Fundación OPTI

SECTOR BIOMASA

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vigilancia tecnológica

1er trimestre 2012

# Aplicación informática BIORAISE

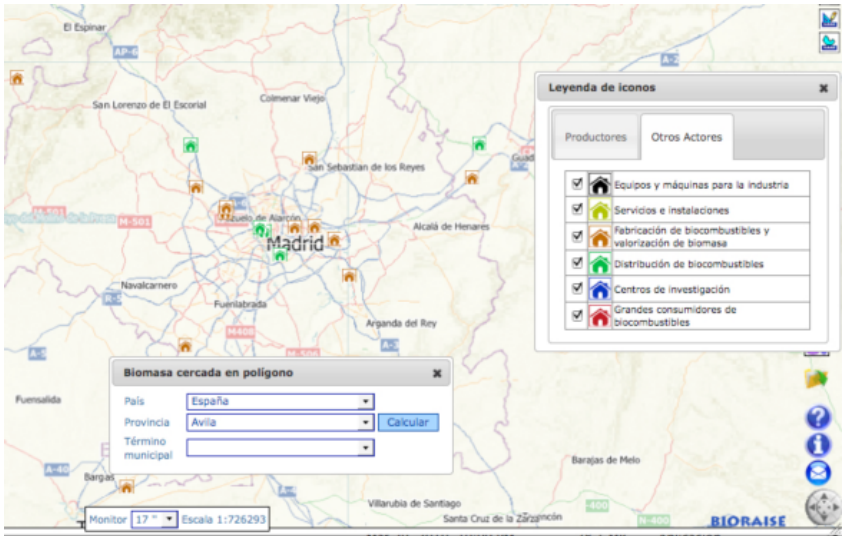
Ya está terminada y funcionando la actualización de la aplicación BIORAISE, un Sistema de Información Geográfica (SIG) on-line para calcular el potencial de biomasa, los costes de recolección y los de transporte en regiones de España, Portugal, Francia, Italia y Grecia.

La herramienta BIORAISE es de libre acceso desde los servidores del CEDER-CIEMAT (Centro de Desarrollo de Energías Renovables del Ciemat) (http://bioraise.ciemat.es/bioraise) o desde la WEB del proyecto BIOMASUD (http://biomasud.eu).

BIORAISE ofrece una visión global de las empresas del sector de la biomasa sólida y permite conocer la disponibilidad de recursos de biomasa en localizaciones geográficas concretas a través de un mapa-visor, un servicio de gran utilidad para promotores de proyectos de energías renovables. Además, la herramienta proporciona información a los usuarios que quieran saber si cerca de su domicilio hay fabricantes de pellets o instaladores de calderas de biomasa.

Hasta ahora, en la aplicación únicamente estaba contemplada la biomasa primaria, agrícola o forestal. Con la actualización, se ha ampliado su capacidad con datos de biomasa secundaria procedente de actividades industriales.

La primera versión se desarrolló en Septiembre de 2009 dentro del marco del proyecto CHRISGAS (www.chrisgas.com) financiado por el VI Programa Marco de la UE y se limitaba a los recursos de biomasa residual de campo existentes en España, Portugal, Francia, Italia y Grecia. BIORAISE permitía calcular tales residuos (en toneladas de materia seca anuales o en unidades de calor potencial, GJ/año) para superficies con radios discretos desde uno a 100 kilómetros alrededor de localizaciones seleccionadas previamente. Además, se podían estimar los costes tanto de extracción como de logística.




## SUMARIO

Mediante el proyecto BIOMASUD, se ha realizado una ardua tarea de recogida de datos de los recursos industriales y de las empresas del sector de la biomasa, implementado la capacidad de calcular el potencial de biomasa secundaria proveniente de las industrias forestales y agrícolas del espacio SUDOE (España, Portugal y Sur de Francia). Como resultado, en Enero de 2012 se puso en servicio una nueva versión de la aplicación en la que se incorporan nuevas funcionalidades, nuevos tipos de biomasa.

El proyecto BIOMASUD (http://biomasud.eu) está coordinado por AVEBIOM y financiado con fondos FEDER dentro del marco del programa Interreg IV B. Tiene como objetivo el diseño y la implementación de mecanismos de soporte que ayuden al desarrollo de un mercado sostenible de la biomasa sólida. Para conseguirlo, se definen unos requerimientos mínimos de sostenibilidad en toda la cadena de valor para este mercado. Además, se creará un sistema que audite y certifique el cumplimiento de estos requisitos, así como un sistema de trazabilidad que permita gestionar los recursos desde una perspectiva global.

Los socios del proyecto son, por parte de España, AVEBIOM, CEDER-CIEMAT (Centro de Desarrollo de Energías Renovables del Ciemat) y UCE (Unión de Consumidores de España); en Portugal, CBE (Centro da Biomassa para a Energia), CVR (Centro para a Valorizaçao de Resíduos); y por parte de Francia, UCFF (Union de la Coopèration Forestière Française), INRIA (Institut National de Recherche en Informatique et Automatique). (FUENTE: AVEBIOM)

## Análisis de patentes

En el primer trimestre de 2012 se han identificado en la base de datos WPI (World Patent Index) 399 familias de patentes con nuevos documentos sobre tecnologías de conversión de la biomasa para la producción de energía, lo que supone el 54% de las encontradas en el último trimestre de 2011. De la Tabla 1 se desprende que, aproximadamente, el 45% de las referencias encontradas están relacionadas con tecnologías termoquímicas y el 42% con bioquímicas. El 13% restante se refiere a tecnologías químicas. La tecnología de combustión directa, es la única que cuenta con más de cien resultados.

**TABLA 1.** Número de familias de patentes clasificadas por tecnologías

| TIPOS DE TECNOLOGÍAS DE CONVERSIÓN DE LA BIOMASA | 1er TRIM. 2012 |
|---|---|
| Tecnologías termoquímicas | 181 |
| Combustión directa | 104 |
| Gasificación | 49 |
| Pirólisis | 28 |
| Tecnologías bioquímicas | 166 |
| Digestión anaeróbica | 94 |
| Fermentación de azúcares | 72 |
| Tecnologías químicas (transesterificación, Fischer-Tropsch síntesis de metanol) | 52 |
| Nº TOTAL FAMILIAS DE PATENTES | 399 |

En la Tabla 2 se muestran los países líderes. Cabe destacar que el 45% de los documentos identificados se solicitaron en China y el 23% son solicitudes internacionales de patente (PCT). A continuación, aunque en mucha menor medida, destacan EE.UU. (12%), Japón (5%) y Corea (5%). España dispone de una referencia.

**TABLA 2.** Ranking por países

| | PAÍS | Nº REFERENCIAS |
|---|---|---|
| 1 | China (CN) | 203 |
| 2 | Patentes PCT (WO) | 104 |
| 3 | EE.UU. (US) | 55 |
| 4 | Japón (JP) | 21 |
| 5 | Corea (KR) | 21 |
| 6 | Patentes Europeas (EP) | 10 |
| 7 | Alemania (DE) | 8 |
| 8 | Francia (FR) | 7 |
| 9 | Polonia (PL) | 6 |
| 10 | Canadá (CA) | 4 |

En los apartados posteriores se recoge una selección de los documentos de patentes identificados en el trimestre analizado, así como un resumen de las noticias más significativas, clasificados por tecnologías.

## Solicitudes de Patentes Publicadas

Los datos que aparecen en la tabla corresponden a una selección de las solicitudes de patentes publicadas por primera vez durante el trimestre analizado.

Si desea ampliar información sobre alguna de las patentes aquí listadas, pulse sobre el número de patente correspondiente para acceder a la información online relativa a la misma.

## COMBUSTIÓN DIRECTA

| Nº DE PUBLICACIÓN | SOLICITANTE | PAÍS ORIGEN | CONTENIDO TÉCNICO |
|---|---|---|---|
| US2012012451 | KIOR INC | EE.UU. | SOLIDS REMOVAL FROM BIO-OIL USING BIOMASS FILTER AID. green process and system are disclosed for utilizing a biomass filter aid in the filtration of a bio-oil. The process comprises filtering a bio-oil containing residual solids from a conversion reaction in the presence of the biomass filter aid to produce a filtered bio-oil. The biomass filter aid facilitates efficient removal of residual solids from the bio-oil. The spent biomass filter aid containing the residual solids may be recycled as a conversion feedstock or used as a combustion heat source in the biomass conversion system. |
| EP2404660 | AIR PRODUCTS AND CHEMICALS, INC | EE.UU. | SORBENT USE WITH OXYFUEL SOUR COMPRESSION. Sulfur dioxide ($SO_2$) is removed from carbon dioxide feed gas comprising $SO_2$ as a contaminant by maintaining the carbon dioxide feed gas at an elevated pressure in contact with an alkaline sorbent for a period of time sufficient to react said alkaline sorbent with $SO_2$. Where NOx , oxygen ($O_2$ ) and water are also present, not only is the rate of reaction with the sorbent increased, but also additional $SO_2$ is removed by conversion to sulfuric acid, and NOx is removed as nitric acid. The method has particular application in the removal of $SO_2$ and NOx from flue gas produced by oxyfuel combustion of a hydrocarbon or carbonaceous fuel. |
| FR2962190 | LUCAS JEAN MARIE GABRIEL CHARLES | Francia | METHOD FOR INCINERATING E.G. WET BIOMASS TO PRODUCE ELECTRICITY, INVOLVES DRYING MATERIAL BY SUPERHEATED STEAM IN GAS CYCLING DRYER, AND AERATING MATERIAL BY GAS CYCLING GASIFIER THAT KEEPS ASHES OF MATERIAL IN NON MELTED FORM. The method involves drying material by superheated steam in a gas cycling dryer e.g. turning drum dryer or bed drum dryer. Heating of the dry stream is obtained by calories of the exhaust gas in a system that burns the material, and by the smoke produced by combustion of gases generated from the material. The material is aerated by a gas cycling gasifier that keeps the ashes of the material in non melted form and produces the gas without pyroligneous. An independent claim is also included for a system for incinerating wet material. |

## COMBUSTIÓN DIRECTA

| Nº DE PUBLICACIÓN | SOLICITANTE | PAÍS ORIGEN | CONTENIDO TÉCNICO |
|---|---|---|---|
| EP2405106 | SIB SIBER S.P.A | Italia | BIOMASS POWER PLANT. The present invention relates to a biomass power plant. This plant comprises a heat generator comprising a burner suitable for said biomass combustion, wherein to said combustion a flame and biomass combustion fumes are associated, a thermodynamic cycle electric energy production assembly, a main heat-exchanger in communication with the burner which puts the burner and the electric energy production assembly in a heat-transfer relationship. The main heat-exchanger comprises a first plurality of pipes which develop as a helix, delimiting a heat-transfer chamber in the main heat-exchanger, and a second plurality of pipes in fluid communication with the first plurality of pipes which develop as a helix, externally at least partially encircling the first plurality of pipes. These first and second pluralities of pipes are adapted to carry a working fluid and are in fluid communication with the electric energy production assembly such as to transfer to it, through said working fluid, part of the heat developed in the burner during the biomasses combustion for implementing said thermodynamic cycle. The burner is configured and arranged in respect to the heat-transfer chamber such that, during the biomasses combustion, the flame develops at least partially within said heat-transfer chamber, so that the working fluid in the first plurality of pipes is heated by convection by the fumes and by radiation by the combustion flame. |
| WO2011162185 | JFE ENG CORP et al. | Japón | BIOMASS CARBONIZATION DEVICE AND BIOMASS CARBONIZATION METHOD. A biomass carbonization device provided with a vertical-type carbonization furnace in which biomass is supplied to the upper part of the carbonization furnace, creating a biomass filling movement layer inside the carbonization furnace; high-temperature gas is supplied to the lower part of the carbonization furnace; and the biomass is brought into contact with the high-temperature gas to induce thermal decomposition. The carbonization device has a temperature control device for controlling the temperature within the carbonization furnace. The temperature control device maintains the lower part of the filling movement layer within a range of temperatures that are not lower than the tar volatization temperature at which the biomass undergoes thermal decomposition and tar is volatized, and no higher than the temperature at which excessive gas is produced when the biomass undergoes thermal decomposition. The temperature control device maintains the upper part of the filling movement layer within a range of temperatures that are not lower than the biomass desiccation temperature at which biomass is desiccated, and no higher than a tar condensing temperature at which the tar condenses. |
| ES1075583 | CALORIFICA DOMESTICA SL | España | CALDERA MODULAR. Caldera modular, que siendo del tipo de las destinadas a la combustión de biomasa, contando con un depósito de combustible, con la correspondiente tolva de alimentación de la biomasa, sistema de alimentación mediante sinfín, quemador, elementos de ventilación y sistemas de control electrónico, se caracteriza porque está constituida a partir de una serie de módulos, destinados a acoplarse lateralmente entre sí, en un número variable, en función de las necesidades específicas de cada caso, módulos que se dividen a su vez en un sub-módulo inferior y en un sub-módulo superior, con la particularidad de que el sub-módulo inferior está destinado a constituir el hogar de la caldera, presentando una configuración prismático rectangular, abierta por sus extremos, a base de paredes dobles. |

