

## BIOMASA FORESTAL: PROYECTOS EUROPEOS

En la introducción del Boletín anterior, se realizó un análisis bibliométrico de la producción científica sobre la valorización energética de la biomasa forestal. Tal como se señaló entonces, la biomasa forestal representa una enorme fuente potencial de biomasa lignocelulósica capaz de producir bioenergía en forma de calor/frío, electricidad y biocombustibles líquidos para el transporte. Asimismo, los subproductos de muchos de los procesos de valorización energética de biomasa forestal son el material de partida para la síntesis de distintos productos de alto valor añadido de la industria química.

Con el fin de complementar el análisis bibliométrico desarrollado y obtener una visión de la gran medida en que la Unión Europea (UE) está apoyando la valorización energética de este recurso, en este apartado se recogen los proyectos financiados por la UE más representativos en este ámbito identificados en la base de datos CORDIS, vigentes en el año 2017 y con fecha de inicio posterior a Enero de 2015. Cabe señalar que la participación de empresas españolas es muy representativa.

**Tabla 1.** Proyectos europeos

<b>EcoBioMass:</b> Harvesting forest energy biomass in the 21st century	
Duración: 2017-08-01 a 2019-07-31	Financiación: Horizon2020
<b>Participantes:</b> <ul style="list-style-type: none"> <li>• <b>Coordinador:</b> Cintoc ABOy (Suecia)</li> </ul>	
<b>COMSYN:</b> Compact Gasification and Synthesis process for Transport Fuels	
Duración: 2017-05-01 a 2021-04-30	Financiación: Horizon2020
<b>Participantes:</b> <ul style="list-style-type: none"> <li>• <b>Coordinador:</b> Teknologian tutkimuskeskus VTT Oy (Finlandia)</li> <li>• Ineratec GmbH (Alemania)</li> <li>• GKN Sinter Metals Filters GmbH Radevormwald (Alemania)</li> <li>• UNIPETROL VYZKUMNE VZDELAVACI CENTRUM AS (República Checa)</li> <li>• Deutsches Zentrum Fuer Luft - und Raumfahrt e.V. (Alemania)</li> <li>• AF-Consult Oy (Finlandia)</li> </ul>	
<b>ECOCAT:</b> Improving the economic feasibility of the biorefinery through catalysis engineering: enhancing the catalyst performance and optimizing valuable product yields	
Duración: 2017-05-01 a 2019-04-30	Financiación: Horizon2020
<b>Participantes:</b> <ul style="list-style-type: none"> <li>• <b>Coordinador:</b> Aston University (Reino Unido)</li> </ul>	

**ARTFUL:** Structure-activity relationships of an emerging family of fungal lytic polysaccharide monoxygenases

Duración: 2017-04-01 a 2019-03-31

Financiación: Horizon2020

**Participantes:**

- **Coordinador:** Universite d'aix Marseille (Francia)

**LIGNINFIRST:** The Lignin-First Approach for the Full Valorisation of Lignocellulosic Biomass

Duración: 2017-03-01 a 2022-02-28

Financiación: Horizon2020

**Participantes:**

- **Coordinador:** Imperial College of Science, Technology and Medicine (Reino Unido)

**OXIDISE:** Interaction and Kinetics of Oxidative Biomass Degrading Enzymes Resolved by High-Resolution Techniques

Duración: 2017-03-01 to 2022-02-28

Financiación: erc

**Participantes:**

- **Coordinador:** Universität für Bodenkultur Wien (Austria)

**FALCON:** Fuel and chemicals from lignin through enzymatic and chemical conversion

Duración: 2017-01-01 a 2020-12-31

Financiación: Horizon2020

**Participantes:**

- **Coordinador:** Koninklijke Nederlandse Akademie Van Wetenschappen - KNAW (Holanda)
- Helsingin Yliopisto (Finlandia)
- Progression-Industry BV (Holanda)
- Italian Bio Products SRL (Italia)
- Bio Base Europe Pilot Plant VZW (Bélgica)
- Winterthur Gas & Diesel AG (Suiza)

**HiEff-BioPower:** Development of a new highly efficient and fuel flexible CHP technology based on fixed-bed updraft biomass gasification and a SOFC

Duración: 2016-10-01 a 2020-09-30

Financiación: Horizon2020

**Participantes:**

- **Coordinador:** Bios Bioenergiesysteme GmbH (Alemania)
- Viessmann Holzfeuerungsanlagen GmbH (Austria)
- Universität Augsburg (Alemania)
- Karlsruher Institut für Technologie (Alemania)
- Lignogen GmbH (Alemania)
- Fraunhofer Gesellschaft zur Förderung der Angewandten Forschung e.V. (Alemania)

**Ambition:** Advanced biofuel production with energy system integration

Duración: 2016-12-01 a 2019-11-30

Financiación: Horizon2020

**Participantes:**

- **Coordinador:** Stiftelsen Sintef (Noruega)
- Laboratorio Nacional de Energia e Geologia I.P (Portugal)
- Stichting Energieonderzoek Centrum Nederland (Holanda)
- Danmarks Tekniske Universitet (Dinamarca)
- Karlsruher Institut für Technologie (Alemania)
- Fundación CENER-CIEMAT (España)

**REHAP:** Systemic approach to Reduce Energy demand and CO2 emissions of processes that transform agroforestry waste into High Added value Products

Duración: 2016-10-01 a 2020-09-30

Financiación: Horizon2020

**Participantes:**

- **Coordinador:** Fundación Tecnalia Research & Innovation (España)
- Teknologian tutkimuskeskus VTT Oy (Finlandia)
- Universität Augsburg (Alemania)
- FORESA Industrias Químicas del Noroeste SA (España)
- Bio Base Europe Pilot Plant VZW (Bélgica)
- Fundación Cartif (España)

**GreenSolRes:** Demonstration of solvent and resin production from lignocellulosic biomass via the platform chemical levulinic acid

Duración: 2016-10-01 a 2020-08-31

Financiación: Horizon2020

**Participantes:**

- **Coordinador:** GFBiochemicals Italy Spa (Italia)
- Henkel KGaA (Alemania)
- Rheinisch-Westfaelische Technische Hochschule Aachen (Alemania)
- Leibniz - Institut für Katalyse e.V an der Universitat Rostock (Alemania)
- Vlaamse Instelling voor Technologisch Onderzoek N.V. (Bélgica)
- Hybrid Catalysis BV (Holanda)

**Zelcor:** Zero Waste Ligno-Cellulosic Biorefineries by Integrated Lignin Valorisation

Duración: 2016-10-01 a 2020-08-30

Financiación: Horizon2020

**Participantes:**

- **Coordinador:** Institut National de la Recherche Agronomique (Francia)
- Aalto-Korkeakouluosaatio (Finlandia)
- Avantium Chemicals BV (Holanda)
- The University of Warwick (Reino Unido)
- W 42 Industrial Biotechnology GmbH (Alemania)
- Hybrid Catalysis BV (Holanda)

**Forwarder2020:** Smart Forwarder for sustainable and efficient forest operation and management

Duración: 2016-10-01 a 2019-09-30

Financiación: Horizon2020

**Participantes:**

- **Coordinador:** Hohenloher Spezial-Maschinenbau GmbH & Co. KG (Alemania)
- Steinbeis Innovation GmbH (Alemania)
- Karlsruher Institut für Technologie (Alemania)
- Hydac System GmbH (Alemania)
- CSP Forestry Ltd (Reino Unido)
- Berner Fachhochschule (Suiza)

**PELIG:** Characterisation of a Novel Pathway for Lignin Fragment Degradation in Rhodococcus jostii

Duración: 2016-10-06 a 2018-10-05

Financiación: Horizon2020

**Participantes:**

- **Coordinador:** The University of Warwick (Reino Unido)

