in the glossiness of fur, stench, odor of feces, color of the feces, and overweightedness.
US10400201	Kiwi Green Tech LLC (US)	<b>Method and structure for comprehensive utilization of co-products of alcohol production from grains.</b> A method is provided for treating distiller's grains with solubles (DGS) to produce one or more byproducts. The method includes separating the DGS into a low protein mixture and a high protein mixture. The method includes generating, from the low protein mixture, a biogas by an anaerobic digestion process. The method includes generating, from the high protein mixture, at least one of a vegetable oil from a vegetable oil separation process, a high protein animal feed from a separation process and a microalgae biomass material from a microalgae production process.
WO2019138024	Novozymes AS (DK) et al.	<b>Animal feed compositions and uses thereof.</b> The presence of either a calcium source or a carbonate source with GH30 xylanases significantly improves the release of xylan oligomers from maize and other feeds compared to the same xylanases without the calcium or carbonate source. Animal feed and animal feed additives comprising a combination of one or more polypeptides having xylanase activity; and one or more sources of calcium; and/or one or more sources of carbonate, wherein the polypeptide is a GH30 xylanase provide for improved xylan release from feedstuff.

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