## COMBUSTIÓN DIRECTA

| Nº DE PUBLICACIÓN | SOLICITANTE | PAÍS ORIGEN | CONTENIDO TÉCNICO |
|---|---|---|---|
| CN202040972 | GUANG HU | China | HOT-WATER BOILER USING BIOMASS PARTICLE FUEL. The utility model provides a hot water boiler using biomass particle fuel, which does not fire off when in burning and discharges less dust. The hot-water boiler comprises a shell, a water jacket and a combustion chamber, wherein the water jacket and the combustion chamber are arranged in the shell. The lower part of the combustion chamber is provided with a fire grate, a feeding device and an ignition device, wherein the feeding device is used for feeding the biomass particle fuel to the fire grate, and the ignition device is used for igniting the biomass particle fuel on the fire grate; the upper part of the combustion chamber is communicated with a smoke channel, the shell pass of a heat exchanger is communicated with the water in the water jacket, and the tube pass of the heat exchanger is connected in the smoke channel in series; the tail end of the smoke channel is communicated with the inlet of a cyclone dust collector; and the outlet of the cyclone dust collector is provided with a draught fan. |
| CN102240614 | GAUNGZHOU DEVOTION THERMAL ENERGY TECHNOLOGY CO LTD | China | BIOMASS FLUE GAS CYCLONE SEPARATOR. The invention discloses a biomass flue gas cyclone separator. A cylindrical cyclone cylinder main body comprises a three-stage cyclone cylinder, and the side wall of an air inlet of the cyclone cylinder is tangent to the side wall of a cylinder body of a first stage cyclone cylinder. A structure of the multi-stage cyclone cylinder which is arranged allows materials to be pulverized after being subjected to continuous multilayer separation in cyclic processes, and minimal materials to be separated, so the cyclone separator of the invention has a higher efficiency than routine cyclone separators, allows the cycle number of the materials in a boiler to be increased, contributes to the burning-out of fuels, and allows the combustion efficiency of the boiler to be improved, the feeding amount of the cyclic materials and the slag removal amount of the boiler to be reduced, and the workload of firemen to be reduced. |
| CN102252321 | SUZHOU CHENCHANG NEW ENERGY TECHNOLOGY CO LTD | China | COMBUSTION DEVICE. The invention discloses an efficient combustion device for the combustion of pyrolysis gas from a biomass carbonization furnace. The device comprises an inlet end disc and a combustion chamber that are connected together. The inlet end disc is provided with an air inlet, inside which a pyrolysis gas ingressive pipe is installed. A biomass oil ingressive pipe is sleeved within the pyrolysis gas ingressive pipe, and one biomass oil ingressive pipe end close to the combustion chamber is provided with an atomization sprayer. Several flow deflectors are installed in the pyrolysis gas ingressive pipe. And the inlet end disc is also equipped with a primary air ingressive pipe communicated with the air inlet. In the combustion chamber, several refueling ingressive pipes are disposed near the inlet end disc. An igniter is installed on the combustion chamber which is also provided with a secondary air ingressive pipe. The combustion device of the invention not only can combust purified non-condensable pyrolysis gas, but also can combust the biomass oil generated in the low temperature pyrolysis process and the pyrolysis gas purification process of biomass raw materials, thus realizing the efficient recovery and utilization of pyrolysis gas energy. |

## COMBUSTIÓN DIRECTA

| Nº DE PUBLICACIÓN | SOLICITANTE | PAÍS ORIGEN | CONTENIDO TÉCNICO |
|---|---|---|---|
| CN102235684 | BEIJING KEJIQIAO TECHNOLOGY TRADE CO LTD | China | THREE-RETURN-STROKE REVERSE-COMBUSTION BIOMASS SUPERCONDUCTIVE HOT HALF GASIFICATION FURNACE. The invention relates to a three-return-stroke reverse combustion biomass superconductive hot half gasification furnace. The furnace has the following characteristics: 1. good heating effect: a furnace body is completely surrounded by a water jacket and is provided with a baffling heat absorption plate, the heating area is large, and the furnace can save energy by more than 60% compared with an ordinary furnace under the same condition; 2. environmentally friendliness and energy conservation: in the combustion mode, air is mainly supply from top to bottom under the aid of air supply from bottom, thus sufficient oxygen is supplied; the flame goes downwards in a mode of reverse combustion, volatile components in flue gas are burned completely to form bright yellow flame under the heating action of reverse combustion plate, the temperature is extremely high, no smoke goes out from a chimney, the flue gas is exhausted from the chimney through twice baffling in a baffling heat absorption plate; and the chimney is internally provided with a superconductive heat pipe which can absorb residual heat effectively, and the waste of heat is reduced greatly; 3. simpleness, convenience and quickness in operation: heating and cooking can be switched directly; and 4.wide fuel sources: and various biomass pressing blocks, smoke coal and smoke-free coal can be used as fuel of the furnace. |
| CN202048567 | FEIKUN HE | China | BIOMASS COMBUSTOR. The utility model discloses a biomass combustor which comprises a control box, a box body, an automatic feeding device, a combustion chamber and a fire nozzle. The automatic feeding device is arranged on the right upper side of the box body; the combustion chamber is arranged on the left side of the box body; the fire nozzle is communicated with the combustion chamber; a main blower and a main bellow which are used for supplying oxygen to the combustion chamber as well as an air supplement machine and an air supplement box which are used for supplying oxygen to the fire nozzle are arranged in the box body at the lower side of the automatic feeding device; the main blower is communicated with a furnace bridge used for supplying oxygen to the combustion chamber and burning the biomass in the combustion chamber, and an air supplement pipe is communicated between the air supplement box and the fire nozzle; an ash outlet is arranged at the bottom of the combustion chamber; an ignition port is arranged in a wall of the combustion chamber; and an inclined feeding port is arranged at the side of the combustion chamber and close to the automatic feeding device. |
| FR2960942 | COMETAL SERVICES SARL | Francia | COMBUSTION HEARTH FOR COMBUSTIBLE PRODUCT INCINERATOR I.E. BIOMASS INCINERATOR, THAT INCINERATES ORGANIC WASTE OF VEGETABLE, HAS STRANDS SEALED IN MANNER TO DIVIDE HOPPER INTO CAISSONS SEALED AGAINST ONE ANOTHER. The hearth has a combustion air supply hopper placed between side walls of a frame. The combustion air supply hopper is located under strands e.g. upper and lower strands, of a chain grid. The air supply hopper comprises partitions transversely extending between the side walls. The strands of the grid cooperate with top and bottom edges of head and foot of the partitions by a sliding contact. The strands are sealed in a manner to divide the air supply hopper into caissons sealed against one another. |

## GASIFICACIÓN

| Nº DE PUBLICACIÓN | SOLICITANTE | PAÍS ORIGEN | CONTENIDO TÉCNICO |
|---|---|---|---|
| WO2012004448 | ELORANTA LIRO JOHANNES | Finlandia | ELECTRICITY AND HEAT PRODUCTION SYSTEM. A heat and electricity production system constitutes of a gasificator, a combustion engine and an electric generator. In connection with the gasificator or with the exhaust channel of the gacificator there is a steamer which absorbs the heat into some evaporating liquid. The steam created by the steamer is lead trough a super steaming zone within the gasificator heat zone and through a regulator to a steam turbine which is connected to another electric generator. |
| US2012020846 | CLEARFUELS TECHNOLOGY INC | EE.UU. | INTEGRATED BIOREFINERY FOR PRODUCTION OF LIQUID FUELS. A system for the production of conversion products from synthesis gas, the system including a mixing apparatus configured for mixing steam with at least one carbonaceous material to produce a reformer feedstock; a reformer configured to produce, from the reformer feedstock, a reformer product comprising synthesis gas comprising hydrogen and carbon monoxide from the reformer feedstock; a synthesis gas conversion apparatus configured to catalytically convert at least a portion of the synthesis gas in the reformer product into synthesis gas conversion product and to separate from the synthesis gas conversion product a tailgas comprising at least one gas selected from the group consisting of carbon monoxide, carbon dioxide, hydrogen and methane; and one or more recycle lines fluidly connecting the synthesis gas conversion apparatus with the mixing apparatus, the reformer, or both. |
| CN102234545 | CHINA PETROLEUM & CHEMICAL et al. | China | PREPARATION METHOD OF SYNTHESIS GAS BY GASIFYING CARBONACEOUS MATERIALS. The invention relates to a preparation method of a synthesis gas by gasifying carbonaceous materials. The preparation method comprises the following steps: mixing the carbonaceous materials with an optional gasification catalyst, drying and dewatering, and pulverizing to obtain carbonaceous particles; separately introducing the carbonaceous particles and gasification agents with different oxygen contents to different parts of a gasifier in a segmented manner, and carrying out reaction in the gasifier to generate a gas product containing the synthesis gas and ash; and mixing all or part of the ash with the carbonaceous particles and returning to the gasifier, and discharging the remaining part out of the system. The preparation method provided by the invention has high adaptability to raw materials and is adaptable to any carbonaceous materials with carbon contents of 1-100wt%, can optimally control the combustion and gasification of the carbonaceous materials and the secondary reaction of the products, and couple fast combustion reaction with slow gasification reaction to realize the autothermal equilibrium of the system and obtain high-yield synthesis gas. |