**FlexiFuel-CHX:** Development of a fuel flexible and highly efficient ultra low emission residential-scale boiler with coupled heat recuperation based on flue gas condensation

Duración: 2016-09-01 a 2018-12-31

Financiación: Horizon2020

**Participantes:**

- **Coordinador:** Windhager Zentralheizung Technik GmbH (Austria)
- Bios Bioenergiesysteme GmbH (Alemania)
- Technische Universität München (Alemania)
- CIEMAT (España)
- Evoplan AG (Suiza)
- Universiteit Utrecht (Holanda)

**STAR4BBI:** Standards and Regulations for the Bio-based Industry

Duración: 2016-09-01 a 2019-08-31

Financiación: Horizon2020

**Participantes:**

- **Coordinador:** Stichting Nederlands Normalisatie - Instituut (Holanda)
- Technische Universität Berlin (Alemania)
- Nova-Institut für Politische und Ökologische Innovation GmbH (Alemania)
- Stichting Wageningen Research (Holanda)

### **BIOSKOH: Innovation Stepping Stones for a novel European Second Generation BioEconomy**

**Duración:** 2016-06-01 a 2021-05-31

**Financiación:** Horizon2020

**Participantes:**

- **Coordinador:** Biochemtex SPA (Italia)
- Energochemica Trading AS (Eslovaquia)
- Novozymes A/S (Dinamarca)
- Lesaffre International SARL (Francia)
- Innventia AB (Suecia)
- Imperial College of Science, Technology and Medicine (Reino Unido)

### **uP\_running: Take-off for sustainable supply of woody biomass from agrarian pruning and plantation removal**

**Duración:** 2016-04-01 a 2019-06-30

**Financiación:** Horizon2020

**Participantes:**

- **Coordinador:** Fundación CIRCE Centro de Investigación de Recursos y Consumos Energéticos (España)
- Asociacion Agraria de Jóvenes Agricultores Alto Aragón (España)
- Services Coop de France, Union des Cooperatives Agricoles (Francia)
- Confederaçao Nacional das Cooperativas Agricolas e do Credito Agricola de Portugal CCRL (Portugal)
- Panhellenic Confederation of Unions of Agricultural Cooperatives Somateio (Grecia)
- Naukovo-Tehnichni Centar Biomasa LLC (Ucrania)

### **AGRIFORVALOR: Bringing added value to agriculture and forest sectors by closing the research and innovation divide**

**Duración:** 2016-03-01 a 2018-08-31

**Financiación:** Horizon2020

**Participantes:**

- **Coordinador:** Steinbeis 2I GmbH (Alemania)
- Institute of Technology Tralee (Irlanda)
- Ghent University (Bélgica)
- Stichting Wageningen Research (Holanda)
- Agencia Andaluza del Conocimiento (España)
- TEAGASC - Agriculture and Food Development Authority (Irlanda)

### **BABET-REAL5: New technology and strategy for a large and sustainable deployment of second generation biofuel in rural areas**

**Duración:** 2016-02-01 a 2020-01-31

**Financiación:** Horizon2020

**Participantes:**

- **Coordinador:** Institut National Polytechnique de Toulouse (Francia)
- CIEMAT (España)
- Universidad Nacional Autónoma de México (México)
- Universite de Reims Champagne-Ardenne (Francia)
- Laboratorio Nacional de Energia e Geologia I.P. (Portugal)
- Aalborg Universitet (Dinamarca)

### **INSERTRONIC: Development of highly-efficient low-emission log wood-fired closed fireplace INSERTs thanks to an automated elecTRONIC control system**

**Duración:** 2016-02-01 a 2018-01-31

**Financiación:** Horizon2020

**Participantes:**

- **Coordinador:** Rika Innovative Ofentechnik GmbH (Austria)

### **Residue2Heat: Renewable residential heating with fast pyrolysis bio-oil**

**Duración:** 2016-01-01 a 2019-12-31

**Financiación:** Horizon2020

**Participantes:**

- **Coordinador:** Rheinisch-Westfaelische Technische Hochschule Aachen (Alemania)
- Aalto-Korkeakouluusatio (Finlandia)
- B.T.G. Biomass Technology Group BV (Holanda)
- Teknologian Tutkimuskeskus VTT Oy (Finlandia)
- Universität Innsbruck (Austria)
- OWI Öl-Wärme Institut GmbH (Alemania)

### **Biomusud Plus:** Developing the sustainable market of residential Mediterranean solid biofuels

**Duración:** 2016-01-01 a 2018-12-31

**Financiación:** Horizon2020

**Participantes:**

- **Coordinador:** Asociación Española de la Valorización Energética de la Biomasa (España)
- CIEMAT (España)
- Aiel Associazione Italiana Energie Agroforestali (Italia)
- Turkiye Bilimsel Ve Teknolojik Arastirma Kurumu (Turquía)
- Centro da Biomassa para a Energia (Portugal)
- Bios Bioenergiesysteme GmbH (Austria)

### **ERIFORE:** Research Infrastructure for Circular Forest Bioeconomy

**Duración:** 2016-01-01 a 2018-01-31

**Financiación:** Horizon2020

**Participantes:**

- **Coordinador:** Teknologian tutkimuskeskus VTT Oy (Finlandia)
- Aalto-Korkeakoulusaatio (Finlandia)
- Institut Technologique FCBA (Foretcellulose Bois-Construction Ameublement) (Francia)
- Rise Processum AB (Suecia)
- Kungliga Tekniska Hoegskolan (Suecia)
- Fundación Tecnalia Research & Innovation (España)

### **US4GREENCHEM:** Combined Ultrasonic and Enzyme treatment of Lignocellulosic Feedstock as Substrate for Sugar Based Biotechnological Applications

**Duración:** 2015-07-01 a 2019-06-30

**Financiación:** Horizon2020

**Participantes:**

- **Coordinador:** Verein zur Förderung des Technologietransfers an der Hochschule Bremerhaven e.V. (Alemania)
- Universita degli Studi di Torino (Italia)
- Weber Ultrasonics GmbH (Alemania)
- Environmental Systems GmbH (Alemania)
- Teknologian tutkimuskeskus VTT Oy (Suecia)
- Fundación Tecnalia Research & Innovation (España)

### **PROVIDES:** PROcesses for Value added fibres by Innovative Deep Eutectic Solvents

**Duración:** 2015-07-01 a 2018-06-30

**Financiación:** Horizon2020

**Participantes:**

- **Coordinador:** Stichting S-ISPT (Holanda)
- Sappi Netherlands Services B.V. (Holanda)
- Universidade de Aveiro (Portugal)
- Teknologian tutkimuskeskus VTT Oy (Finlandia)
- Technische Universiteit Eindhoven (Holanda)
- Buckman Laboratories NV (Bélgica)

### **FlexiFuel-SOFC:** Development of a new and highly efficient micro-scale CHP system based on fuel-flexible gasification and a SOFC

**Duración:** 2015-05-01 a 2019-04-30

**Financiación:** Horizon2020

**Participantes:**

- **Coordinador:** Windhager Zentralheizung Technik GmbH (Alemania)
- Bios Bioenergiesysteme GmbH (Alemania)
- Technische Universiteit Delft (Holanda)
- HyGear B.V (Holanda)
- Universiteit Utrecht (Holanda)
- AVL List GmbH (Austria)

### **DIABOLO:** Distributed, integrated and harmonised forest information for bioeconomy outlooks

**Duración:** 2015-03-01 a 2019-02-28

**Financiación:** Horizon2020

**Participantes:**

- **Coordinador:** Luonnonvarakeskus (Finlandia)
- Bundesforschungs und Ausbildungszentrum für Wald Naturgefahren und Landschaft (Austria)
- Universite de Liege (Bélgica)
- Kobenhavns Universite (Dinamarca)
- Institut National de la Recherche Agronomique (Francia)
- Universidad Politécnica de Madrid (España)

