VT BIOMASA
PATENTES
15
Vigilancia Tecnológica
1er trimestre 2015

SITUACIÓN ACTUAL DEL BIOGÁS EN LA UNIÓN EUROPEA

Según el último informe elaborado por L´Observatoire des Energies Renouvables (EurObserv´ER, 2014) se estima que en Europa, durante el 2013, la energía primaria procedente de biogás superó los 13,5 millones de toneladas equivalentes de petróleo (Mtep) (Tabla 1). Ésto supuso un aumento del 11,9% respecto al 2012. Sin embargo, este crecimiento es inferior al producido en años anteriores (17% entre 2011 y 2012), debido, sobre todo, a que los dos principales productores, Alemania e Italia, han realizado cambios en sus políticas de biogás.

El país dominante que copa más del 50% de la producción primaria es Alemania. Le siguen, con gran diferencia, Reino Unido e Italia, que aportan un 13,5% y 13,4%, respectivamente. España se encuentra en séptima posición y junto a Austria son los únicos países, entre los quince principales productores, que bajan su producción (Tabla 1).

El 69,8% del biogás producido en la Unión Europea (UE) procede de plantas industriales, el 20,7% de los vertederos y el 9,5% restante procede de plantas depuradoras de aguas residuales (tanto urbanas como industriales). Esta distribución varía entre los distintos miembros de la UE. Alemania lidera la producción en el campo de la generación de biogás a partir de residuos agrícolas y ganaderos, así como en la generación de biogás de depuradora. Al igual que Alemania, Italia, Austria y la República Checa han optado por promover el desarrollo de las plantas que tratan residuos agroindustrales y cultivos energéticos. En Reino Unido, España, Portugal e Irlanda la producción se basa en la generación de biogás de vertedero y en el caso de Suecia y Polonia la mayor producción de biogás procede de depuradoras.

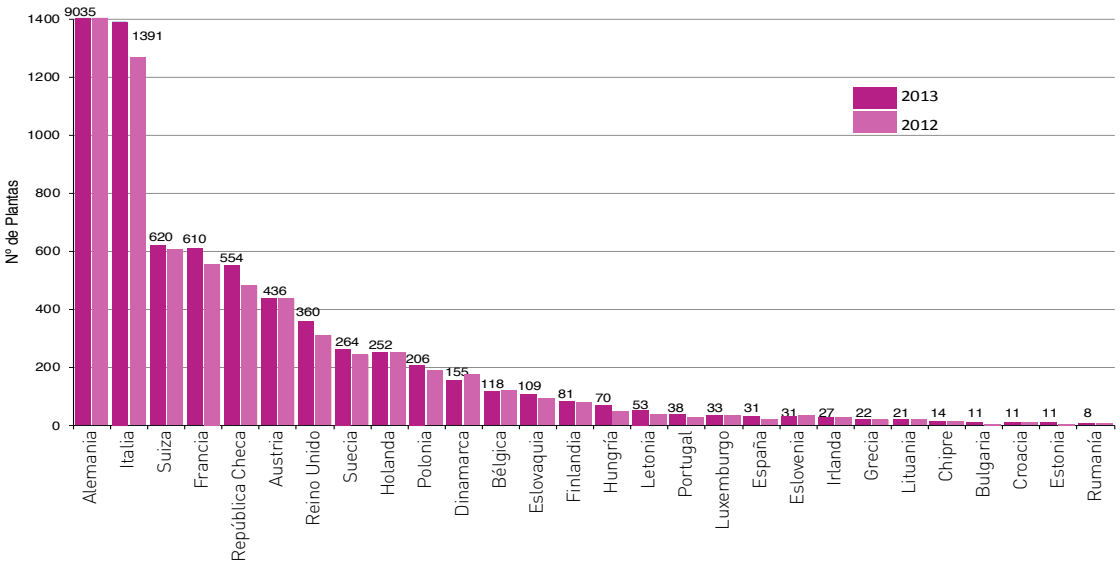
TABLA 1. Producción De Biogás En La Unión Europea (ktep)