## GASIFICACIÓN

| Nº DE PUBLICACIÓN | SOLICITANTE | PAÍS ORIGEN | CONTENIDO TÉCNICO |
|---|---|---|---|
| CN102252317 | ZHUANGRONG MU | China | GASIFICATION COMBUSTOR FOR BIOMASS GRANULES. The invention relates to a gasification combustor for biomass granules. The gasification combustor comprises a shell, wherein a filler device is arranged on the shell; an inner container and a blast blower are arranged in the shell; and an ignition tuyere and a fire grate is formed on the lower part of the inner container. The gasification combustor is characterized in that: an annular air diffuser is arranged on the upper part in the inner container; a carbonization area corresponds to the ignition tuyere in the inner container, a reduction area is positioned between the carbonization area and the fire grate, and a gasification area is positioned outside the fire grate; the gasification area is connected with a filter by a connection pipe; a gas pipe is arranged at an outlet of the filter; an ash discharge opening is formed at the bottom of the filter; a burner and an ignition device are arranged at the lead-out end led out of the filter and the shell on the gas pipe; and the blast blower is connected with the air diffuser and the burner respectively by a pipeline and a valve arranged on the pipeline. The gasification combustor can gasify the biomass granules fully, is good in combustion effect, high in heat efficiency and heat value, energy-saving, low-carbon, environment-friendly and low in discharge, can replace fuel oil, gas and fire coal, and does not have oil tar, waste water and smoke dust; and the gasification combustor has a compact structure, and is easy and convenient to mount, small in space occupation and wide in application range. |
| US2011315931 | AFTON CHEMICAL CORP | EE.UU. | NANOPARTICLE CATALYSTS AND METHOD OF USING THE SAME FOR BIOMASS GASIFICATION. A nanoalloy catalyst, dual catalyst and methods for improving the efficiency and output of a biomass gasification process are provided where the catalysts comprise a volatile organometallic compound(s) and/or a nanoalloy catalyst. The subject nanoalloy catalyst cracks and gasifies lignin, which is generally inert in conventional gasification, at relatively low gasification temperatures. The subject disclosure also provides a means to increase gas yields and lower lignin content in the resulting product relative to conventional gasification. Alternatively, oil production may be increased, if desired. Moreover, the resulting gas may achieve a Fischer-Tropsch reactor favorable H2:CO ratio of up to about 9:1. The energy input to the gasification is correspondingly reduced to reduce costs and the environmental impact associated with the gasification process. |
| WO2012005768 | JURANITCH JAMES CHARLES et al. | EE.UU. | PLASMA FEEDWATER AND/OR MAKE UP WATER ENERGY TRANSFER SYSTEM. A method and system for converting a feedstock using thermal plasma or other gassifier, into a feedwater or make up water energy transfer system. Feedstock is any organic material or fossil fuel. The energy transferred in the feedwater or make up water is used in any Rankine or other steam process, or any process that requires heat. Heat is extracted from a gas product issued by a gassifier and is delivered to a power plant via its feedwater system or make up water system. Preferably, the gassifier is a plasma gassifier and the gas product is syngas that is combusted in an afterburner. A heated air flow and/or EGR flow is provided to the afterburner at a variable flow rate that is responsive to an operating characteristic of the afterburner. |

## GASIFICACIÓN

| Nº DE PUBLICACIÓN | SOLICITANTE | PAÍS ORIGEN | CONTENIDO TÉCNICO |
|---|---|---|---|
| WO2012004001 | ENI SPA | Italia | PROCESS FOR THE PRODUCTION OF SYNTHESIS GAS BY MEANS OF A FLUID BED GASIFICATION REACTOR FED WITH CARBONACEOUS MATERIAL AND DEVICE SUITABLE FOR THE PURPOSE. A process for the production of synthesis gas which comprises : feeding a carbonaceous material having a particle-size lower than or equal to 50 mm, to a gasification reactor; feeding an oxidizing gas to the bottom of the reactor at a flow-rate which is such as to give the solid mass present in the reactor an aspect of a biphasic bed; filtering the solid particles entrained by the gas, in a cyclone filter positioned internally at the top of the reactor; discharging from the cyclone filter a gaseous stream essentially consisting of synthesis gas and unreacted oxidizing gas; and recycling the filtered solid particles, discharged at the base of the cyclone, directly to the biphasic bed, through an inner duct. |
| CN102191089 | XIANFA WAN | China | TWO-STAGE HIGH-TEMPERATURE PREHEATED STEAM BIOMASS GASIFICATION FURNACE. The invention discloses a two-stage high-temperature preheated steam biomass gasification furnace. According to the invention, steam with a high temperature is used as a gasification agent. Fuel gas with high quality and high heat value is obtained through the gasification of the biomass. Meanwhile, active carbon, which is a byproduct, is produced. The gasification furnace is composed by a first reactor and a second reactor. The first reactor is a fixed bed gasification section, where volatile matters in feedings are removed. During the process, only high-temperature preheated pure steam provided by a high-temperature air generator is used.The second reactor is a spouted bed gasification section, where a high-temperature preheated mixture of air and steam is used for a complete cracking reaction and a tar breaking reaction. The biomass gasification furnace provided by the present invention has advantages of high gasification efficiency, high gasification speed, complete reaction, high utilance of raw materials, and is energy saving and environment protecting. The fuel gas produced by the gasification furnace has advantages of good quality and high heat value. |
| EP2399973 | SIEMENS AG | Alemania | A BIOMASS GASIFICATION SYSTEM AND A METHOD FOR BIOMASS GASIFICATION. A biomass gasification system includes a gasifier for producing a combustible gas known as producer gas or synthesis gas by gasifying biomass in presence of oxidizer, a gas engine for receiving the synthesis gas atleast from one of the gasifier or a gas storage for generating energy using the synthesis gas, and the gas storage for receiving and storing the synthesis gas and providing the synthesis gas stored in the gas storage to the gas engine on a basis of availability of the synthesis gas from the gasifier to the gas engine. The gas storage further provides the synthesis gas to the gasifier for providing heat to the gasifier to enhance the gasification process. |

## GASIFICACIÓN

| Nº DE PUBLICACIÓN | SOLICITANTE | PAÍS ORIGEN | CONTENIDO TÉCNICO |
|---|---|---|---|
| CN202040828 | WUHAN KAIDI ENGINEERING RES INST CO LTD | China | BIOMASS FUEL TWO-STAGE MATERIAL PLUG SPIRAL POSITIVE-PRESSURE CONTINUOUS FEEDING DEVICE. The utility model discloses a biomass fuel two-stage material plug spiral positive-pressure continuous feeding device which aims at solving the defects that the feeding device of a biomass boiler or a gasification furnace is easy to block, continuous positive-pressure feeding can not be realized, fire is easy to occur, the failure rate of equipment is high and the like. The device is mainly formed by connecting a first-stage spiral feeding machine, a vertical cylinder and a second-stage spiral feeding machine in series, wherein a feed port at the upper end of the vertical cylinder is connected with the output end of the first-stage spiral feeding machine, a discharge port at the lower end of the vertical cylinder is connected with the input end of the second-stage spiral feeding machine and the output end of the second-stage spiral feeding machine is connected with a feed port of a furnace chamber of the biomass fuel boiler or the gasification furnace. Further, a fire-fighting medium spraying joint is arranged on the cylinder wall of the vertical cylinder. The device is conductive to stabilizing and regulating the temperature of the furnace chamber of the biomass boiler or the gasification furnace, improving the load stability, ensuring the safety of burning of the furnace chamber, and prolonging the continuous operation time of the boiler and the gasification furnace thus reducing the fire risk to the lowest level. |
| WO2011159352 | FRONTLINE BIO ENERGY LLC | EE.UU. | PRODUCING LOW TAR GASES IN A MULTI-STAGE GASIFIER. A system for gasifying solid matter uses multiple stages to produce low-tar combustible gas includes a first reactor having a fluidized bed to produce hydrogen containing gas, pyrolysis vapors, tars, and char particles at temperature less than the exit of the second reactor and a higher temperature partial oxidation combustor zones. A second reactor includes a higher temperature partial oxidation zone to activate hydrogen and cause cracking of aromatic ring compounds, a co-flow moving granular bed with a char gasification stage to catalyze tar reduction,and control char residence time, and a media screen comprising a parallel wire screen substantially vertically oriented supporting granular media. |
| CN202047039 | YANGZHOU POLYTECHNIC INST | China | EXHAUST PREHEATING TYPE BIOMASS GASIFICATION DEVICE OF DUAL-FUEL ENGINE. The utility model discloses an exhaust preheating type biomass gasification device of a dual-fuel engine, which comprises a biomass gasifier, a dual-fuel engine, a heat exchanger and the like. part of high-temperature exhaust gas from the dual-fuel engine is guided into a spiral tube disposed inside the gasifier, and materials in the gasifier can be heated, so that biomass gasification temperature and interior catalytic pyrolysis chamber temperature can be increased, pyrolysis of tar in gas inside the gasifier is benefited. The heat exchanger disposed at an outlet of the gasifier is capable of providing self-produced vapor and condensing and cooling the gas, so that the vapor and air are used as gasification agents, while gas heat value of the gasification agents compared with the air, generally used as the gasification agent for a down-draft gasifier is increased by above 20%. The exhaust preheating type biomass gasification device integrates biomass gasification and interior catalytic pyrolysis of the tar, so that the tar in the gas is purified effectively, while tar content compared with tar content in gas of a common fixed-bed gasifier is reduced by above 60%. The exhaust preheating type biomass gasification device is simple in structure, low in flow resistance and easy to implement. |

## PIRÓLISIS

| Nº DE PUBLICACIÓN | SOLICITANTE | PAÍS ORIGEN | CONTENIDO TÉCNICO |
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| WO2012009207 | UOP LLC et al. | EE.UU. | CHAR-HANDLING PROCESSES IN A PYROLYSIS SYSTEM. Char-handling processes for controlling overall heat balance, ash accumulation, and afterburn in a reheater are provided. Carbonaceous biomass feedstock is pyrolyzed using a heat transfer medium forming pyrolysis products and a spent heat transfer medium. The spent heat transfer medium is separated into segregated char and char-depleted spent heat transfer medium. The char-depleted spent heat transfer medium is introduced into a dense bed of heat transfer medium fluidized by a stream of oxygen-containing regeneration gas. All or a portion of the segregated char is combusted in the dense bed using the stream of oxygen-containing regeneration gas. A portion of the segregated char may be exported out of the pyrolysis system to control the overall heat balance and ash accumulation. |
| WO2011160163 | UNIV CURTIN TECH et al. | Australia | METHOD OF AND SYSTEM FOR GRINDING PYROLYSIS OF PARTICULATE CARBONACEOUS FEEDSTOCK. A pyrolysis plant comprises a grinding pyrolyser, being a machine or apparatus in which both particle size reduction and pyrolysis occur simultaneously. Plant also comprises a bin for holding wet particulate biomass feedstock. Chute leads from the bin to a biomass dryer which reduces moisture content of the feedstock to below about 10 % wt. Dried feedstock is conveyed from dryer via line to a dried biomass feedstock hopper. Dried feedstock is fed from hopper into a chute which leads to an inlet trunnion of grinding pyrolyser. A discharge trunnion of grinding pyrolyser leads to a char holder for collecting char particles and a condensation train for condensing vapour generated by the pyrolysis to produce oil. |
| WO2012005784 | CATCHLIGHT ENERGY LLC et al. | EE.UU. | SOLVENT-ENHANCED BIOMASS LIQUEFACTION. The present invention provides an improved method for solvent liquefaction of biomass to produce liquid products such as transportation fuel. The method uses a novel solvent combination that promotes liquefaction relatively quickly, and it reduces the need to transport large amounts of hydrogen or hydrogen-carrying solvents. It operates at lower pressure than previous methods, does not require a catalyst or hydrogen gas or CO input, and provides very high conversion of biomass into a bio-oil that can be further processed in a petroleum refinery. It also beneficially provides a way to recycle a portion of the crude liquefaction product for use as part of the solvent combination for the biomass liquefaction reaction. |
| WO2011159154 | STICHTING ENERGIE et al. | Holanda | PYROLYSIS OF LIGNIN. The invention provides a process for the pyrolysis of lignin. The lignin- containing material is intimately mixed with a phyllosilicate clay and optionally pelletised. The pelletised starting material is fed into a pyrolysis reactor and pyrolysed to provide a pelletised carbonaceous product and a bio-oil containing lignin monomers. |