### **SteamBio:** Flexible Superheated Steam Torrefaction and Grinding of Indigenous Biomass from Remote Rural Sources to Produce Stable Densified Feedstocks for Chemical and Energy Applications

**Duración:** 2015-02-01 a 2018-12-31

**Financiación:** Horizon2020

**Participantes:**

- **Coordinador:** Fraunhofer Gesellschaft zur Foerderung der Angewandten Forschung e.v. (Alemania)
- Heckmann Metall- und Maschinenbau GmbH (Alemania)
- Network New Europe Limited (Reino Unido)
- Fundación CIRCE Centro de Investigación de Recursos y Consumos Energéticos (España)
- Sveriges Lantbruksuniversitet (Suecia)
- Ava Green Chemistry Development GmbH (Alemania)

### **MOBILE FLIP:** Mobile and Flexible Industrial Processing of Biomass

**Duración:** 2015-01-01 a 2018-12-31

**Financiación:** Horizon2020

**Participantes:**

- **Coordinador:** Teknologian tutkimuskeskus VTT Oy (Finlandia)
- Commissariat a L'Energie Atomique et aux Energies Alternatives (Francia)
- Institut Technologique FCBA (Foretcellulose Bois-Construction Ameublement) (Francia)
- Rise Processum AB (Suecia)
- Maa Ja Elintarviketalouden Tutkimuskeskus (Suecia)
- Raussin Energia Oy (Finlandia)

### **greenGain:** Supporting Sustainable Energy Production from Biomass from Landscape Conservation and Maintenance Work

**Duración:** 2015-01-01 a 2017-12-31

**Financiación:** Horizon2020

**Participantes:**

- **Coordinador:** Fachagentur Nachwachsende Rohstoffe e.V. (Alemania)
- Landwirtschaftskammer Niedersachsen (Alemania)
- Syncom Forschungs- und Entwicklungsberatung GmbH (Alemania)
- Fundación CIRCE Centro de Investigación de Recursos y Consumos Energéticos (España)
- Grupo de Acción Local Bajo Aragón-Matarrana (España)
- Sogesca s.r.l. (Italia)

\*Se consideran los proyectos cuya información ha sido actualizada en CORDIS durante 2017

\*\*Se mencionan los coordinadores y hasta cinco participantes adicionales

# ANÁLISIS DE PATENTES

Durante el tercer trimestre de 2017 se han identificado en la base de datos WPI (World Patent Index) 208 familias de patentes sobre tecnologías de conversión de la biomasa para la producción de energía, excluyendo las invenciones con ámbito de protección exclusivamente asiático. Cabe señalar que el 68.8% de las familias se refiere a tecnologías termoquímicas. El 28.8% y el 8.7% hacen referencia a tecnologías bioquímicas y químicas, respectivamente. La tecnología de pirólisis/gasificación es la que cuenta con mayor número de resultados, 40.4% del total, seguida de la de combustión, con el 29.8% (Tabla 2).

Tipos de tecnologías de conversión de la biomasa	Nº Familias
Tecnologías termoquímicas	143
Combustión directa	62
Gasificación/pirólisis	84
Tecnologías bioquímicas	60
Digestión anaeróbica	30
Fermentación de azúcares	33
Tecnologías químicas (transesterificación, Fischer-Tropsch, síntesis de metanol)	18
<b>Nº total familia de patentes</b>	<b>208</b>

**Tabla 2.** Número de familias de patentes clasificados por tecnologías

**Nota:** Alguna invención puede incluirse en más de una tecnología

En la Tabla 3 se muestran los países líderes en protección. En primer lugar se encuentran las solicitudes internacionales (PCT), con 77 documentos; en segundo lugar se encuentra EE.UU., con 62. En tercer lugar y a distancia, se sitúa Alemania, con 18 referencias. En España, en el periodo analizado, se publicaron 4, ocupando la octava posición en el ranking. En la Tabla 4 se recogen los ámbitos de protección más representativos de las invenciones correspondientes a las distintas tecnologías.

	País	Nº Documentos
1	PCT	77
2	EE.UU. (US)	62
3	Alemania (DE)	18
4	Brasil (BR)	17
5	Rusia (RU)	16
7	EP	15
7	Francia (FR)	12
8	España (ES)	4

**Tabla 3.** Ranking por países

	Tipos de Tecnología (Nº Documentos)		
	Termoquímicas	Bioquímicas	Químicas
PCT	50	29	5
EP	9	5	1
Alemania (DE)	17	2	0
Brasil (BR)	10	5	2
EE.UU. (US)	42	20	6
España (ES)	4	0	0
Francia (FR)	4	5	3
Rusia (RU)	14	0	2

**Tabla 4.** Ámbitos de protección más solicitados por tecnologías

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

# TECNOLOGÍAS TERMOQUÍMICAS

## PATENTES

COMBUSTIÓN DIRECTA		
Nº Publicación	Solicitante (País)	Contenido técnico
FR3045659	Deneux Lionel et al. (FR)	<b>Manufacture of wood pellets used as fuel in stove.</b> The invention relates to an installation for the production of wood pellets from non - barked branches and to an associated pellet manufacturing process, said method comprising the following steps: a first grinding step (B1) of the branch, a first grinding step (B2) of the first branch grind that makes it possible to detach the bark and the non-woody parts of the wood, a first step of grinding (S2) (T1) in a first screen for removing the residual bark fines from the second ground, - a hot pressing step (P), through a die, of the second mill after separation of the residual fines, cooling step (R) allowing the curing of the granules resulting from the pressing.
DE102016002114	Het Heiz- und Energietechnik Entw (AT)	<b>Biomass furnace and working procedure.</b> The invention relates to a biomass furnace, in particular a pellet furnace, comprising: a combustion chamber (2) which is designed to receive pourable fuel (6) and which has a glow rod section (8), and an aftercombustion chamber (3) for the post - combustion of combustion gas (24), the combustion gas (24) being directed from the ember stick section (8) into the afterburning chamber (3).
WO2017108055	Inbicon AS (DK)	<b>Fluid composition comprising lignin and vinasse.</b> The present invention relates to a fluid composition comprising a solid fraction and a liquid organic fraction, wherein said solid fraction and said liquid fraction are present in a state of being intermixed, wherein said solid fraction comprises a lignin component, wherein said liquid fraction comprises an organic substance. Furthermore, the present invention relates to a process for the manufacture of such fluid compositions, to various uses thereof, and to a process for treatment of a lignocellulosic biomass.
US2017184315	Intel Corp (US)	<b>Energy efficient combustion heater control.</b> A method and apparatus for controlling a combustion heater are provided. An example method includes measuring a room temperature, measuring a combustion heater temperature, and measuring a fuel weight. Adjustments are computed to an operational parameter to adjust a room temperature. An anticipatory alert is provided to inform a user of a predicted time at which the fuel weight will be too low to maintain the room temperature
US2017176018	Original Pellet Grill Company LLC (US)	<b>Double-sealed high-temperature resistant DC ignitor for use with wood pellet burner assemblies.</b> Embodiments of the inventive concept provide a double-sealed high-temperature resistant DC ignitor for use with a wood pellet burner assembly. The DC ignitor includes a non-heating element portion. The non-heating element portion is connected to at least one of a battery or an AC to DC electrical transformer attached to the wood pellet burner assembly. A heating element is connected to the non-heating element portion, and extends by at least one inch into a combustion region of the wood pellet burner assembly. The heating element portion is configured to be heated by power received from the battery or the AC to DC electrical transformer. The DC ignitor provides safe, reliable, and fast combustion of wood pellets that congregate in a combustion region of the wood pellet burner assembly.
WO2017130165	Padhi Payodhar et al. (IN)	<b>A high temperature combustion system and its process thereof for producing heat for wide range of application.</b> The present invention provides a high temperature combustion system and a process for producing heat for wide range of application such as Industry, handicraft workshops, community kitchen, domestic usage etc. The present combustion system uses any kind of biomass as a primary source of fuel that has combustible properties and water as a secondary source of fuel and designed in such a way that can generate temperature more than 1000 degree centigrade, without emitting any harmful gases such as CO, SO2, CO2, NO2 etc. that can adversely affect either human health or Environment as a Whole.