PAÍS	Vertedero		Depuradoras de aguas residuales		Plantas industriales		Total	
	2012	2013	2012	2013	2012	2013	2012	2013
Alemania	123,7	110,7	372,1	438,0	5.925,6	6.319,2	6.421,4	6.867,9
Reino Unido	1.533,9	1.538,2	269,7	286,2	0,0	0,0	1.803,6	1.824,4
Italia	364,7	403,2	42,0	48,6	772,0	1.368,8	1.178,8	1.815,5
República Checa	31,7	28,9	39,4	39,6	303,8	502,5	374,9	571,1
Francia	166,5	180,7	43,4	43,4	184,4	212,6	394,4	436,7
Holanda	29,9	24,6	53,1	57,8	214,5	220,3	297,5	302,8
España	159,6	166,1	76,3	69,6	55,0	49,8	290,9	285,5
Austria	3,8	3,7	18,2	18,4	184,3	174,6	206,4	196,8
Bélgica	32,4	28,4	17,2	24,0	108,0	136,5	157,7	189,0
Polonia	53,7	51,5	79,3	80,1	34,9	49,8	168,0	181,4
Suecia	12,6	9,8	73,5	73,4	40,6	61,8	126,7	145,0
Dinamarca	5,5	5,1	21,4	23,1	77,7	82,7	104,7	110,9
Grecia	69,4	67,5	15,8	16,1	3,4	4,8	88,6	88,4
Hungría	14,3	14,3	18,7	20,1	46,8	47,8	79,8	82,2
Eslovaquia	3,1	3,4	13,8	14,8	45,1	48,5	62,0	66,6
Portugal	54,0	61,8	1,7	2,7	0,7	0,8	56,4	65,3
Letonia	18,4	7,0	5,7	3,0	27,8	55,0	51,9	65,0
Finlandia	31,6	31,8	13,9	13,9	12,4	13,4	57,9	59,1
Irlanda	43,0	36,8	7,5	7,9	5,4	3,5	55,9	48,2
Eslovenia	6,9	7,1	3,1	2,8	28,2	24,8	38,1	34,7
Rumania	1,4	1,5	0,1	0,1	25,9	28,4	27,3	30,0
Croacia	0,7	0,4	2,7	2,3	8,1	13,8	11,4	16,6
Lituania	6,1	7,1	3,1	3,6	2,3	4,8	11,6	15,5
Luxemburgo	0,1	0,1	1,3	1,3	12,0	11,4	13,4	12,8
Chipre	0,0	0,0	0,0	0,0	11,4	12,0	11,4	12,0
Estonia	2,2	6,3	0,7	0,9	0,0	0,0	2,9	7,2
Bulgaria	0,0	0,0	0,0	0,0	0,1	0,1	0,1	0,1
Malta	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Total	2.769.2	2.796.1	1.193,9	1.291,9	8.130,6	9.442,8	12.093,6	13.530,7

Fuente: EurObserv´ER 2014

Según el informe publicado en 2014 por la EBA (Asociación Europea de Biogas), a finales de 2013 en Europa existían más 14.500 plantas de biogás en operación. Alemania es la primera potencia europea en este sector, alcanzando las 9.035 plantas de producción de biogás (Figura 1). Durante ese año cabe destacar el importante crecimiento que tuvo lugar en los países del centro de Europa: Hungría, la República Checa, Eslovaquia, y Polonia, donde se registró un aumento del 18%.

FIGURA 1. Plantas de Biogás en Europa



Fuente: European Biogas Association

Durante el 2013, el destino principal de la energía fue la producción de electricidad. Se producieron 52.729,6 GWh (Tabla 2), un incrementó del 13,7% con respecto a 2012. El 61,0% de la electricidad producida corresponde a las plantas de cogeneración. Los mayores productores de electricidad son, nuevamente, Alemania, Italia, Reino Unido, la Republica Checa y Francia. España sigue en séptima posición, pasando de 866,0 GWh en 2012 a 908,0 GWh en 2013 (Tabla 2). En 2013, el suministro de calor procedente del biogás fue de 469,3 ktpe en la UE (Tabla 3), un aumento del 33,7% con respecto al año anterior.

La depuración del biogás permite obtener biometano de alta pureza que se puede utilizar como sustituto del gas natural. La producción de biometano está ganando gran popularidad en los países de la Unión Europea, ya que les permite reducir su dependencia de las importaciones de gas natural. Según los datos dados por EurObserv´ER, a finales de Junio de 2014 había, al menos, 258 plantas de biometanización en servicio en la Unión Europea (Figura 2). El biometano producido es casi en su totalidad inyectado en redes de gas natural y utilizado para generar electricidad y calor (CHP), pero se está haciendo cada vez más popular su uso como combustible para transporte.