## PIRÓLISIS

| Nº DE PUBLICACIÓN | SOLICITANTE | PAÍS ORIGEN | CONTENIDO TÉCNICO |
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| CN102199440 | ANHUI UNIVERSITY OF SCIENCE & TECHNOLOGY | China | METHOD FOR PREPARING LOW-ACIDITY AND LOW-OXYGEN CONTENT BIOLOGICAL OIL BY TWO-SECTION CONVERSION. The invention discloses a method for preparing low-acidity and low-oxygen content biological oil by the two-stage conversion of biomass, which comprises: allowing biomass granules (which are less than or equal to 1 millimeter) serving as raw materials to enter a fluidized bed reactor from the screw feeder at the speed of 0.005 t/h; cracking in a fluidized bed cracking reactor at the temperature of between 400 and 450 DEG C under the condition that the N2 feed is 1.37 m<3>/hour and under the pressure of between 0.01 and 0.1 MPa; and condensing biological oil steam by a microwave catalyst bed and the upgrading deoxidation of a catalyst under the condition of taking noncondensable gas generated by a cracking reaction as spouted gas and fluidifying gas (a ratio of the spouted gas to the fluidifying gas ranges from 1 to 10) and carrier gas to obtain the low-acidity and low-oxygen content biological oil. When the method is used, steam products can outflow continuously, and the biomass granules serving as the raw materials are circulated in a bed (the retention time of the biomass granules in the reactor is 0.1 to 3 seconds), so that large granules are cracked fully until the granules are diminished to be discharged from a bed layer by the gas. The biomass oil steam cracked by the fluidized bed in the first stage is subjected to catalytic upgrading in a microwave field, so energy consumption is reduced, and the quality of the biological oil is improved. |
| WO2011159768 | VIRESCO ENERGY et al. | EE.UU. | LOW OXYGENATE BIO-OIL THROUGH TWO STAGE PYROLYSIS. A two-stage pyrolysis process is used to produce a low oxygenate bio-oil. In the first stage, biomass feedstock is subjected to a slow pyrolysis to convert the biomass feedstock into a low-oxygen content biomass feedstock having an oxygen removal degree of at least 0.5 at minimal carbon loss, while the low-oxygen content biomass feedstock is subjected to flash pyrolysis in the second stage. So produced bio-oil has low oxygenate content and therefore significantly improved storage and stability properties. |
| CN202030705 | TIANJIN CITY SHURONG BIOLOG TANBAO TECHNOLOGY CO LTD | China | CO-PRODUCTION EQUIPMENT UTILIZING VARIOUS BIOMASS RAW MATERIALS FOR CARBON, GAS AND OIL PREPARATION. The utility model relates to co-production equipment utilizing various biomass raw materials for carbon, gas and oil preparation, which comprises a carbonizing kiln, a draft fan, a purification and recovery device and a tail gas treatment device. The equipment is characterized in that the carbonizing kiln adopts a pool structure, the pool type carbonizing kiln is connected with a filtering and purification pool, the filtering and purification pool is connected with the purification and recovery device, the purification and recovery device is connected with the draft fan, the draft fan is connected with a gas separator, and the gas separator is connected with the tail gas purification and recovery device. Various raw materials can be mixed for combustion, destructive distillation and carbonization, so as to change the single utilization of biomass raw materials, and enlarge the utilization range of biomass raw materials; biomass carbon, biomass tar, pyroligneous liquor and biomass gas produced by the equipment all have high use value; and compared with the traditional smoldering carbon production method, the equipment has the advantages that the production cycle is shortened, the yield and the quality are improved, and byproducts can be used as industrial raw materials. |

## PIRÓLISIS

| Nº DE PUBLICACIÓN | SOLICITANTE | PAÍS ORIGEN | CONTENIDO TÉCNICO |
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| CN202030708 | UNIV SHANDONG TECHNOLOGY | China | SOLID BIOMASS HEATING PYROLYTIC LIQUEFACTION SYSTEM WITH HEAT STORAGE BALL. The utility model provides a solid biomass heating pyrolytic liquefaction system with a heat storage ball. An outlet of a heat storage ball heating device is communicated with a feed inlet of a reactor by a feeding device, a discharge outlet of the reactor is communicated with a separating device, an ash case is connected to the bottom of the separating device, the top of the separating device is connected with a pyrolysis gas treatment device, and a second heat storage ball outlet on the lateral wall of the lower end of the separating device is connected with the heat storage ball heating device by a heat storage ball lifting device. The solid biomass heating pyrolytic liquefaction system is characterized in that the reactor is a sleeve type reactor and comprises an inner tube and an outer tube which are coaxially sleeved, two ends of the inner tube are respectively communicated with the feeding device and the separating device, a hot air outlet and a hot air inlet of the outer tube are respectively communicated with the heat storage ball heating device, the separating device consists of a separating case and a sieve plate obliquely disposed inside the separating case, the sieve plate is oblique along the direction of an outlet at the bottom of the inner tube, the lower end of the sieve plate is connected with the second heat storage ball outlet, and the upper end of the sieve plate and the lateral wall of the separating case form a falling opening of charcoal ash. The solid biomass heating pyrolytic liquefaction system saves energy consumption, and is high in continuous running capacity and liquid conversion rate and excellent in working performance. |

## PRODUCCIÓN DE HIDRÓGENO A PARTIR DE GASIFICACIÓN DE BIOMASA

En la Universidad de Castilla-La Mancha se está desarrollando un proyecto de investigación para obtener hidrógeno a partir de la gasificación de biomasa. El trabajo está financiado por la empresa Husesolar en el marco de un proyecto con CDTI.

El trabajo estudia la viabilidad técnica de la gasificación de biomasa acoplada a un proceso Water-Gas Shift (WGS). Uno de los primeros objetivos cumplidos fue seleccionar los tipos de biomasa más adecuados para la realización del proyecto, optándose por el orujo de uva y el sarmiento de vid.

El paso siguiente fue realizar un exhaustivo estudio experimental para analizar el proceso de gasificación de dichos combustibles con el objeto de seleccionar las condiciones operativas, tratando, por un lado, de maximizar la producción de hidrógeno del gas de síntesis y, por otro, de maximizar la eficiencia del proceso y la calidad del gas obtenido. Por último, y empleando los resultados obtenidos, se llevó a cabo un estudio del proceso WGS con el fin de enriquecer el contenido de hidrógeno del gas. Para realizar este proceso se ensayaron catalizadores comerciales de alta, media y baja temperatura y se seleccionaron las condiciones operativas óptimas del reactor catalítico.

El equipo asegura que tras los estudios realizados en el laboratorio será necesario llevar a acabo una segunda fase a nivel industrial para realizar una evaluación técnico-económica del proceso a gran escala.

## EL CAFÉ COMO FUENTE DE ENERGÍA

Investigadores del Energy & Environmental Research Center (EERC) de la Universidad de Dakota del Norte trabajan en colaboración con la empresa de bioenergía Wynntryst LLC, ubicada en Vermont, y con la empresa cafetera Green Mountain Coffee Roasters en en un proyecto destinado a la utilización de los desechos de su planta de procesamiento de café para producir energía.

El EERC está trabajando con las empresas para desarrollar un sistema energético de gasificación alimentado por residuos de café, envases de plástico, papel, tela o arpillera, y los vasos de plástico Keurig de porción individual.

La primera etapa del proceso es demostrar que se puede gasificar la compleja mezcla de los residuos y producir gas sintético limpio mediante la utilización de un avanzado sistema de gasificación de lecho fijo (AFBG).

El proyecto es una extensión del trabajo realizado por el EERC para la NASA, que explora la conversión de los residuos de una estación espacial y las futuras bases en Marte y en la Luna para producir calor y electricidad.

Según EERC, el sistema ya ha producido energía mediante la gasificación de residuos forestales, piezas de empate de ferrocarril, desperdicios de pavo y otras materias primas de biomasa.

## PLANTA DE PIRÓLISIS RÁPIDA DE BIOMASA

Ikerlan tiene en su centro tecnológico del país Vasco una planta piloto de pirólisis rápida de biomasa donde se trabaja con un flujo másico de 20 Kg/h, utilizando diferentes materias primas con el fin de evaluar la mejor valorización de los diferentes productos que se obtienen.

La biomasa de alimentación del reactor encuentra un lecho isotermo de arena a 450-500ºC cuyo contacto vigoroso con la biomasa produce una transferencia de calor muy elevada. Las partículas de biomasa describen un movimiento cíclico y, una vez que han reaccionado totalmente, salen en forma de gases y biochar arrastrados hacia la salida en la parte superior del reactor, permaneciendo el lecho de arena en el interior, cuya densidad es mucho mayor que la del biochar.

## DIGESTIÓN ANAERÓBICA

| Nº DE PUBLICACIÓN | SOLICITANTE | PAÍS ORIGEN | CONTENIDO TÉCNICO |
|---|---|---|---|
| CN102220230 | SHAANXI UNIVERSITY OF SCIENCE & TECHNOLOGY | China | AMMONIFICATION ANAEROBIC FERMENTATION EQUIPMENT AND METHOD FOR PRODUCTION OF STRAW BIOGAS. The invention relates to ammonification anaerobic fermentation equipment for producing straw biogas. The ammonification anaerobic fermentation equipment comprises a gas tank, a first reaction chamber and a second reaction chamber, wherein the first reaction chamber and the second reaction chamber are communicated respectively with the gas tank through gas pipes. The first reaction chamber and the second reaction chamber are communicated through a broth backflow pipe. The broth backflow pipe is provided with a flow stop valve. The invention also provides a method of an ammonification anaerobic fermentation. The method comprises that the first reaction chamber and the second reaction chamber are utilized alternately for a continuous fermentation adopting an ammonification reaction and an anaerobic fermentation reaction. The ammonification anaerobic fermentation equipment and method realize a high efficiency biotransformation of straw and an improvement of economic benefits of straw and solve a problem of low anaerobic fermentation efficiency of straw. The ammonification anaerobic fermentation equipment adopts a solar auxiliary heating two-chamber recirculation bioreactor with functions of intermittent feeding and continuous fermentation, does not need applied energy and has a low operation cost. In the invention, a complete conversion of waste straw is realized. The ammonification anaerobic fermentation equipment has a simple structure and a good operability, and is suitable for a large-scale industrial production. |
| KR20110072802 | REPUBLIC KOREA MAN RURAL DEV | Corea | ANAEROBIC DIGESTION VESSEL. A anaerobic digestion vessel is provided to extinct the pathogen while producing the energy from the organic waste wince the high temperature bath and middle temperature tub are composed of 2 shift. The anaerobic digestion includes: a first anaerobic digestion vessel; and a second anaerobic digestion vessel; and a solar battery. The first anaerobic digestion vessel is heated by the first temperature. The first anaerobic digestion vessel eliminates the pathogenic microorganism existing within the organic waste. The first anaerobic digestion vessel hydrolyze the organic waste and produces the biogas. The second anaerobic digestion vessel keeps the organic waste which has been transferred to from the first anaerobic digestion vessel with the second temperature lower than the first temperature. The second anaerobic digestion vessel collects the biogas from the organic waste which has been transferred to. The solar battery is installed in the outside upper end of the second anaerobic digestion vessel and the first anaerobic digestion vessel. The solar battery changes the solar energy to the electrical energy and heats the first anaerobic digestion vessel. |
| KR20110083218 | NEWENTEC ENVIRONMENTAL SERVICES INC | Corea | SLUDGE AND ORGANIC MATTER TREATMENT PLANT HAVING TWO-PHASE DIGESTER. Sludge and organic wastewater processing apparatus equipped with a two phase digesting bath is provided to increase the digesting efficiency of the sludge and the organic wastewater by activating microorganism. An acid generating bath receives sludge and organic wastewater and generates hydrolysis and acid. A methane generating bath receives the sludge and the organic wastewater through the acid generating bath and generates methane. A transferring pipe transfers the sludge and the organic wastewater from the acid generating bath and the methane generating bath. A circulating pipe moves the sludge and the organic wastewater from the methane generating bath and the acid generating bath. Pressurizing pumps and venture pipes are arranged in the transferring pipe and the circulating pipe. |