Nº Publicación	Solicitante (País)	Contenido técnico
ES1186208	Pellax Spolka Z O O Spolka Komandytowa (PL)	<b>The unit for supplying air to the combustion chamber of a pellet burner.</b> The subject of the utility model is an unit for supplying air to the combustion chamber of a pellet burner having a housing with a delivery pipe of pellets and a rotary chamber, in addition, inside the housing there are a motor driving a shaft of a worm feeder of pellets and a fan, and a part of the burner housing is a blow-in chamber. The essence of a solution according to the utility model is a ring-shaped slot (14), which is an inlet of air from the blow- in chamber (7) to an axial part of the chamber (2), created between a contraction (9) on the outlet of a pipe of the worm feeder (5) and an inlet (10) of a reducer (11), an outlet (12) of which is fitted in a rear wall (13) of the combustion chamber (2).
DE202017001335	Spartherm Feuerungstechnik GmbH (DE)	<b>Fireplace.</b> Fireplace (1), in particular a fireplace or tiled stove, a fireplace insert or the like, A device for the combustion of solid fuels such as logs, wood presses such as brickets or pellets or mineral fuels such as coal or anthracite, comprising a fireplace body in which a wall (1.2), a back wall (1.4), a floor (1.5) and a combustion chamber door (1.1 (7), which is connected to the combustion chamber (1.3), is preferably arranged at least partially within an exhaust gas dome (2), characterized in that a catalytic converter module (4) is provided to the exhaust gas guide (7) assigned.
WO2017135154	Sumitomo Heavy Industries (JP)	<b>Combustion control system and combustion control method.</b> Provided is a combustion control system for controlling combustion of a boiler, the combustion control system comprising: an exhaust gas amount detection unit for detecting an exhaust gas amount exhausted from the boiler; and an energy amount adjustment unit for adjusting an amount of energy obtained by the boiler, using information on the exhaust gas amount detected by the exhaust gas amount detection unit.
US2017234533	Suncue Co Ltd (TW)	<b>Automatic ash discharge device for a burner.</b> An automatic ash discharge device for a burner has a furnace base, a duct set, and a discharge set. The furnace base has a combustion chamber, a mounting opening, a discharge mouth, two guiding faces, and multiple inlet holes. The combustion chamber is formed in the furnace base. The guiding faces are formed aslant in the furnace base. The inlet holes are formed through the guiding faces. The duct set is connected to the furnace base and has two bellows and a blower. The bellows are mounted on the furnace base respectively corresponding to the guiding faces and communicate with the combustion chamber. The blower communicates with the bellows. The discharge set is connected to the furnace base and has a receiving tank connected to the furnace base and communicating with the combustion chamber, and a discharge shaft rotatably mounted in the receiving tank.
US2017248307	WE2E LLC (US)	<b>Vortex combustion boiler.</b> The present invention is an improved vortex incinerator suitable for complete or near complete combustion of solid materials, such as coal, waste coal fines, petroleum coke, biomass, waste tires, as well as municipal solid waste. The improvement includes a pulverizer for reducing the aforementioned combustible materials into an appropriate size. In addition to the pulverizer, a further improvement over the aforementioned vortex incinerator is the use of a pneumatic feeder to introduce the pulverized combustible material into the combustion chamber.

## PIRÓLISIS/GASIFICACIÓN

Nº Publicación	Solicitante (País)	Contenido técnico
WO2017115019	Forestgas OY (FI)	<b>System and method for producing hydrogen rich syngas for hydrogen generation.</b> A process (100) for producing hydrogen-rich syngas by biomass gasification is provided. It comprises determining a height above a fixed bed in a downdraft gasifier (200) for introduction of one of oxygen and oxy-steam mixture in the downdraft gasifier (200). The height is based on mass-flux of biomass, diameter of biomass particles, relevant ambient temperature for water gas shift reaction to proceed in the forward direction, and thermal diffusivity. The process (100) comprises charging biomass through a lock-hopper (206) into the downdraft gasifier (200) and introducing the oxy-steam mixture in the downdraft gasifier (200) at the height determined. The char in the ignition zone at the bottom of the reactor is then ignited. Hydrogen-rich syngas is then collected from the downdraft gasifier (200). Mass-flux of the biomass is varied in a range of 0.05-0.11 kg/m <sup>2</sup> s to control a flame propagation rate (FPR) in the downdraft gasifier (200).
WO2017163266	Indian Inst Scient (IN)	<b>System and method for producing hydrogen rich syngas for hydrogen generation.</b> A process (100) for producing hydrogen-rich syngas by biomass gasification is provided. It comprises determining a height above a fixed bed in a downdraft gasifier (200) for introduction of one of oxygen and oxy-steam mixture in the downdraft gasifier (200). The height is based on mass-flux of biomass, diameter of biomass particles, relevant ambient temperature for water gas shift reaction to proceed in the forward direction, and thermal diffusivity. The process (100) comprises charging biomass through a lock-hopper (206) into the downdraft gasifier (200) and introducing the oxy-steam mixture in the downdraft gasifier (200) at the height determined. The char in the ignition zone at the bottom of the reactor is then ignited. Hydrogen-rich syngas is then collected from the downdraft gasifier (200). Mass-flux of the biomass is varied in a range of 0.05-0.11 kg/m <sup>2</sup> s to control a flame propagation rate (FPR) in the downdraft gasifier (200).
WO2017116025	Inst for Advanced Engineering et al. (KR)	<b>Apparatus for manufacturing torrefied materials by using mixed biomass.</b> The present invention relates to an apparatus for manufacturing torrefied materials by using mixed biomass. The present invention comprises: a raw material treatment part, which comprises a first supply part for storing plant biomass, a second supply part for storing animal biomass, and a third supply part for storing organic biomass, and individually dries and pulverizes each biomass; a mixture treatment part, which includes a raw material mixing part connected to the raw material treatment part so as to additionally mix the dried and pulverized biomass with a binder, thereby manufacturing mixed fuel forming the torrefied materials, a mixture storing part for storing the mixed fuel mixed through the raw material mixing part, and a mixture supplying part for supplying the mixed fuel to a torrefaction part; the torrefaction part mixing the mixed fuel and the binder, and removing oxygen, so as to carbonize the mixture, thereby manufacturing the same into the torrefied material; a torrefied material treatment part to which the torrefied materials, manufactured in the torrefaction part, are supplied and selectively molding the torrefied materials according to a request of a user; and a control part for controlling the driving of the raw material treatment part, the mixture treatment part, the torrefaction part, and the torrefied material treatment part.
WO2017133917	Klinkenberg Zaanstad B V (NL)	<b>Method and installation for torrefying biomass.</b> Method for torrefying biomass (28) whereby the method comprises a torrefaction step in which said biomass (28) is thermally treated at a temperature between 220 °C and 330 °C in a reactor (3), whereby the biomass (28) is present as a bed (29) of particles of biomass (28), whereby in the torrefaction step oxygen (30), is injected into said reactor (3), whereby said oxygen (30) is injected into said reactor (3) underneath said bed (28) or inside said bed (28), whereby in the reactor (3) the biomass (28) is heated by means of heat transfer through a reactor wall (7), whereby in the reactor (3) the biomass (28) is also heated by reaction with said oxygen (30), whereby a temperature of the biomass (28) in said reactor (3) is controlled, whereby the amount of oxygen (30) that is injected is used for controlling said temperature.
WO2017141955	Mitsubishi Heavy Ind Environmental & Chemical Eng Co Ltd (JP)	<b>Biomass fuel production plant.</b> Provided is a biomass fuel production plant (1) comprising: a drying heat source (13) that generates a heat medium; a drying device (3) that uses the heat medium supplied from the drying heat source (13) to heat and dry a wood biomass (B); a carbonized product production device (4) that performs pyrolysis of the dried wood biomass (B) so as to produce a carbonized product; a bulk density measurement device (5) that measures the bulk density of a carbonized product (C) discharged from the carbonized product production device (4); and a control device (8) that controls the amount of heat in the heat medium supplied to the wood biomass (B) in the drying device (3). The control device (8) controls the amount of heat in the heat medium supplied to the wood biomass (B) in the drying device (3) on the basis of an LHV calculation unit (47) that calculates the LHV of the carbonized product from the bulk density, and the calculated LHV.