TABLA 2. Producción de electricidad a partir de biogás en la Unión Europea (GWh)

	Plantas Productoras solo de electricidad		Plantas CHP		Electricidad Total	
PAÍS	2012	2013	2012	2013	2012	2013
Alemania	5.916,0	8.800,0	21.322,0	20.435,0	27.238,0	29.235,0
Italia	2.160,6	3.434,9	2.459,3	4012,8	4.619,9	7.447,7
Reino Unido	5.249,2	5.265,7	625,0	665,0	5.874,2	5.930,7
República Checa	55,0	55,0	1.412,0	2.239,0	1.467,0	2.294,0
Francia	755,0	774,8	529,7	731,8	1.284,7	1.506,6
Holanda	68,0	60,0	940,0	906,0	1.008,0	966,0
España	765,0	800,0	101,0	108,0	866,0	908.0
Bélgica	90,4	118,9	573,1	654,9	663,5	773,8
Polonia	0,0	0,0	565,4	689,7	565,4	689,7
Austria	592,0	574,0	46,0	41,0	638,0	615,0
Dinamarca	2,1	1,3	371,9	387,7	374,0	389,0
Letonia	0,0	0,0	223,0	287,0	223,0	287,0
Portugal	199,0	238,0	10,0	10,0	209,0	248,0
Hungría	58,0	60,0	153,0	169,0	211,0	229,0
Grecia	40,0	39,2	164,3	177,2	204,3	216,4
Eslovaquia	88,0	94,0	102,0	110,0	190,0	204,0
Irlanda	174,6	157,6	24,5	28,6	199,1	186,2
Eslovenia	4,9	4,2	148,2	136,8	153,1	141,0
Finlandia	57,2	82,9	82,3	56,3	139,4	139,2
Croacia	1,5	19,3	55,0	58,4	56,5	77,7
Lituania	0,0	0,0	42,0	59,0	42,0	59,0
Luxemburgo	0,0	0,0	57,9	55,3	57,9	55,3
Chipre	0,0	0,0	50,0	52,0	50,0	52,0
Estonia	0,0	0,0	15,8	30,0	15,8	30,0
Rumania	0,0	0,0	19,0	25,8	19,0	25,8
Suecia	0,0	0,0	20,0	20,0	20,0	20,0
Malta	0,0	0,0	2,0	3,0	2,0	3,0
Bulgaria	0,0	0,0	0,3	0,5	0,3	0,5
Total	16.276,5	20.580,0	30.114,6	32.149,6	46.391,1	52.729,6

Fuente: EurObserv´ER 2014

En Alemania, según la Agencia Federal de Redes (Bundesnetzagentur), la cantidad de biometano que se inyecta a la red de gas natural, prácticamente, se ha duplicado desde 2011, se ha pasado de 256.084 tpe en 2012 a 484.230 tep en 2013. En la mayoría de las plantas como materia prima se utilizan cultivos energéticos (59,6% maíz, 16,3% otros cultivos energéticos).

En Suecia el uso de biometano como combustible ya ha superado al Gas Natural Comprimido (CNG) con una participación en mercado del 57%.