## DIGESTIÓN ANAERÓBICA

| Nº DE PUBLICACIÓN | SOLICITANTE | PAÍS ORIGEN | CONTENIDO TÉCNICO |
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| WO2012003556 | PETROLEO BRASILEIRO SA et al. | Brasil | METHOD FOR PRODUCING ENERGY-RICH GASES FROM LIGNOCELLULOSIC MATERIAL STREAMS. The present invention relates to a method for producing energy-rich gases, preferably hydrogen and methane, from liquid and/or solid streams from an ethanol production process that uses lignocellulosic biomass as the raw material, in particular waste from the agro-industry and agroforestry materials. The gases are obtained by anaerobic fermentation of these liquid streams in the presence of a specific microbial flora. |
| CN102206620 | ZAOZHUANG JIENUO ENZYME CO LTD | China | COMPOUND ENZYME USED FOR METHANE GAS FERMENTATION AND CAPABLE OF SUPPLEMENTING TRACE ELEMENTS. The invention discloses compound enzyme used for methane gas fermentation and capable of supplementing trace elements, which is used for quickly decomposing raw materials in methane gas fermentation to supplement the trace elements so as to quicken gas production and increase gas yield. The compound enzyme comprises an enzyme preparation part and a trace element part, wherein the enzyme preparation part is prepared by compounding the following solid monomeric enzyme raw materials in percentage by weight: 20 to 30 percent of 20,000u/g xylanase, 20 to 30 percent of 20,000u/g cellulose, 5 to 10 percent of 1,500u/g lipase, 5 to 10 percent of 10,000u/g pectinase, 5 to 10 percent of 30,000u/g saccharifying enzyme and 5 to 10 percent of 10,000u/g glucanase; the trace element part is prepared from the following raw materials in percentage by weight: 10 to 15 percent of zinc sulfate, 20 to 30 percent of powdered rock phosphate, 10 to 20 percent of steelmaking slag, 12 to 16 percent of calcium carbonate, 20 to 25 percent of stove ash, 5 to 10 percent of active carbon and 4 to 8 percent of nonionic surfactant; and a weight ratio of the enzyme preparation part to the trace element part is 1:(1-2). The compound enzyme can produce gas quickly, increase gas yield, prolong fermentation time, reduce residual energy and improve utilization rate of the raw materials. |
| EP2402066 | BEUTLER & LANG SCHALUNGS UND BEHAELTERBAU GMBH | Alemania | PRESSURISED CONTAINER, SYSTEM AND METHOD FOR REMOVING IMPURITIES FROM A BIOGAS ASSEMBLY. Vacuum container for connecting on a biogas plant, which generates biogas via anaerobic digestion of a biomass, comprises: an inlet for connecting to a suction line extending into the biogas plant, and for filling the vacuum container with a mixture containing impurities including sand, and a system liquid, preferably water; a first outlet for discharging impurities; a second outlet for discharging the system liquid and connecting to a recirculation line in the biogas plant; and a ventilation opening through which a vacuum is generated in the vacuum container. Independent claims are also included for: a system for removing impurities from the biogas plant, comprising the vacuum container with the outlet for discharging the mixture containing impurities and the system liquid, preferably water, and a device following the outlet for separating water insoluble solid components of the mixture and the liquid, where the separating device is a glass screw, and/or comprises a discharge with a discharging valve, through which the separated liquid is re-circulated along a discharge line into the biogas plant; and operating the biogas plant, comprising connecting the biogas plant to the vacuum container, discharging the mixture from the biogas plant under the influence of a vacuum in the container, and introducing into the container, opening the outlet in the vacuum container to supply back the liquid discharge from the vacuum container, preferably biogas plant, and extending a withdrawal period by at least 10 seconds before performing the step, where the impurities of the liquid mixture, preferably system liquid get deposited. |

## DIGESTIÓN ANAERÓBICA

| Nº DE PUBLICACIÓN | SOLICITANTE | PAÍS ORIGEN | CONTENIDO TÉCNICO |
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| CN102172596 | WEIFANG JINSIDA INDUSTRY CO LTD | China | URBAN AND RURAL HOUSEHOLD GARBAGE RESOURCE UTILIZING METHOD. The invention discloses an urban and rural household garbage resource utilizing method which comprises an acidification anaerobic tank, a deepening anaerobic tank, a biogas collection tank and a fuel gas generating unit, wherein a fuel gas inlet of the fuel gas generating unit is connected to the biogas collection tank through a pipeline. The method comprises a step of garbage receiving, a step of uniform material distribution, a step of primary magnetic separation, a step of primary crushing, a step of primary elutriation and flotation, a step of uniform cutting, a step of anaerobic acidification, a step of screening and separation, a step of buffering and adjustment, a step of anaerobic deepening and a step of sludge precipitation and concentration. Through the invention, the garbage does not need to be classified, the classification and screening of garbage run through the entire process of garbage utilization, and the biggest bottleneck restraining garbage treatment is overcome; and moreover, the method disclosed by the invention can realize continuous garbage treatment with an anaerobic method, and thoroughly solves the problem that the non-anaerobic garbage such as waste plastics, waste fibers and the like in the garbage cannot be recycled so that resources in the garbage are completely recovered. |
| CN102115294 | HENAN TIANGUAN IND BIOGAS LTD | China | METHOD FOR TREATING WASTEWATER CONTAINING HIGH-CONCENTRATION FUEL ETHANOL BY UTILIZING WHEAT AND OTHER GAINS AS MAIN RAW MATERIALS. The invention discloses a method for treating wastewater containing high-concentration fuel ethanol by utilizing wheat and other gains as main raw materials. The method comprises the following steps: carrying out anaerobic treatment in an intermediate temperature fermentation upflow anaerobic sludge blanket (UASB) retort by using primary anaerobic treatment and secondary aerobic treatment; after the effluent potential energy of anaerobic effluent is reduced by an energy dissipation jar and partial anaerobic sludge is precipitated, feeding the anaerobic effluent into a pre-aeration pool; and after passing through a sedimentation pool, causing pre-aeration pool effluent to a sequencing batch reactor (SBR) pool for aeration and precipitation so that the effluent reaches the emission standard. Marsh gas generated in an anaerobic fermentation jar can be used as a renewable energy source to be fed into a marsh gas cabinet for marsh gas generation, generated electricity energy can meet sewage treatment electro-requirement and then the residual electricity energy can be supplied for fuel ethanol production. The remained sludge generated in a marsh gas production and sewage treatment process is subjected to concentrated separation and then is dried by using high-temperature tail gas generated in marsh gas generation so as to obtain an organic fertilizer. The method has the advantages of low operation cost and high treatment efficiency, the whole sewage treatment system achieves zero energy supply, the generated electricity energy is slightly remained, and the anaerobic effluent in the operation process has less possibility of incrustation and blockage, thereby achieving the win-win purpose of environment and energy source. |

## DIGESTIÓN ANAERÓBICA

| Nº DE PUBLICACIÓN | SOLICITANTE | PAÍS ORIGEN | CONTENIDO TÉCNICO |
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| CN102199630 | WUXI FENGLU ENVIRONMENTAL PROT TECHNOLOGY CO LTD | China | ANAEROBIC DRY FERMENTATION METHOD FOR GENERATING BIOGAS AND USED SYSTEM THEREOF. The invention discloses an anaerobic dry fermentation method for generating biogas and a used system thereof. The method uses crop straw as raw material and contains two stages, namely pretreatment and anaerobic fermentation. The pretreatment stage comprises the following steps: crushing crop straw, performing air explosion, adding composite microbial inoculum accounting for 0.1-0.2wt% of crop straw, replenishing water to perform stacking treatment, then mixing the treated crop straw with animal manure to ensure that the carbon nitrogen ratio is 20-30:1 and obtain straw-manure mixture, and using biogas slurry to inoculate after mixing. The anaerobic fermentation stage is that the inoculated straw-manure mixture is utilized to perform anaerobic fermentation at 25-35 DEG C to generate biogas. By adopting the anaerobic dry fermentation method for generating biogas, the cellulose, hemicellulose and lignin of the straw can be effectively degraded, the effect of high biogas output can be achieved, the excessive accumulation of organic acid can be prevented and the internal temperature of the anaerobic reactor can be stable. |
| CN102251849 | SHANGHAI KALU AUTOMATION TECHNOLOGY CO LTD | China | HYDROGEN PRODUCTION, METHANE PRODUCTION AND POWER GENERATION TECHNOLOGY THROUGH ANAEROBIC DIGESTION OF FOOD WASTE. The invention relates to a hydrogen production, methane production and power generation technology through anaerobic digestion of food waste. The method comprises the following steps: 1) sorting and crushing the food waste and performing centrifugal dewatering; 2) fermenting the dewatered food waste in a hydrogen production fermentation tank; 3) fermenting material discharged from the hydrogen production tank in a follow-up methane tank (mixed sludge synchronous fermentation) for producing methane; and 4) utilizing a gas internal combustion engine power generator set, a lithium bromide absorption type cold or hot water unit and a heat exchange device to synchronously transform hydrogen and methane gas to electrical energy and heat energy. Compared with the traditional anaerobic digestion process, the method provided by the invention has the advantages that hydrogen with high calorific value can be produced while the food waste is treated and the follow-up gas power generation efficiency is further improved. The resource regeneration mode of circular economy can perform effective harmless treatment and resource utilization of the food waste and is the most advanced and effective way for centralized treatment of the food waste without emission of the three wastes at home and abroad at present. |

## DIGESTIÓN ANAERÓBICA

| Nº DE PUBLICACIÓN | SOLICITANTE | PAÍS ORIGEN | CONTENIDO TÉCNICO |
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| CN201999928 | ANYANG LIPP SILO ENGINEERING CO LTD | China | CONTINUOUS MONITORING ANAEROBIC FERMENTATION TANK OF SAMPLING LOOP. The utility model discloses a continuous monitoring anaerobic fermentation tank of a sampling loop, which is characterized by comprising a fermentation tank main body, a monitoring system sampling device, a stirring element, a heating device and a gas storage device, wherein the bottom of the fermentation tank is provided with a heating element, and the top of the tank body is provided with a hemispheroid inner film of a gas storage cabinet with expanding and contracting functions, and an outer film of the gas storage cabinet; and a submersible mixer is arranged at the liquid surface position of the tank body, and the axis of the mixer is arranged in a mode of facing to the liquid surface and being arranged obliquely downwards; and monitoring sampling systems are arranged on the top and the outer wall of the tank and a sampling backflow pipeline, therefore, a hardware platform can be provided for continuous monitoring on the fermentation and methane generating process, the methane fermentation tank during the anaerobic fermentation process can be continuously monitored, and operators in a factory can monitor dynamic change of the methane generating process on line, and master the microbial fermentation process, so that high-efficient running and managing of the fermentation tank can be realized. |
| CN102181421 | SUN YAT-SEN UNIVERSITY | China | METHOD FOR STRENGTHENING ACTIVITY OF ANAEROBIC AMMOXIDIZED MICROORGANISMS THROUGH POLYVINYL ALCOHOL-SODIUM ALGINATE-ACTIVATED CARBON EMBEDMENT. The invention belongs to the field of water treatment, and relates to a method for strengthening the activity of anaerobic ammoxidized microorganisms through polyvinyl alcohol-sodium alginate-activated carbon embedment. The method comprises the following steps of: soaking activated carbon in anaerobic ammoxidized basic inorganic salt solution, and preparing an embedding medium by using polyvinyl alcohol, sodium alginate and the activated carbon into in a proportion; and uniformly mixing treated anaerobic ammoxidized sludge and the embedding medium in a volume ratio to obtain immobilized balls, and culturing to obtain the anaerobic ammoxidized microorganisms steadily coupled on the activated carbon. The invention aims at wastewater with low carbon-nitrogen ratio, and can provide a method for embedding the anaerobic ammoxidized sludge by using the sodium alginate and the polyvinyl alcohol as carriers and the activated carbon as a strengthening agent, and a technology for strengthening the activity of the anaerobic ammoxidized microorganisms and enabling the anaerobic ammoxidized microorganisms to resist the influence of adverse environment. By the method, sewage plants can run more steadily for a long time, and the conditions of actual operation management of the sewage plants are met. |