Nº Publicación	Solicitante (País)	Contenido técnico
US2017240814	Phillips 66 Co (US)	<b>Two-stage biomass pyrolysis.</b> The present disclosure relates generally to a two-stage biomass pyrolysis processes that maximize pyrolysis vapor yield from a lignocellulosic biomass while being conducive to commercial-scale throughput of biomass. A lignocellulosic feedstock is first pyrolyzed in a reactor first stage comprising at least one auger at a temperature and residence time that produces pyrolysis vapors derived predominantly from cellulose and hemi-cellulose fractions of the feedstock. Partially-pyrolyzed feedstock from the reactor first stage is then pyrolyzed in a reactor second stage at a higher temperature for an additional residence time to produce additional pyrolysis vapors that are predominantly derived from lignin. Certain embodiments arrange multiple reactor first stages around a single reactor second stage.
WO2017157625	Siemens AG (DE)	<b>Device and method for generating a non-thermal plasma for the gasification of a mass using a pulse generator.</b> The invention relates to a device (I) and a method for generating a combustible gas from a mass (M), in particular a biomass, using a non-thermal plasma produced in a reactor (3), wherein an electric power supply system (7) that is controlled by a control system (5) applies pulse patterns over time to electrodes (9) of an electrode system that is provided in the reactor (3). The invention is characterised in that the power supply system (7) is a voltage pulse generator that has an inductive voltage adder (11).
WO2017160146	TorrGas Tech B V (NL)	<b>Process to prepare a char product and a syngas mixture.</b> The invention is directed to a process to prepare a char product and a syngas mixture comprising hydrogen and carbon monoxide from a solid biomass feed comprising the following steps: (i) performing a continuously operated partial oxidation of the solid biomass feed at a gas temperature of between 700 and 1100 °C and at a solids residence time of less than 5 seconds, (ii) continuously separating the formed char particles as the char product from the formed gaseous fraction and (iii) subjecting the gaseous fraction obtained in step (ii) to a continuously operated partial oxidation and/or to a steam reforming to obtain the syngas mixture. The solid biomass feed has been obtained by torrefaction of a starting material comprising lignocellulose and is a sieve fraction wherein 99 wt% of the solid biomass particles is smaller than 2 mm.
EP3214156	Turboden S P A (IT)	<b>Apparatus for feeding solid biomass to a gasifier.</b> A batch feeding apparatus of biomass to a gasifier is described. A casing is equipped with an inlet of the biomass, also provided in bulk by outside means, and with an outlet of a biomass load towards the gasifier. A transferring element has the function of transferring the biomass from the inlet to the outlet of the casing itself. The transferring element in turn comprises a compartment to temporarily collect a corresponding quantity of biomass. The transferring element is inserted in the casing and is movable with respect to the latter between an initial position, at which the collecting compartment is aligned with the inlet to receive a biomass load, and a final position at which the collecting compartment is aligned with the outlet, to unload the biomass load to the gasifier. A compacting piston is provided for in the collecting compartment.
WO2017100877	Univ Estadual de Campinas (BR)	<b>Integrated system for producing biofuels from waste and use thereof.</b> The present invention relates to an integrated system for producing devices from biomass and/or waste by the interconnection of hydrolysis apparatus using sub-supercritical water and semi-continuous or continuous gasification. With the proposed system, it is possible to convert solid or liquid biomass, waste from the agri-food industry or sanitary waste, into biofuels, and to produce fermentable sugars for the production of ethanol by hydrolysis, or a hydrogen-rich and/or methane-rich biogas by gasification.
US2017240934	Univ King Abdullah Sci & Tech (SA)	<b>Pyrolysis of lignin.</b> One aspect of the present invention relates to a method of modifying thermoplastic properties of lignin rich biomass to reduce agglomeration during any subsequent pyrolysis. The method comprises providing a lignin rich biomass and treating the lignin rich biomass with an alkali metal hydroxide or an alkaline earth metal hydroxide under conditions effective to reduce agglomeration, during any subsequent pyrolysis, compared to when the lignin rich biomass is not subjected to said treating. Also disclosed is a method of fast pyrolysis using the product of this method of modifying the thermoplastic properties of lignin rich biomass.
WO2017153970	Univ King Abdullah Sci & Tech (SA)	<b>Supercritical water gasification with decoupled pressure and heat transfer modules.</b> The present invention discloses a system and method for supercritical water gasification (SCWG) of biomass materials wherein the system includes a SCWG reactor and a plurality of heat exchangers located within a shared pressurized vessel, which decouples the function of containing high pressure from the high temperature function. The present invention allows the heat transfer function to be conducted independently from the pressure transfer function such that the system equipment can be designed and fabricated in manner that would support commercial scaled-up SCWG operations. By using heat exchangers coupled to the reactor in a series configuration, significant efficiencies are achieved by the present invention SCWG system over prior known SCWG systems.
DE102016100768	Universität Rostock (DE)	<b>Procedure to obtain biochar.</b> In a method according to the invention for producing biochar, biomass is treated in a reactor device in a hydrolysis phase, wherein acidification is carried out in the reactor device to form a acidified hydrolyzate and the acidified hydrolyzate is treated to form biochar.