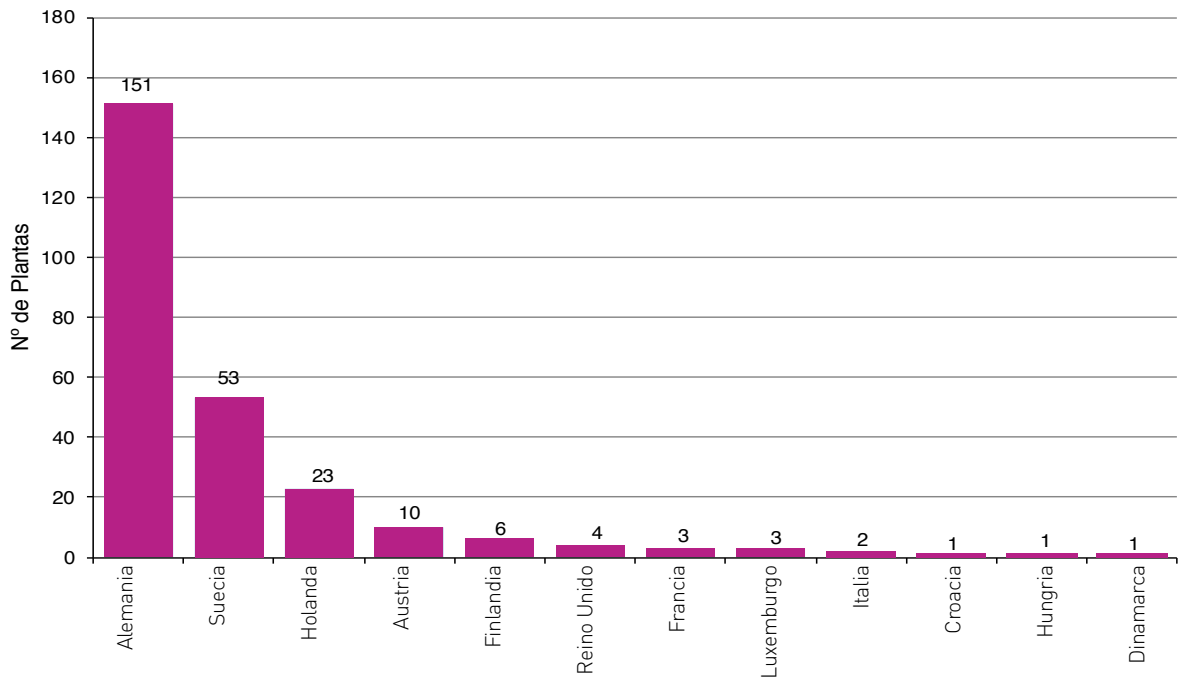
La producción de biometano también está aumentando considerablemente en otros países. Por ejemplo, en Holanda seprodujó un incrementó del 70,3% entre 2012 y 2013. En Austria, la producción de biometano alcanzó 4.729 tpe en 2013. Según la asociación de proveedores de gas y redes de calefacción de ese país, la conexión de dos nuevas plantas de producción condujo hasta 3.009 tpe durante los primeros 4 meses del año. En Finlandia, el sector del biogás está casi puramente impulsado por el transporte. Según la asociación finlandesa de biogás el consumo de biometano en el transporte aumentó en un 168% en 2013 en comparación al año anterior.

TABLA 3. Producción de de calor a partir de biogás en la Unión Europea (ktep)

	Plantas Productoras solo de calor		Plantas CHP		Calor Total	
PAÍS	2012	2013	2012	2013	2012	2013
Italia	0,3	0,3	138,5	200,8	138,8	201,0
Alemania	33,2	45,9	47,8	70,5	81,0	116,5
Dinamarca	5,6	1,7	29,6	31,7	35,2	33,4
Francia	2,4	2,4	9,1	14,4	11,6	16,8
Letonia	0,0	0,0	11,0	14,2	11,0	14,2
Suecia	5,4	7,2	5,7	6,1	11,2	13,3
Republica Checa	0,0	0,0	8,7	11,6	8,7	11,6
Finlandia	6,2	7,4	1,6	1,9	7,8	9,3
Polonia	0,3	0,0	4,8	9,0	5,1	9,0
Eslovenia	0,0	0,0	9,3	8,8	9,3	8,8
Austria	1,9	1,9	5,2	4,4	7,1	6,3
Estonia	0,0	0,0	0,1	5,7	0,1	5,7
Bélgica	0,0	0,0	6,6	5,2	6,6	5,2
Holanda	0,0	0,0	4,4	3,7	4,4	3,7
Rumania	0,9	0,9	2,4	2,4	3,3	3,3
Eslovaquia	0,0	0,0	2,7	2,9	2,7	2,9
Croacia	0,0	0,0	2,7	2,7	2,7	2,7
Lituania	0,0	0,0	1,2	2,3	1,2	2,3
Hungria	0,4	0,4	0,9	0,9	1,3	1,3
Luxemburgo	0,0	0,0	1,0	1,1	1,0	1,1
Chipre	0,0	0,0	1,0	1,0	1,0	1,0
Luxemburgo	0,0	0,0	57,9	55,3	57,9	55,3
Chipre	0,0	0,0	50,0	52,0	50,0	52,0
Estonia	0,0	0,0	15,8	30,0	15,8	30,0
Rumania	0,0	0,0	19,0	25,8	19,0	25,8
Suecia	0,0	0,0	20,0	20,0	20,0	20,0
Malta	0,0	0,0	2,0	3,0	2,0	3,0
Bulgaria	0,0	0,0	0,3	0,5	0,3	0,5
Total	56,7	68,1	294,4	401,2	351,1	469,3