## DIGESTIÓN ANAERÓBICA

| Nº DE PUBLICACIÓN | SOLICITANTE | PAÍS ORIGEN | CONTENIDO TÉCNICO |
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| CN202030756 | UNIV NORTHEAST AGRICULTURAL | China | HYDRAULIC CONVEYING-BASED METHANE GENERATING DEVICE. The utility model relates to a hydraulic conveying-based methane generating device, which belongs to the biomass energy utilizing and processing device; the upper parts of an acidifying tank, a down-flow gas production tank, an increase-flow anaerobic gas production tank and a rear storage tank are respectively and sequentially provided with a conical body section and a gas storage chamber with a gas outlet pipe and a gas return pipe, a hydraulic conveying overflow pipe with a telescopic connecting pipe is respectively assembled between the acidifying tank and the down-flow gas production tank, between the down-flow gas production tank and the increase-flow anaerobic gas production tank and between the increase-flow anaerobic gas production tank and the rear storage tank, the tanks are sequentially communicated with each other, a feeding port pipeline of a feeding pump and a backflow mixing pump is respectively provided with a clean water pipe with a valve, and the valve is controlled by a valve controller to open and close; and the hydraulic conveying-based methane generating device has a simple structure, less operation energy consumption and fewer malfunctions, fast anaerobic fermentation speed, high gas production speed, comprehensive and accurate measurement and display and convenience in use. |

## FERMENTACIÓN DE AZÚCARES

| Nº DE PUBLICACIÓN | SOLICITANTE | PAÍS ORIGEN | CONTENIDO TÉCNICO |
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| CN102220382 | BIOMASS ENERGY RES INST XINJIANG ACADEMY OF AGRICULTURAL SCIENCES | China | METHOD FOR PRODUCING ETHANOL BY FERMENTATION OF RECOMBINANT SACCHAROMYCES CEREVISIAE ENGINEERING STRAIN. The invention discloses a method for producing ethanol by fermentation of a recombinant saccharomyces cerevisiae engineering strain which comprises the following steps: (1) pulverizing sweet sorghum straw; (2) adding glucoamylase with a weight of 0.05-0.4% of the straw weight; (3) adding a recombinant saccharomyces cerevisiae engineering strain with a weight of 0.08-0.2% of the straw weight, wherein the engineering strain is a recombinant bacterium containing PYES2-GAP-xyl1-xyl2 plasmid, and the fermentation time is 24-90 hours. The method of the invention decreases the unit time required by fermentation of fuel ethanol, reduces the production cost, minimizes the environment pollution, and can be used without improvement of original production conditions. |

## FERMENTACIÓN DE AZÚCARES

| Nº DE PUBLICACIÓN | SOLICITANTE | PAÍS ORIGEN | CONTENIDO TÉCNICO |
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| CN102220378 | COFCO CORP et al. | China | METHOD FOR PREPARING ALCOHOL. The invention provides a method for preparing alcohol. The method comprises the following steps of: pulverizing raw materials of potatoes, mixing pulverized products with enzyme, carrying out enzymolysis in an enzymolysis device to obtain enzymolysis products and fermenting the enzymolysis products, wherein the step of pulverizing the raw materials of potatoes comprises the processes of pulverizing the mixture of particles of potatoes and grains of sand and obtaining the particles of potatoes and the grains of sand through separation; the enzymolysis device comprises a flash tower, a heat source, an enzymolysis tank, a source of materials and a vacuum pump, the flash tower comprises a first interface, a second interface, a third interface and at least one discharge opening, the source of materials is communicated with the flash tower through the first interface, the enzymolysis tank is communicated with the discharge opening of the flash tower, the vacuum pump is communicated with the second interface of the flash tower, and the heat source is communicated with the third interface of the flash tower. The method can realize continuous production and energy conservation. |
| CN102220380 | NINGBO INST MAT TECH & ENG CAS | China | METHOD FOR PREPARING FUEL ETHANOL EFFICIENTLY FROM LARGE-ALGAE BIOMASS AS RAW MATERIAL. The invention discloses a method for preparing fuel ethanol efficiently from large-algae biomass as a raw material. The method comprises: 1), cleaning and crushing large-algae biomass, 2), adding hydrolysis catalysts into the crushed large-algae biomass to hydrolyzing the crushed large-algae biomass into carbohydrate matters which can be utilized by fermentation organisms to obtain hydrolysis mash, and adjusting the PH of the hydrolysis mash to a PH in a range of 5 to 7, 3), adding active carbon, adsorbent zeolite or an adsorbent resin into the hydrolysis mash to carry out virus-free processing, 4), carrying out disinfection processing, 5), adding one or more nitrogen sources into the hydrolysis mash processed by the step 5 to realize that a concentration of the nitrogen sources in the hydrolysis mash is in a range of 0.1 to 5 g/L, and 6), carrying out an inoculating process of fermentation strains in the hydrolysis mash containing nitrogen sources and carrying out a fermentation process of the inoculated fermentation strains to obtain ethanol. Compared with the prior arts, the method improves greatly an efficiency of converting algal biomasses through fermentation microbes and a concentration of ethanol in fermentation broth, wherein the conversion efficiency is over 48% and is five to ten times the existing reported conversion efficiency and the concentration is in a range of 1.8 to 4%. |

## FERMENTACIÓN DE AZÚCARES

| Nº DE PUBLICACIÓN | SOLICITANTE | PAÍS ORIGEN | CONTENIDO TÉCNICO |
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| CN102220383 | COFCO CORP et al. | China | METHOD FOR PREPARING ALCOHOL BY ADOPTING RAW MATERIALS OF CASSAVA. The invention relates to a method for preparing alcohol by adopting raw materials of cassava. The method comprises the step of preparing alcohol by utilizing an alcohol preparing system and adopting raw materials of cassava, wherein the system comprises a first conveying device, a size grading device, a second conveying device, a suction device, a pulverizing device, a third conveying device, a tripper, a fourth conveying device, a flash tower, a heat source, an enzymolysis tank, a vacuum pump and a fermentation tank; the raw materials of cassava is delivered into the size grading device through the first conveying device, and the raw materials of cassava with larger sizes are fed into the pulverizing device to be pulverized; pulverized products from the pulverizing device are mixed with raw materials of cassava with smaller sizes in the tripper to obtain materials to be processed by enzymolysis, the materials to be processed by enzymolysis contact with thermal media in the flash tower so as to raise the temperature thereof, then the materials to be processed by enzymolysis are delivered into the enzymolysis tank so that the materials to be enzymolysis can be mixed with enzyme to realize enzymolysis, and finally fermentation is carried out. The method greatly increases the enzymolysis efficiency and alcohol yield. |
| WO2012001416 | COURT OF EDINBURGH NAPIER UNIVERSITY et al. | Gran Bretaña | PROCESS FOR THE MANUFACTURE OF BUTANOL OR ACETONE. Process for the manufacture of butanol, acetone and/or other renewable chemicals is provided wherein the process utilises one or more of the group comprising by-products of the manufacture of malt whisky, such as draff, pot ale and/or spent lees, biomass substrates, such as paper, sludge from paper manufacture and spent grains from distillers and brewers, and diluents, such as water and spent liquid from other fermentations. The process comprises treating a substrate to hydrolyse it and fermenting the treated substrate at an initial pH in the range of 5.0 to 6.0. Also provided is a biofuel comprising butanol manufactured according to the process of the invention. |
| WO2011159915 | POET RES INC et al. | EE.UU. | FERMENTATION OF BIOMASS. A method for producing a fermentation product in a fermentation system from biomass that has been pre-treated and separated into a first component and a second component is provided. The method comprises preparing a slurry comprising: supplying the first component to the fermentation system; and providing an ethanologen to the fermentation system. The method also comprises adjusting the pH of the slurry to a range of about 4.5 to about 6.5, maintaining the first component and ethanologen in the fermentation system at a temperature of between about 25 and about 37 degrees Celsius, and recovering fermentation product from the fermentation system. The ethanologen is supplied to the fermentation system in a concentration of less than 2 grams of ethanologen on a dry basis per liter of slurry. The biomass comprises lignocellulosic material. The first component comprises pentose, which can comprise xylose. The ethanologen is capable of fermenting xylose into ethanol. |

## FERMENTACIÓN DE AZÚCARES

| Nº DE PUBLICACIÓN | SOLICITANTE | PAÍS ORIGEN | CONTENIDO TÉCNICO |
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| KR20110070834 | KOREA IND TECH INST | Corea | A NOVEL ISOLATED PHOMA SP. FROM ROTTEN TANGERINE PEEL AND CELLULOLYTIC ENZYMES AND [beta]-GLUCOSIDASE PRODUCED BY THEREOF. A cellulose derived from fibrous biomass is provided to efficiently hydrolyze fibers remaining after acid saccharification. CONSTITUTION: A Phoma sp.(deposit number KCTC 11825BP) produces cellulose derived from fiber including red algae. The cellulose has an endoglukinase activity, exoglucanase activity, or beta-glucosidase activity. The Phoma sp. is isolated from tangerine peels. A fiber biomass-derived composition for cellulose decomposition contains supernatant of culture liquid obtained by culturing Phoma sp. |
| CN102199554 | CHINESE ACAD INST MICROBIOLOGY | China | SACCHAROMYCES CEREVISIAE STRAIN WITH MULTIPLE-STRESS RESISTANCE, AND APPLICATION THEREOF IN CELLULOSE ALCOHOL FERMENTATION. The invention discloses a saccharomyces cerevisiae strain with multiple-stress resistance, and the application of the saccharomyces cerevisiae strain in cellulose alcohol fermentation. The invention provides a saccharomyces cerevisiae T43 CGMCC No. 4642. The saccharomyces cerevisiae T43 has strong temperature adaptability (such that cooling and heating cost is reduced during fermentation processes) and good tolerance with inhibitors in cellulose hydrolysate (such that production processes can be simplified, and fermentation time can be shortened). Therefore, the saccharomyces cerevisiae has good prospect to be adopted in industrial application. According to the present invention, the efficient conversion of glucose in corn stalk hydrolysate to ethanol can be achieved, and the saccharomyces cerevisiae can be directly used in present fuel ethanol production technologies and new lignocellulose ethanol technologies. With the technical scheme of the present invention, ethanol production theorugh cerevisiae fermentation of cellulose hydrolysate can be started at a high temperature. According to the present invention, low energy consumption, low material consumption, low cost and high ethanol yield can be achieved in the cerevisiae fermentation process of cellulose alcohol production. With the present invention, huge economic benefits and good social benefits are brought in. |
| WO2011156794 | UNIV CALIFORNIA | EE.UU. | SYNTHETIC PATHWAYS FOR BIOFUEL SYNTHESIS. The present disclosure provides optimized recombinant cells for the production of n-butanol. Methods for the use of these cells are also provided. Specifically, the utility of acylating aldehyde dehydrogenases and pyruvate:flavodoxin/ferredoxin-oxidoreductase for the improvement of w-butanol yields from recombinant cells is disclosed. |
| US2011312033 | CATCHLIGHT ENERGY LLC | EE.UU. | METHODS OF SPRAYING SACCHARIFICATION ENZYMES AND FERMENTATION ORGANISMS ONTO LIGNOCELLULOSIC BIOMASS FOR HYDROLYSIS AND FERMENTATION PROCESSES. The present invention provides spray methods of delivering saccharification enzymes, fermentation organisms, and other hydrolysis or fermentation ingredients onto lignocellulosic biomass. The methods reduce the need for mechanical mixing when the biomass solids are undergoing enzymatic hydrolysis, and reduce dilution to allow higher product titers in the hydrolysis and/or fermentation steps. |