# TECNOLOGÍAS BIOQUÍMICAS PATENTES

DIGESTIÓN ANAERÓBICA		
Nº Publicación	Solicitante (País)	Contenido técnico
EP3205629	Bioentech et al. (FR)	<b>Procedure for estimating the biodegradation of a substrate in a digester.</b> The invention relates to a method for estimating the characteristics of the biodegradation of a substrate by anaerobic digestion in a methanizer which is carried out from a near infrared spectroscopy analysis of a substrate sample and using a model for predicting the characteristics of a substrate so as to predict the biochemical potential of the methane and the time required for the production of methane expressed as a percentage of the biochemical potential of the methane of the substrate. Based on the predicted substrate characteristics, an anaerobic digestion model is implemented to determine an estimate of the characteristics of anaerobic digestion to predict the methanizer performance.
BR102015031011	Fermentec - Tecnologias em Açúcar e Álcool Ltda (BR)	<b>Integrated production process of oil and biogas from vinasse.</b> This document refers to an integrated process of production of lipids and biogas from the vinasse. The lipids are produced from the vinasse by oleaginous yeasts under aerobic conditions while the biogas is obtained anaerobically from the effluent of the lipid production process. The lipids are extracted from the yeast and used for the production of biodiesel and antifoam. In turn, biogas will be produced from the effluent from the lipid production process in order to reduce the organic load. Such an integration process will transform traditional distilleries into versatile bioenergy production units in the form of bioethanol, biodiesel, biogas and bioelectricity with lower environmental impact. This destination offers an excellent alternative to reduce the pollutant load of vinasse, in line with the economy of inputs and environmental sustainability.
US2017172055	Holistic Farming Inc (US)	<b>System and method for anaerobic digestion of animal wastes.</b> A new method of disposing of waste for the hog industry is disclosed which avoids use of lagoons. Manure is semi-continuously dewatered, anaerobically digested and digested with biomass to produce bio-organic fertilizer and biogas.
EP3181524	Holzer André (RU) et al.	<b>Method and plant for treatment under pressure of liquid feedstock.</b> The invention relates to a process for treating a feedstock (3) in a liquid form comprising the steps of providing a feedstock (3); optionally diluting the feedstock (3) by addition of an aqueous solution (5) in order to obtain a feedstock slurry (11), and subjecting the feedstock slurry (11) to an anaerobic fermentation in a biogas reactor (13) thereby forming a liquid phase (15) and gas phase (17), wherein the biogas reactor (13) is supplied with feedstock (3) or feedstock slurry (11) at least in an amount via which content of ammonium of at least 2.7 g/l as determined according to DIN 38406-5 is set in the liquid phase (15) and in that the anaerobic fermentation is conducted at a pressure of at least 0.13 MPa of the gas phase (17) in the head space of the biogas reactor (13). The invention also relates to the plant to perform the process.
WO2017109398	Jua Group (MU)	<b>Facility and method for biologically treating organic waste and effluents.</b> The facility comprises: - a first tank (1) comprising separation means (15) extending over a portion of the height of the tank, so as to define a central compartment, or tube (11), a peripheral compartment, or ring (12), and a compartment for stirring and biochemical exchanges (16) in the bottom portion of the tank, comprising stirring means (17), - a second tank (2) comprising separation means (25) extending over a portion of the height of the tank, so as to define a central compartment, or tube (21), a peripheral compartment, or ring (22), and a compartment for stirring and biochemical exchanges (26) in the bottom portion of the tank, comprising stirring means (27), - means (ALIM) for feeding the waste to be treated into the first ring - means (T) for transferring the partially treated waste from the first tube to the second ring, - means (EVAC) for discharging the treated waste out of the second tube, - advantageously pneumatic means (4, 43, 44) for circulating the waste from the first ring to the second tube.
WO2017098335	Primeco AS (PL)	<b>Device for hygienisation of post-fermentation sludge from biogas plant.</b> The object of the invention is a device for the hygienisation of the post-fermentation sludge from the biogas plant, characterised by it has a housing (1) having an elongated, cylindrical shape, in which a body (4) of a UV lamp of the elongated cylindrical shape is arranged, wherein the body is made of a material permeable to the UV radiation, is equipped with at least three partitions (3) made of the material permeable to the UV radiation, wherein the housing (1) is covered, on the inside, with a layer reflecting the UV radiation (2), and the UV lamp arranged in the body (4) includes an envelope (5), a filament (6) and a power supply.

Nº Publicación	Solicitante (País)	Contenido técnico
US2017211033	Purdue Research Foundation (US)	<b>Production of hydrogen using an anaerobic biological process.</b> Various embodiments of the present invention pertain to methods for biological production of hydrogen. More specifically, embodiments of the present invention pertain to a modular energy system and related methods for producing hydrogen using organic waste as a feed stock.
PL413809	Szkoła Główna Gospodarstwa Wiejskiego W Warszawie (PL)	<b>Application of new Lactobacillus buchneri M strain in the process of lignocellulose plants ensiling.</b> The subject of the application is a strain of Lactobacillus buchneri M, deposited in the Polish Collection of Microorganisms at the Institute of Immunology and Experimental Therapy, Wrocław, under number B / 00077, for use in preserving lignocellulosic biomass for biogas production. The application also includes the use of the new strain of Lactobacillus buchneri M in the lignocellulosic plant for biogas production.
US9684314	The Board of Regents of The Univ of Nebraska (US)	<b>Gas collection.</b> A system includes a vessel configured to couple with a gas source for drawing gas into the vessel. The vessel is also configured to receive liquid. The system includes an overflow port in fluid communication with the environment external to the vessel. The overflow port is configured to separate gas within the vessel from the external environment. The system also includes an overflow conduit having an end within the overflow port so that when gas pressure within the vessel increases, liquid is received by the overflow conduit. Another system includes a tank defining an air space for receiving gas generated during the biodegradation of biomass feedstock. The second system also includes an exhaust port, a first evaporator, a first condenser, an expansion valve, and a compressor. The second system also includes a heat exchanger, a second evaporator, and a second condenser.
WO2017109468	Thermo Pressure Tech Ltd (IE) at al.	<b>Biomass thermal pressure hydrolysis and anaerobic digestion.</b> A process is provided for preparing a low density, fibrous primary lignocellulose biomass, particularly straw for anaerobic digestion at large scale, i.e. >2 MWth, which comprises a step that greatly increasing the density of the straw through size reduction, moisture adjustment and compression ahead of loading and subsequent agitation of the resultant biomass in a pressure vessel through an atmosphere of saturated steam providing heat for thermal-pressure hydrolysis and recovering treated biomass from the vessel. The primary lignocellulose biomass may be prepared in admixture with secondary biomass which may be manure-based. There is also provided a feedstock for anaerobic digestion comprising a fibrous primary lignocellulose biomass in a finely divided state, a secondary biomass providing anaerobically digestible nitrogen and aqueous liquid, the primary biomass having a disrupted cellular structure such that its inherent buoyancy in aqueous liquid is lost and digestible carbon is released and the mixture being in the form of an aqueous slurry in a sterilized state. The feedstock after thermal pressure hydrolysis may be anaerobically digested e.g. by wet mesophilic anaerobic digestion to achieve a high unit throughput and biomethane output thus allowing the deployment of the system at large scale within the anaerobic digestion industry.
US2017158539	WM Intellectual Property Holdings L L C (US)	<b>System and method for converting organic waste into methane and other useful products.</b> An organic waste processing system and method for producing an organic waste slurry for the production of bio-gas, transportation fuels or chemical products, wherein the system and method produces an organic waste slurry having substantially ten to fifteen percent in total solids and high levels of COD.
FERMENTACIÓN DE AZÚCARES		
Nº Publicación	Solicitante (País)	Contenido técnico
WO2017140878	Biopract GmbH (DE)	<b>Arabinanase and uses thereof.</b> The invention relates to the use of an isolated arabinanase enzyme comprising the activities of (1-5)- $\alpha$ -arabinofuranosidic linkage endohydrolysis in (1-5)- $\alpha$ -L-arabinans (EC 3.2.1.99), and hydrolysis of (1-5)- $\alpha$ -arabinofuranosidic linkages at the non-reducing end of $\alpha$ -L-arabinans or $\alpha$ -L-arabinose-oligomers (EC 3.2.1.55), particularly an arabinan-degrading enzyme isolated from <i>Arxula adenivorans</i> as feed additive in livestock breeding. Furthermore, the invention relates to the application of the arabinanase in the production of fruit juices or biofuels.
WO2017091614	Cargill INC (US)	<b>Genetically modified yeasts and fermentation processes using genetically modified yeasts.</b> The present invention relates to a genetically engineered yeast capable of manufacturing a fermentation product using sucrose as a fermentation substrate, and fermentation processes using such a yeast. In some embodiments, the fermentation product is ethanol.