Fuente: EurObserv´ER 2014

FIGURA 2. Plantas de biometano en Europa



Fuente: EurObserv´ER 2014

Actualmente la metanización está plenamente reconocida como un proceso ejemplar para el tratamiento de residuos y la recuperación de energía pero el crecimiento que se está produciendo en los países líderes puede verse afectado por la limitación que se quiere dar al uso de cultivos energéticos. Así, la Comisión Europea insiste en que la producción de biogás debe basarse principalmente en el uso de los subproductos y residuos orgánicos.

ANÁLISIS DE PATENTES

Durante el primer trimestre de 2015 se han identificado en la base de datos WPI (World Patent Index) 1.597 familias de patentes sobre tecnologías de conversión de la biomasa para la producción de energía (Tabla 4). El 52,5% de las referencias encontradas están relacionadas con las tecnologías bioquímicas y el 37,9% con las termoquímicas. La tecnología de digestión anaeróbica es la que cuenta con mayor número de resultados, 45,0% de los totales, seguida de la combustión directa (20,1%).

Tipos de tecnologías de conversión de la biomasa	1er trimestre. 2015
Tecnologías termoquímicas	606
Combustión directa	321
Gasificación/pirólisis	285
Tecnologías bioquímicas	838
Digestión anaeróbica	719
Fermentación de azúcares	119
Tecnologías químicas (transesterificación, Fischer-Tropsch síntesis de metanol)	153
Nº TOTAL FAMILIAS DE PATENTES	**1.597**

Tabla 4. Número de familias de patentes clasificadas por tecnologías

En la Tabla 5 se muestran los países que han publicado 10 o más documentos de patente en el primer trimestre de el 2015. El país líder es China con 1.104 documentos de patente, en segundo lugar, y con gran diferencia, le siguen las solicitudes internacionales (PCT). En tercero y cuarto lugar se encuentran EE.UU. y Corea con 100 y 78 documentos, respectivamente. En España durante este trimestre se han publicado ocho documentos.

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

	País	Nº referencias
1	China	1.104
2	PCT	186
3	EE.UU.	100
4	Corea	78
5	Japón	71
6	Alemania	40
7	EP	33
8	Francia	17
9	Rusia	11

Tabla 5. Ranking por países.

TECNOLOGÍAS TERMOQUÍMICAS
Patentes

COMBUSTIÓN DIRECTA		
Nº Publicación	Solicitante (País)	Contenido técnico
WO2015038994	Clearstak LLC (US); et al	**Fuel feed and air feed controller for biofuel-fired furnace.** A microprocessor-based controller manages delivery of BTUs or power by determining an amount of thermal heat or power needed through sensors and, in response, controls a batch or continuous feed of biofuel fuel and/or air to a biofuel furnace. The controller controls the fuel and air required to operate the furnace efficiently