## FERMENTACIÓN DE AZÚCARES

| Nº DE PUBLICACIÓN | SOLICITANTE | PAÍS ORIGEN | CONTENIDO TÉCNICO |
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| US2011312053 | BUTAMAX TM ADVANCED BIOFUELS LLC | EE.UU. | SUPPLEMENTATION OF FATTY ACIDS FOR IMPROVING ALCOHOL PRODUCTIVITY. Fatty acids derived from biomass at a step in a fermentation process can be added to a fermentation medium comprising a recombinant microorganism that produces a product alcohol. At least one of growth rate and fermentable carbon consumption of the microorganism is greater in the presence of the fatty acids than the growth rate and the fermentable carbon consumption of the microorganism in the absence of the fatty acids. The addition of the fatty acids can increase glucose consumption, and can improve microorganism biomass production (cell growth/density) and growth rate, thereby reducing production time and increasing productivity of the fermentation process. |
| CN102180726 | BING ZHENG at al. | China | FERMENTATION METHOD AND DEVICE FOR BIOMASS MICROENVIRONMENT REGULATION. The invention discloses a fermentation method of biomass microenvironment regulation, which comprises the following steps: crushing biomass; mixing the biomass with nitrogen-source ingredients to obtain a nutrient material, stirring uniformly, adjusting the pH to 6-9.5, controlling the water content to be 40-75%; charging the nutrient material into a fermentation device, decomposing the biomass with bacterial community, decomposing the biomass with fungus community, and finally decomposing the biomass with actinomycete community. The fermentation device comprises an imitating rumen, a reticulum, and an omasum, wherein the imitating rumen is a big shed with an air inlet and an air outlet; the reticulum is disposed in the imitating rumen; the reticulum comprises a basket body with an air vent; the omasum is disposed in the reticulum; the omasum comprises a hollow-out cylinder and a cushion; the cushion is disposed on the hollow-out cylinder; a heat-dissipating oxygen vent is disposed on the cushion; the vent wall of the heat-dissipating oxygen vent extends a heat-dissipating oxygen tube downwardly; and the heat-dissipating oxygen tube is inserted in the hollow-out cylinder. The invention changes waste into valuables, and reduces environmental pollution. |

## CREACIÓN DE UNA RED DE BIOGÁS EN LA COMUNIDAD DE CASTILLA-LEÓN

El Instituto de Recursos Naturales de la Universidad de León y la Agencia Energética Municipal de Valladolid coordinan la creación de una Red de Biogás en Castilla y León. Esta iniciativa forma parte del proyecto europeo Biogas and Networks (BaN), encuadrado en el programa Interreg IV C, en el que también participan la Agencia Energética del Sudeste de Suecia, la Comunidad del Valle de Non (Italia), el Instituto Tecnológico de Estonia, la ciudad de Tartu (Estonia) y el Diadyma Waste Management de Macedonia. Con este proyecto, se pretende favorecer la comunicación entre los diferentes colaboradores para impulsar y favorecer el uso de las energías renovables y, en concreto, del biogás.

En la primera fase del proyecto, cada uno de los participantes presentará un estudio sobre la utilización del biogás en su región, así como sobre el potencial de desarrollo futuro local de esta fuente de energía. El resultado de esta primera fase constituirá la base de la creación de las distintas redes regionales para potenciar el uso del biogás.

En España, la Comunidad de Castilla y León es la que dispone de un mayor potencial accesible de residuos agroalimentarios con destino a su aprovechamiento energético, tal como se expone en el proyecto singular y estratégico Probiogás. De los 31 millones de toneladas al año cuantificadas en España, Castilla y León dispone de 7.7 millones, superando a Andalucia (7.1 millones), y muy por encima de Castilla-La Mancha (3.8 millones) y Cataluña (2.4 millones).

## ENERGÍA LIMPIA CON LODOS DE DEPURADORA

La empresa Facsa, perteneciente al Grupo Gimeno, y el centro tecnológico Ainia están desarrollando un proyecto dirigido a mejorar la autosuficiencia energética de una estación depuradora de aguas residuales urbanas (EDAR), a partir de la utilización de los lodos que genera. El proyecto, denominado SLUDGE4ENERGY, con una duración de tres años (2011-2014), está apoyado por el Ministerio de Economía y Competitividad y cofinanciado con fondos europeos FEDER (Fondo de Desarrollo Regional).

El proyecto se está desarrollando en la EDAR de Castellón de la Plana y en él se investigan nuevas tecnologías de digestión anaeróbica de los lodos de la depuradora en dos etapas de temperaturas distintas combinadas con procesos de ozonización, con el fin de maximizar la producción de biogás. El biogás obtenido servirá como fuente de energía de la EDAR.

## OBTENCIÓN DE ETANOL A PARTIR DE LA MADERA DE PINO

Un equipo de microbiología de la Universidad de Georgia (Estados Unidos) ha desarrollado una levadura que incrementa notablemente la cantidad de etanol que puede obtenerse a partir de la madera de pino. Este tipo de biomasa resulta muy atractiva por ser muy rica en azúcares, pero éstos se caracterizan por ser de difícil fermentación.

El proceso estándar comienza con el pretratamiento de la madera de pino mediante calor y sustancias químicas, facilitando a las enzimas la degradación posterior de la celulosa, descomponiéndola en azúcares que la levadura transforma, a continuación, en etanol. Sin embargo, el rendimiento de la fermentación es muy bajo ya que los subproductos generados durante el pretratamiento resultan muy nocivos incluso para las cepas industriales de levadura más resistentes. El equipo de la Universidad de Georgia ha desarrollado un proceso innovador, empleando la evolución, así como la capacidad de adaptación de la Saccharomyces cerevisiae, una especie de levadura usada comúnmente en la industria para la producción de etanol de maíz, para generar una "superlevadura" invulnerable a la toxicidad de los subproductos del pretratamiento convencional. El resultado es la producción de etanol a partir de concentraciones más elevadas de madera pretratada de pino que las logradas en otras investigaciones precedentes.

## PRODUCCIÓN DE BUTANOL A PARTIR DE BIOMASA DE MADERA

La Universidad de Aalto (Finlandia) ha desarrollado un proceso que permite obtener butanol a partir de biomasa de madera mediante la utilización de microorganismos.

El proyecto dirigido por la Universidad de Aalto es parte del programa Tekes BioRefine. Su objetivo es aumentar el valor de refinación de los residuos forestales que no se pueden utilizar en, por ejemplo, la fabricación de pasta de papel.

El butanol es particularmente adecuado como combustible para el transporte porque no es soluble en agua y, además, presenta mayor contenido de energía que el etanol. Las materias primas más comúnmente utilizadas en la producción de butanol han sido, hasta el momento, el almidón y la caña de azúcar. En contraste con esto, el aspecto novedoso del estudio de la Universidad de Aalto ha sido el utilizar únicamente lignocelulosa (también llamada biomasa de madera) como producto de partida, que no compite, como los anteriores, con la producción de alimentos.

El proceso consiste, esencialmente, en someter la biomasa de madera a un pretratamiento en el que somete a ebullición en una mezcla de agua, alcohol y dióxido de azufre. Como consecuencia de éste, todas las partes de la madera –celulosa, hemicelulosa y lignina– se separan en fracciones limpias. La celulosa se puede utilizar, entonces, para la fabricación de papel, nanocelulosa y otros productos, mientras que la hemicelulosa puede someterse a un tratamiento microbiano para producir butanol, así como otras sustancias químicas.

## TECNOLOGÍAS QUÍMICAS

| Nº DE PUBLICACIÓN | SOLICITANTE | PAÍS ORIGEN | CONTENIDO TÉCNICO |
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| US2012017493 | UOP LLC | EE.UU. | METHODS FOR PRODUCING LOW OXYGEN BIOMASS-DERIVED PYROLYSIS OILS. Methods for producing low oxygen biomass-derived pyrolysis oil are provided. Starting biomass-derived pyrolysis oil is deoxygenated by exposing the biomass-derived oil to a first catalyst in the presence of hydrogen-containing gas at first hydroprocessing conditions to produce a partially deoxygenated biomass-derived pyrolysis oil. The first catalyst has a neutral catalyst support. The partially deoxygenated biomass-derived pyrolysis oil is exposed to a second catalyst in the presence of additional hydrogen-containing gas at second hydroprocessing conditions to produce a hydrocarbon product. The biomass-derived pyrolysis oil may be esterified prior to deoxygenation. A portion of the low oxygen biomass-derived pyrolysis oil is recycled. |
| US2012016167 | EXXONMOBIL RES & ENG CO | EE.UU. | HYDROPROCESSING OF BIOCOMPONENT FEEDS WITH LOW PRESSURE HYDROGEN-CONTAINING STREAMS. The invention relates to a method for forming an at least partially renewable diesel product, comprising: hydrodeoxygenating a feedstock comprising about 0.1 wt % to about 50 wt % of a fresh biocomponent portion with a relatively pure hydrogen treat gas in the presence of a hydrodeoxygenation catalyst under relatively low total pressure to form a hydrodeoxygenated product; and separating the hydrodeoxygenated product into a vapor effluent and a liquid effluent, at least a first portion of the latter being recycled to the hydrodeoxygenation step, and at least a second portion of the latter being a diesel product. Advantageously, the hydrodeoxygenation catalyst can have a relatively low catalytic activity (about 50% or less of fresh HDS/HDN activity). |
| KR20110074317 | KOREA IND TECH INST | Corea | SOLID-PHASE BASIC CATALYST FOR BIO-DIESEL AND METHOD FOR MANUFACTURING THE SAME, AND METHOD FOR MANUFACTURING BIO-DIESEL. A sold catalyst for biodiesel manufacture, a manufacturing method of the same and a manufacturing method of biodiesel are provided to have excellent yield of biodiesel by showing excellent reaction activity in the manufacture of biodiesel, facilitate the collection and reuse of the catalyst after the completion of reaction, and to contribute to the improvement of the biodiesel productivity since the effluent is not generated. CONSTITUTION: The sold catalyst for biodiesel manufacture includes zeolite, and the basic material dipped in the zeolite. On the zeolite 100 parts by weight, the basic material of impregnation amount is 30 - 70 parts by weight. The basic material is dipped as the Incipient wetness impregnation. The basic material includes more than one selecte from the group of the potassium hydroxide (KOH), the NaOH, the calcium hydroxide, baOH and the ammonium hydroxide. After the basic material is dipped in the zeolite, the basic material is plasticized and dipped in 300[deg.] C - 700[deg.]C. The manufacturing method of biodiesel includes the steps of: the process of preparing the solid base catalyst in which the basic material is dipped in the zeolite; and process of reacting the fatty acid induced from the maintenance or the raw material selected from the mixture with the alcohol under maintenance of the solid base catalyst. |