Nº Publicación	Solicitante (País)	Contenido técnico
US9677036	Central Indiana Ethanol LLC (US)	<b>Ethanol processing facility capable of using a plurality of different feedstocks.</b> An ethanol production facility is provided for processing a plurality of fermentable feedstock materials into an ethanol end product through fermentation and distillation. The facility includes a fermenting stage for converting the plurality of fermentable feedstocks into an alcohol mixture including ethanol and water, and a distillation stage. The distillation stage distills the low concentration alcohol mixture into a high concentration alcohol distillate. A kernel feedstock processing stage is provided for receiving the kernel containing feedstock, and includes a receiving station for receiving the kernel containing feedstock. A storage station is provided for storing the kernel based feedstock, and a mill is provided for milling the kernel based feedstock into a flour based feedstock. A conveyor is provided for conveying the milled flour based feedstock to the fermenting stage. A flour feed stock processing stage is operable in parallel with the kernel feedstock processing stage for receiving and processing a flour predominant feedstock. The flour feedstock processing stage includes a storage station for storing the flour for predominant feedstock, and a pneumatic conveyor for conveying the flour to the fermenting stage.
MX2015014521	Centro de Investigación y Asistencia en Tecnología y Diseño del Estado de Jalisco A C (MX)	<b>Ozone pre-treatment for lignocellulosic residues to increase the saccharification performance of reducing sugars.</b> The present disclosure is related to a pretreatment process of lignocellulosic material or residues, using ozone for the lignin selective oxidation, allowing increasing the saccharification performance of reducing sugars for the biofuel production with special emphasis on the moisture content of the material and the ozone dose to be used.
WO2017121902	Cic Nanogune - Asociación Centro De Investigación Coop en Nanociencias (ES)	<b>Endocellulases and uses thereof.</b> The invention relates to an endocellulase catalytic domain comprising the sequence of SEQ ID NO: 1 or a functionally equivalent variant of said catalytic domain that substantially maintains or improves its catalytic activity. The invention also relates to a polypeptide, a nucleic acid, an expression cassette, a vector or a host cell. Additionally, the invention relates to the use of an endocellulase catalytic domain or the polypeptide of the invention for hydrolysing cellulose, producing bioethanol or as a detergent. The invention also relates to a method for hydrolysing cellulose and for producing bioethanol.
US2017240925	Inst Nuclear Energy Res Atomic Energy Council Executive Yuan Roc (TW)	<b>Method of transforming biomass into hydrocarbon.</b> A method is provided to transform biomass. Non-food biomass is preprocessed. Then, fermentation is processed to generate ethanol. Ethanol is dehydrated through a catalyst to generate ethylene. After the dehydration, oligomerization is processed with a catalyst to transform ethylene into olefins having 6~20 carbon atoms (C6~C20). The olefins are hydrotreated into alkanes. Thus, C6~C20 hydrocarbons having long carbon chains are formed. The hydrocarbons having 6~10 carbon atoms can be used as gasoline; those having 8~16 carbon atoms, jet fuel; and those having 16~20 carbon atoms, diesel. On generating ethanol, byproducts of lignin may be generated. The byproducts can be processed through depolymerization/deoxygenation to generate aromatic hydrocarbons or can be gasified to generate methanol or dimethyl ether. By further processing dehydration, aromatic hydrocarbons are generated to be mixed into gasoline, jet fuel or diesel. Or, the lignin byproducts are gasified to generate syngas.
WO2017136915	logen (CA)	<b>Pretreatment of lignocellulosic biomass with sulfur dioxide and/or sulfurous acid.</b> A process for hydrolyzing lignocellulosic biomass includes feeding lignocellulosic biomass into a pretreatment reactor, wherein the pretreatment reactor has a headspace charged with sulfur dioxide previously used in the pretreatment of lignocellulosic biomass. In addition, acid comprising sulfur dioxide and/or sulfurous acid is fed into the pretreatment reactor (e.g., with the lignocellulosic biomass, separate from the lignocellulosic biomass, or a combination thereof) and the lignocellulosic biomass is heated. As the pretreated lignocellulosic biomass is discharged from the pretreatment reactor, at least a portion of the sulfur dioxide used in the pretreatment is retained in the headspace.
WO2017138462	Kawasaki Heavy Ind Ltd (JP)	<b>Method for producing saccharified liquid by enzymatic method using cellulose-type biomass as raw material.</b> The present invention addresses the problem of providing a method for producing a saccharified liquid, in which a biomass is solubilized early while keeping the concentration of solid materials in a reaction vessel at a high level to produce a slurry in an early stage of the enzymatic hydrolysis of cellulose contained in the biomass to solubilize the cellulose. In the method for producing a saccharified liquid according to the present invention, an aqueous solution containing a cellulose-degrading enzyme is injected into a reaction vessel and subsequently a milled biomass is supplied to the aqueous solution stepwise while stirring in an early stage of the mixing of the milled biomass with the aqueous solution in the reaction vessel. The final concentration of solid materials in the reaction vessel is adjusted to 15 to 30% by mass inclusive. The reaction vessel has a cone-like or head-plate-like bottom surface, and multiple impellers each having a large turning radius are provided at at least an upper part and a lower part of the reaction vessel to stir the ingredients in the reaction vessel.

Nº Publicación	Solicitante (País)	Contenido técnico
WO2017095042	Korea Res Inst Chemical Tech (KR)	<b>Development of biomass pretreatment technology via controlled feeding system of fibrous biomass into continuous high-pressure reactor.</b> The present disclosure relates to a high-pressure reactor for continuous hydrolysis of lignocellulosic biomass and a method for continuous high-pressure pretreatment. The present disclosure is very useful in continuous high-temperature, high-pressure steam explosion and hydrolysis of biomass because the surface area can be increased and the aspect ratio (fiber width/fiber length) can be decreased through quick hydration and abrasion and various crushed lignocellulosic biomass having different properties can be continuously injected into the high-pressure reactor, regardless of the kind of biomass.
WO2017112540	Novozymes AS (DK) et al.	<b>Processes for producing fermentation products.</b> The present invention relates to processes for producing fermentation products from starch-containing material, wherein an alpha-amylase and a thermostable hemicellulase is present and/or added during liquefaction. The invention also relates to compositions suitable for use in processes of the invention.
WO2017097312	Pontificia Univ Católica del Ecuador et al. (EC)	<b>Bioprocess for producing bioethanol from tagua nut.</b> The present invention relates to a bioprocess for obtaining bioethanol from the endosperm of tagua nut, a second-generation bioprocess, which consists in crushing tagua nuts and grinding same to obtain a fine powder having a particle size of less than 100 µm, and subsequently impregnating with 1% w/v H2SO4, performing acid hydrolysis in a reactor, filtering, neutralising, inoculating microorganisms, and fermenting, to finally obtain products and sub-products with industrial use.
US2017166881	Taipei Medical Univ et al. (TW)	<b>Poly-L-lactic acid (PLLA) microtube array membrane-immobilized yeast cells for bioethanol fermentation.</b> The invention uses a highly porous MTAM to immobilize yeast cells for bioethanol fermentation, a first in bioethanol production. The invention also optimizes the conditions to prepare MTAM-immobilized cells and evaluates their potential for batch bioethanol fermentation.
WO2017129607	Vib VZV (DE)	<b>Improvement of salt tolerance in yeast.</b> The present invention provides a chimeric gene useful to develop yeast strains for industrial fermentation at salt level conditions that reduce the fermentation efficiency. The invention also provides recombinant yeast strains for fermentation of second-generation substrates including cellulosic or lignocellulosic hydrolysates or of feedstocks with high salt levels. In addition, the invention relates to the use of such yeast strains for the production of second-generation biofuels.