COMBUSTIÓN DIRECTA

Nº Publicación	Solicitante (País)	Contenido técnico
WO2015028154	Mertik Maxitrol GmbH & CO KG (DE)	**System for controlling combustion air supply.** The object of the invention is to provide a system for controlling combustion air supply, in which the air supply to the primary and secondary air supply can be infinitely variable. The object is also to enable said system to be retrofitted in furnaces having a primary and a secondary air supply. To achieve this, a housing having an internal, pot-shaped insert provided with radial openings associated with either the primary air supply or the secondary air supply of the furnace is located between the furnace and the supply line for the combustion air, the cross-sections of said openings being infinitely variable via a pivotally mounted motion link, the rotary angle of which is restricted by one or more stops. The motion link is actuated by means of a drive unit which in turn can be controlled by a control unit.
EP2846088	RWTH AACHEN (DE)	**Flue gas purification device for small-scale furnace systems.** The device has a flow orifice coupled to a chimney, and a memory filter arrangement. The interior of memory filter arrangement is set in communication with a bypass chamber so that the gas path leads to the feeder only by the filter arrangement. An electric centrifugal fan is operatively connected to the bypass chamber so that the flue gas is sucked through filter arrangement into the branch. A pure gas outlet, through which the purified flue gas is discharged to the environment, is arranged at the downstream of the centrifugal fan. Use: Flue gas cleaning device for connection to chimneys for small-scale biomass combustion plants.
ES2523952	Alatoz Energy Systems, Sl (IT)	**Quemador de biomasa de llama horizontal.** Quemador de biomasa de llama horizontal por cuya parte superior se ubica el alimentador de biomasa y en su extremo se ubica el tubo de combustión que comprende un equipo mezclador con un eje acoplado en su base a un motor del eje, y al que se sueldan unas aletas helicoidales con forma de tornillo de Arquímedes ubicadas a la salida del alimentador y varillas rectas, así como un dispositivo rascador que comprende a su vez un vástago parcialmente fileteado y un actuador lineal que comprende un disco acoplado a un motor del actuador lineal, estando el disco enroscado en la parte fileteada del vástago.
ES1134455	Arcos Cantero, A (ES)	**Estufa de calentamiento alimentada por combustible solido.** 1. Estufa de calentamiento alimentada por combustible sólido que comprende una carcasa exterior con una forma sensiblemente prismática que define un recinto interiormente hueco, caracterizada por el hecho de que el recinto interiormente hueco comprende una primera cámara de combustión superior alimentada por biomasa provista de medios de alimentación de pellets o similares y al menos un quemador de pellets, y una segunda cámara de combustión inferior alimentada con leña, estando ambas primera y segunda cámara de combustión separadas por medio de una placa extraíble situada en el interior de la carcasa exterior. 2. Estufa de calentamiento según la reivindicación 1, caracterizada por el hecho de que la placa extraíble está hecha de hierro con un espesor comprendido entre 4 y 7 milímetros, y más preferentemente 6 milímetros. 3. Estufa de calentamiento según la reivindicación 1, caracterizada por el hecho de que los medios de alimentación de pellets consisten en una estructura de tolva de carga de combustible. 4. Estufa de calentamiento según la reivindicación 3, caracterizada por el hecho de que la tolva de carga de combustible está alojada en el interior de la primera cámara de combustión. 5. Estufa de calentamiento según la reivindicación 3, caracterizada por el hecho de que la tolva de carga de combustible está alojada en la zona exterior de la carcasa exterior, habiéndose provisto una región de acoplamiento en la parte superior de la carcasa exterior para acoplar la tolva de carga de combustible. 6.; Estufa para el calentamiento según la reivindicación 5, caracterizada por el hecho de que la región de acoplamiento comprende un saliente tubular que sobresale verticalmente hacia arriba con una forma geométrica tal que se adapta a la parte interior de la tolva de carga de combustible. 7. Estufa para el calentamiento según la reivindicación 6, caracterizada por el hecho de que el saliente tubular incluye una tapa extraíble. 8.; Estufa para el calentamiento según la reivindicación 1, por el hecho de que la placa extraíble incluye un orificio pasante vinculado a un tramo de conducto transversal que está en comunicación con la segunda cámara de combustión inferior, siendo dicho conducto susceptible de acoplarse a un tubo de salida de humos que está previsto para la salida del humo procedente de la combustión de leña hacia el exterior de la carcasa exterior a través de un orificio practicado en la parte superior de la carcasa exterior. 9. Estufa para el calentamiento según la reivindicación 1, caracterizada por el hecho de que una de las paredes laterales de la carcasa exterior incluye una puerta de acceso para acceder al interior de la cámara de combustión superior. 10.; Estufa para el calentamiento según la reivindicación 1, caracterizada por el hecho de que la pared frontal de la carcasa exterior presenta una puerta de acceso que se comunica con la primera y segunda cámaras de combustión. 11. Estufa para el calentamiento según la reivindicación 1, caracterizada por el hecho de que la cámara de combustión inferior presenta una base provista de un tramo enrejillado que comunica la citada cámara de combustión inferior con una bandeja recogedora de cenizas procedentes de la combustión de la leña.