## TECNOLOGÍAS QUÍMICAS

| Nº DE PUBLICACIÓN | SOLICITANTE | PAÍS ORIGEN | CONTENIDO TÉCNICO |
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| WO2012006302 | CHLOR BIOENERGY INC | EE.UU. | CULTIVATION OF GREEN ALGAE CHLOROCOCCUM PAMIRUM FOR PRODUCTION OF BIOFUEL. This invention provides methods for cultivating microalgae Chlorococcum pamirum (Chlorophyceae class) and inducing oil accumulation in the green algae. Also disclosed are methods of purifying the organisms, media used for culturing the organisms, and methods for enriching the oil content in the organisms. The oil-rich microalgae produced according to the present invention can be used as feedstock for production of biodiesel in large-scales. |
| WO2012005410 | UNIV YONSEI IACF | Corea | NEW STRAIN CHLAMYDOMONAS PITSCHMANNII YSL03. The present invention relates to new strain Chlamydomonas pitschmannii YSL03 [KCTC 11715BP], and, more specifically, the new strain Chlamydomonas pitschmannii YSL03 [KCTC 11715BP] has a high lipid content, is very effective in the production of biodiesel and is strongly resistant to waste water and can eliminate the nitrogen and phosphorus in waste water and thus allows bioenergy production at the same time as waste water treatment. |
| CN102134514 | HENGQUAN LI | China | SYNTHETIC BIODIESEL AND PREPARATION METHOD THEREOF. The invention discloses synthetic biodiesel and a preparation method thereof. The biodiesel is prepared from the following components in percentage by weight: 50 to 70 percent of acidified oil, 10 to 20 percent of methanol, 10 to 38 percent of desulfurized heavy benzol, 1 to 5 percent of light oil and 0.3 to 0.8 percent of catalysis additive. The synthetic biodiesel has the advantages of high oxygen content, full combustion, low sulfur content, low corrosion, no freezing at the temperature of below 4DEG C, high fluidity at low temperature, and light exhaust emission pollution. |
| CN102078825 | LUDONG UNVIERSITY | China | SOLID CATALYST FOR PREPARING BIODIESEL BY UTILIZING NORMAL-PRESSURE ESTER EXCHANGE METHOD AND PREPARATION METHOD THEREOF. The invention discloses a solid catalyst for preparing biodiesel by utilizing a normal-pressure ester exchange method and a preparation method thereof. The preparation method disclosed by the invention is characterized by comprising the following steps: by taking cobalt salt, hydroxyethylidene diphosphonic acid, sodium hydroxide and an organic template agent as raw materials, synthesizing basic hydroxyethylidene diphosphonic acid sodium cobaltate by utilizing a hydrothermal method; filtering, drying, grinding, sieving, and then, soaking in a sodium hydroxide solution; and subsequently, baking for 3-6 hours at 250-300 DEG C to finally prepare a basic hydroxyethylidene diphosphonic acid sodium cobaltate-sodium hydroxide solid catalyst. The solid catalyst prepared by the method disclosed by the invention has higher catalytic activity in the process of preparing the biodiesel by utilizing the normal-pressure ester exchange method and can obtain higher yield of the biodiesel, wherein the yield can reach about 92%. In the invention, the biodiesel prepared from soybean oil has the advantages of mild reaction conditions, simple operation, low energy consumption and small pollution and has higher popularization and application values. |

## TECNOLOGÍAS QUÍMICAS

| Nº DE PUBLICACIÓN | SOLICITANTE | PAÍS ORIGEN | CONTENIDO TÉCNICO |
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| CN102191126 | UNIV SHENZHEN | China | PREPARATION METHOD OF BIODIESEL FROM MICROALGAL OIL BY ENZYME METHOD. Belonging to the biochemical field, the invention provides a preparation method of biodiesel from microalgal oil by enzyme method in a novel reaction medium. The method comprises the steps of: (1) providing algae powder made from dried microalgaes; (2) extracting microalgal oil from the algae powder; (3) characterizing the microalgal oil with physiochemical constants, and acquiring a saponification value so as to determine the amount of methanol needed; and (4) with ionic liquid (BMIm)(PF6) or tert-butyl alcohol as the reaction medium, adding methanol which contains alcohol and oil in a ratio ranging from 1:2 to 5:1 by mole into the microalgal oil, and adding 50-400mg penicillium expansum lipase for reaction, thus obtaining fatty acid methyl ester as the product |
| CN102108319 | METAL INDUSTRY RES DEV CT | Taiwán | CONTINUOUS SYSTEM AND METHOD FOR PREPARING BIODIESEL. The invention discloses a continuous system and a continuous method for preparing biodiesel. The continuous method for preparing biodiesel comprises the following steps: (a) pressurizing and heating liquid alcohol till the liquid alcohol changes into a subcritical state or high-pressure liquid state; (b) performing continuous extraction by using a continuous extraction module which has a plurality of extraction tanks for receiving the subcritical or high-pressure liquid alcohol, extracting a grease raw material in the extraction tanks, and obtaining an extract product; (c) performing the transesterification of the extract product to obtain a product of the transesterification; and (d) separating the product of the transesterification to obtain the biodiesel. In the continuous system and the continuous method for preparing biodiesel, the biodiesel is prepared by extracting the grease with the subcritical or high-pressure liquid alcohol and the transesterification of supercritical alcohol, the continuous extraction module and the continuous extraction method are used for extraction, the extraction and transesterification process procedures are performed by using the same alcohol, the process is simplified, and labor force and energy are saved. |
| WO2011161317 | TEKNOLOGIAN TUTKIMUSKESKUS VTT | Finlandia | GENETICALLY MODIFIED FUNGI AND THEIR USE IN LIPID PRODUCTION. The invention refers to fungal cells, and especially to oleaginous fungal cells that have been genetically modified to produce enzymes of the pyruvate dehydrogenase bypass route to enhance their lipid production. Especially the cells are modified to over-express genes encoding pyruvate decarboxylase (PDC), acetaldehyde dehydrogenase (ALD) and/or acetyl-CoA synthetase (ACS), optionally together with a gene encoding diacylglycerol acyltransferase (DAT), or to express genes encoding PDC together with ALD and/or ACS. Methods of producing lipids, biofuels and lubricants using the modified fungi are also disclosed as well as expression cassettes useful therein.A new enzyme having phosholipid: diacylglycerol acyltransferase (PDAT)activity and a polynucleotide encoding it are also disclosed, which are useful in the lipid production.A recombinant Cryptococcus cell and its construction is described. |

## TECNOLOGÍAS QUÍMICAS

| Nº DE PUBLICACIÓN | SOLICITANTE | PAÍS ORIGEN | CONTENIDO TÉCNICO |
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| CN202039033 | UNIV SOUTHEAST | China | CATALYTIC HYDROGENATION DEVICE FOR BIO-OIL AND DERIVATIVES THEREOF. The utility model discloses a catalytic hydrogenation device for bio-oil and derivatives thereof, relating to the field of catalytic hydrogenation of unstable oxygenated chemical compounds. The device specifically comprises a liquid sample inlet unit, a low-temperature hydrogenating gas-liquid reactor, a high-temperature hydrogenating gas-liquid reactor, a gas-liquid separator, a pressure controller, a product collecting and analyzing unit. The bio-oil or the derivatives thereof are firstly injected into the low-temperature hydrogenating gas-liquid reactor at high pressure by the liquid sample inlet unit for carrying out primary selective hydrogenation and stably fed, and then are injected into the high-temperature hydrogenating gas-liquid reactor connected with the low-temperature hydrogenating gas-liquid reactor for deep hydrogenation. A hydrogenation product is separated and recovered through the gas-liquid separator; a gas phase product is monitored on line by the product collecting and analyzing unit; and the pressure of a whole system is controlled by the pressure controller. With the adoption of the catalytic hydrogenation device for the bio-oil and the derivatives thereof, the unstable oxygenated chemical compounds, such as the bio-oil and the derivatives thereof, and the like, can be economically and efficiently hydrogenated to prepare petrochemicals so as to effectively relieve the phenomenon of oil shortage. In addition, the catalytic hydrogenation device disclosed by the utility model has a simple system structure, is easy to operate, and is very suitable for industrial application. |
| CN102199495 | LANZHOU CHEM PHYS INST | China | METHOD FOR PREPARING BIODIESEL OIL THROUGH BIOLIPID HYDROGENATION. The invention discloses a method for preparing biodiesel oil through biolipid hydrogenation. With the method provided by the present invention, CuO is adopted as an active component of a catalyst; single SiO2 or single Al2O3 or a composite oxide formed by SiO2 and Al2O3 is adopted as a carrier; the biolipid is subjected to a hydrogenation reaction with hydrogen in a reactor to prepare the biodiesel oil, wherein reaction conditions are controlled to a temperature of 180-260 DEG C and reaction pressure of 4.0-8.0 MPa. According to the present invention, transformation ratio of the biolipid and selectivity of components of the biodiesel oil are high than 90%. |

## DESARROLLO DE MICROALGAS PARA OBTENER BIODIÉSEL

El Instituto Vasco de Investigación y Desarrollo Agrario Neiker-Tecnalia coordina una investigación para cultivar microalgas que resulten más productivas en cuanto a cantidad de aceite y que puedan ser aprovechadas para la obtención de biodiésel de una forma económicamente más rentable y medioambientalmente más sostenible.

La investigación aborda todas las fases del proceso productivo, desde el cultivo hasta la transformación en biodiésel, e incluye el aprovechamiento como biogás de la materia residual que se obtiene del proceso de extracción del aceite.

En este trabajo participan el Centro Nacional de Energías Renovables (CENER), la Fundación Tecnalia, la Universidad del País Vasco (UPV-EHU), la Asociación para el Medioambiente y la Seguridad en Aquitania (APESA, Francia) y el Centro de Aplicación y Transformación de Agro Recursos (CATAR-CRITT), y cuenta con la colaboración de Acciona.

Los investigadores consideran que los métodos tradicionales de cultivo de microalgas pueden ser mejorados mediante una modificación en el metabolismo de las algas. La regulación metabólica tiene como objetivo que las microalgas produzcan y acumulen más lípidos. Una vez conseguida esta meta, se procederá al desarrollo de nuevos sistemas de extracción del aceite y su posterior transformación en biodiésel, empleando métodos químicos tradicionales y enzimas inmovilizadas en soportes magnéticos. Finalmente, la biomasa

residual del proceso de extracción de aceite, se pretende aprovechar para obtener biogás, mediante un proceso de digestión anaeróbica.

El proyecto, denominado Energreen, tiene una duración de dos años y un presupuesto de un millón de euros, de los que 660.000 provienen de los fondos europeos FEDER.

## BIODIÉSEL A PARTIR DE ACEITES USADOS

La empresa valenciana Grupo Vento ha desarrollado un sistema que permite obtener biodiésel con una pureza superior al 99% a partir de una mezcla de FAME (Fatty Acid Methyl Ester) procedente de materias primas de baja calidad, como oleínas, grasa animales, aceites de fritos e impurezas procedentes del proceso de refinado de aceites. Hasta el momento, las empresas que utilizaban este tipo de materias primas obtenían un biodiésel de pureza inferior al 96.5% exigido por la Normativa Europea sobre combustibles de automoción (EN 14214).

La tecnología desarrollada por Grupo Vento conjuga los procesos de evaporación de alto vacío con intercambios térmicos para recuperación energética, consiguiendo un proceso de alta rentabilidad.

Grupo Vento ha instalado ya los primeros destiladores en algunas industrias del sector como BIOCARSA, en Cuevas de Almanzor, Almería, planta con una capacidad de tratamiento de 1500 L/h.

## UN SENSOR GENÉTICO AUMENTA LA PRODUCCIÓN DE BIOCOMBUSTIBLES

Uno de los problemas que ha limitado la cantidad de biocombustible que un microorganismo es capaz de generar es el desequilibrio existente entre los diferentes ingredientes biológicos, o precursores, utilizados para fabricar el producto combustible final. Un grupo de investigadores de la Universidad de California, en Berkeley, acaban de publicar un estudio en Nature Biotechnology sobre un sistema de sensor genético que permite a las bacterias ajustar su expresión génica en respuesta a diferentes niveles de intermediarios clave para la fabricación de biodiésel. Como resultado, los microorganismos producen tres veces más combustible.

Los investigadores diseñaron un microorganismo a partir de una cepa de E.coli modificada genéticamente, utilizando un sensor de origen natural, el cual responde a la cantidad interna de ácidos grasos y moléculas relacionadas, y que ajusta la actividad de las vías de producción de etanol y de conversión de ácidos grasos. Cuando dentro de la célula hay cantidades limitadas de ácido graso, las moléculas reguladoras frenan tanto la vía de producción de etanol como la de conversión de ácidos grasos. De igual modo, cuando las bacterias contienen elevados niveles de ácidos grasos, dejan de frenarse las vías.

El sistema regulador mejora las bacterias manipuladas de dos formas: las vías metabólicas se equilibran de manera que no produzcan un precursor en exceso con respecto a otro y, además, las bacterias modificadas son más estables puesto que la producción de biocombustibles no resta a la célula capacidad de crecer. Esta "conciencia de sí misma" ha logrado incrementar la cantidad de biodiésel producido por la bacteria un 28% por encima del máximo teórico, un aumento tres veces mayor del previamente registrado en este tipo de cepa.

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