# TECNOLOGÍAS QUÍMICAS

## PATENTES

Nº Publicación	Solicitante (País)	Contenido técnico
US2017218412	Commissariat Energie Atomique (FR)	<b>Use of nitric oxide or nitric oxide donor for inducing the production of triacylglycerols in microalgae.</b> The invention relates to a method for triggering triacylglycerols (TAG) accumulation in microalgae comprising the step of contacting a source of exogenous nitroxide (NO) with said microalgae in their growth medium.
AU2017203882	De Angelis Nazzareno (AU)	<b>Use of nitric oxide or nitric oxide donor for inducing the production of triacylglycerols in microalgae.</b> The invention relates to a method for triggering triacylglycerols (TAG) accumulation in microalgae comprising the step of contacting a source of exogenous nitroxide (NO) with said microalgae in their growth medium.
US9677005	Emerging Fuels Tech Inc (AU)	<b>Integrated fuel processing with biomass oil.</b> A gas to liquids process with a reduced CO2 footprint to convert both natural gas and a renewable feedstock material into fuels or chemicals. In one embodiment of the invention, a natural gas feed is converted into synthesis gas containing hydrogen and carbon monoxide. A minor portion of the hydrogen is thereafter extracted from the synthesis gas. The synthesis gas is converted to hydrocarbons in a Fischer Tropsch reaction. The Fischer Tropsch hydrocarbon product and a renewable feedstock are hydroprocessed with the extracted hydrogen in order to produce fuels and/or chemicals. Waste products from the renewable feed are recycled to produce additional synthesis gas for the Fischer Tropsch reaction.
WO2017132773	Epiphany Energy Corp (CA)	<b>Production of liquid hydrocarbons, biofuels and uncontaminated CO2 from gaseous feedstock.</b> There is provided a method for producing hydrocarbon compounds. The method comprising: producing a syngas by introducing a fuel stream comprising a reformable fuel into a reforming system (steam reformer, autothermal reformer, cold plasma reformer and/or internal-reforming fuel cell), and wherein the syngas comprises H2, CO and CO2, and has a ratio of [H2]/[CO] of about 1.4 to about 2.5; producing a decarbonated and dehydrated syngas from the syngas having a ratio of [CO2]/[CO + CO2] of no higher than 0.6; performing a Fischer-Tropsch synthesis on the decarbonated and dehydrated syngas in the presence of a cobalt- or iron-based Fischer- Tropsch catalyst, said Fischer-Tropsch catalyst comprising pellets of trilobe, cylindrical, hollow cylinder or spherical construction with diameter about 0.5 mm to about 3.0 mm and aspect ratio of 1 to 3.5, to produce a product stream comprising the hydrocarbon compounds; and recycling aqueous products and/or tail gas.
US2017233775	Genifuel Corp (US)	<b>Two-stage process for producing oil from microalgae.</b> A process for production of biofuels from algae can include cultivating an oil-producing algae by promoting sequential photoautotrophic and heterotrophic growth. The method can further include producing oil by heterotrophic growth of algae wherein the heterotrophic algae growth is achieved by introducing a sugar feed to the oil-producing algae. An algal oil can be extracted from the oil-producing algae, and can be converted to form biodiesel.
FR3047740	Inst Nat Polytechnique et al. (FR)	<b>Preparation of fatty acid alkyl ester.</b> The present invention relates to a process for preparing a composition containing C4-C18 alkyl esters of fatty acids comprising contacting lipid material with at least one alcohol in the presence of water and an amphiphilic catalyst followed by heating the reaction medium at a temperature of at least 70 ° C, with trapping of the generated water, for a time allowing a C4-C18 alkyl ester conversion of at least 70% to obtain a composition in the form of a purified mixture comprising C4-C18 alkyl esters of fatty acids and alcohol.
US9745541	Inventure Renewables Inc (US)	<b>Methods for making free fatty acids from soaps using thermal hydrolysis followed by acidification.</b> Provided are methods, processes and systems for treating a soapstock. In alternative embodiments, provided are systems and methods for treating a soapstock to generate free fatty acids and/or fatty acid derivatives, e.g. fatty acid alkyl esters. In alternative embodiments, provided are systems and methods for realizing the full fatty acid yield of a soapstock by first converting substantially all of the saponifiable material in a soapstock to salts of fatty acids (soaps) and acidulating the soaps to generate free fatty acids and/or fatty acid derivatives, e.g. fatty acid alkyl esters, wherein the soapstock comprises soaps and saponifiable lipids, e.g. glycerides and/or phospholipids, and the generating of free fatty acids and/or fatty acid is achieved.



Nº Publicación	Solicitante (País)	Contenido técnico
US2017218407	Kiverdi Inc (US)	<p><b>Biological and chemical process utilizing chemoautotrophic microorganisms for the chemosynthetic fixation of carbon dioxide and/or other inorganic carbon sources into organic compounds and the generation of additional useful products.</b></p> <p>The invention described herein presents compositions and methods for a multistep biological and chemical process for the capture and conversion of carbon dioxide and/or other forms of inorganic carbon into organic chemicals including biofuels or other useful industrial, chemical, pharmaceutical, or biomass products. One or more process steps utilizes chemoautotrophic microorganisms to fix inorganic carbon into organic compounds through chemosynthesis. An additional feature described are process steps whereby electron donors used for the chemosynthetic fixation of carbon are generated by chemical or electrochemical means, or are produced from inorganic or waste sources. An additional feature described are process steps for the recovery of useful chemicals produced by the carbon dioxide capture and conversion process, both from chemosynthetic reaction steps, as well as from non-biological reaction steps.</p>
FR3046790	Univ de Montpellier et al. (US)	<p><b>Process for converting the carbohydrates in biomass into alkyl levulinates.</b> The invention relates to a process for converting the carbohydrates present in a biomass into alkyl levulinates which consists in esterifying said biomass in an acidic aqueous medium and in the presence of at least one alkene and which is characterized in that said alkene is a disubstituted alkene having the number of carbon atoms greater than or equal to 7 and which comprises at least one ring, wherein the at least one ring has a number of carbon atoms between 5 and 7 and containing the double bond of alkene.</p>
MX2015014745	Univ Nac Autónoma de México (US)	<p><b>Process for obtaining biofuels from natural rubber microalgae oil.</b> The present disclosure is related to a process for obtaining biofuels using natural rubber sources (latex) from the native endemic species from Mexico: <i>Castilla elastica</i>, <i>Hevea brasiliensis</i> and <i>Parthenium argentatum</i> (Guayule), and the use of freshwater, or marine, or adapted to the marine environment freshwater microalgae oils from oleaginous strains adapted to the marine environment. The obtaining process of the present invention is performed in two stages: Degradation via metathesis and transesterification by homogeneous catalysis of oligomers. In the first stage, a new generation metathesis catalyst is used; an alkylidene or valylidene carbene complex, in a molar ratio [C=C/Ru] of 100 to 4000, At a temperature ranging from 40°C to 100°C. In the transesterification by homogeneous catalysis of oligomers step, a catalytic solution is used in the following relation: Solution (ml)/oligomers (ml) = 6:1 in an alcohol. The obtained biofuel by the described process, is formed by methyl esters of fatty acids and low molecular weight aliphatic hydrocarbons, and is a biodiesel/diesel blend.</p>
WO2017132242	Wu Xiao et al. (US)	<p><b>A liquid plasma discharge device and method for biodiesel synthesis using same.</b> A process comprises feeding a stream of reactant compounds to a reactor and discharging a liquid plasma into the reactant stream in the reactor, wherein the plasma initiates or accelerates a reaction of the reactant compounds to form a product composition. The reactor can comprise one or more chambers, a high-voltage electrode positioned at a first portion of the one or more chambers, a ground electrode positioned at a second portion of the one or more chambers, and a dielectric plate between the ground electrode and the high-voltage electrode that comprises openings through which the reactant stream can pass from the first portion to the second portion or from the second portion to the first portion. Discharging the plasma can include supplying electrical power to the high-voltage electrode such that plasma is discharged where the reactant stream flows through the openings.</p>

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# VT BIOMASA

## PATENTES

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