COMBUSTIÓN DIRECTA

Nº Publicación	Solicitante (País)	Contenido técnico
ES1135111	Forte Jimenez, P (ES)	**Dispositivo de refrigeración para cañón de quemador de biomasa.** 1. Dispositivo de refrigeración para cañón de quemador de biomasa, que comprende una cámara de combustión con parrilla de quemado y un cajón que incluye medios para alimentación de combustible y medios para alimentación de aire; cuya cámara y cajón posterior quedan separadas por un tabique dotado de aberturas para el paso del combustible y aire, caracterizado porque: - la cámara de combustión comprende una pared interna y una pared externa, cuya pared externa circunda, al menos parcialmente la pared interna a partir del tabique de separación entre la cámara de combustión y el cajón posterior y delimita con la pared interna una cámara periférica que comunica con el cajón posterior y cámara de combustión a través de aberturas para la entrada de aire a dicha cámara de combustión. 2. Dispositivo de refrigeración para cañón de quemador de biomasa según reivindicación 1, caracterizado porque las aberturas que comunican la cámara periférica con la cámara de combustión disponen de placas deflectoras que dirigen la entrada de aire a lo largo de la superficie interior de la pared interna de dicha cámara.
WO2015014989	Kiln Flame Systems Ltd (GB)	**Burner for the combustion of particulate fuel.** A burner for burning a suspension of solid fuel in an oxygen containing gas. A portion of the suspension is passed through a first conduit which contains a bluff body and helical vanes to impart turbulence and swirl to the suspension. A further portion of the suspension is passed through a second conduit which is coaxial with the first conduit. Means for varying the relative sizes of each portion are provided. The arrangement allows improved fuel/air mixing, flame shape, heat transfer and control of NOx emissions.
EP2827059	Beilschmidt Alfred (AT)	**Incinerator installation.** The invention relates to an incinerator plant preferably for the combustion of biomass, in particular wood pellets comprising an ignition unit, a combustion chamber with a fuel supply, a combustion air inletsas well as with a heat exchanger heater for heat provided exhaust systemas well as a Stirling engine for electrical energy, wherein the heater head of the Stirling engine is arranged in the combustion chamber.In the combustion chamber is a fluidized bed consist of a bed of solid particles, preferably silica sand, arranged, and the heater head of the Stirling engine is located in the fluidized bed.
EP2845482	Fritsch GmbH (DE)	**Baking oven device.** The invention relates to an oven apparatus for baking-made baked bread, with a baking chamber, whose wall is formed at least for the most part of a stone or stone-like material, wherein said baking chamber through which, upon the combustion of lumpy wood fuel resulting flame and smoke gases can be directly heated, and wherein at least the baking space has a furnace door through which the Brotteiglinge can be introduced into the baking chamber, and wherein said baking chamber at least one flue gas opening through which spent flue gas from the baking space can be derived, wherein said oven means comprises an igniter with which the wood fuel pieces at least during the initial heating of the oven means can be ignited,and wherein said oven means comprises a conveyor, by means of the can, the inflamed wood fuel pieces conveyed in and / or distributed in the burning state through an inlet opening in the baking space.
WO2015005766	Nano Silver MFG SDN BHD (MY)	**An integrated waste incinerating and purifying apparatus.** An integrated waste incinerating and purifying apparatus comprising a closeable opening for receiving the waste, a combustion chamber for thermally decomposing the received waste in excess air from which ash and exhaust gases are produced, a collector disposed within the combustion chamber for collecting the ashes and non-combusted solids, an exhaust gas purifying unit mounted on the combustion chamber; wherein the exhaust gas purifying unit includes a liquid-based adsorbent medium which adsorbs uncollected ash or toxic compounds from the exhaust gas, and a solid-based adsorbent medium for entrapping any remaining toxic compound which passes through the liquid- based adsorbent medium, and an outlet attached to the exhaust gas purifying unitfor expelling the purified gases to the atmosphere.

COMBUSTIÓN DIRECTA

Nº Publicación	Solicitante (País)	Contenido técnico
EP2824049	CS Thermos SRL (IT)	**Solid fuel heating apparatus.** A solid fuel heating apparatus and, in particular, a woodchips or wood flakes heating apparatus, comprising a tank of the solid fuel, at least one auger, which is provided for picking up the solid fuel from the tank and for falling it in prefixed doses into a combustion brazier, where a forced and adjustable air jet is blowed and where an electrical resistor is placed to perform a flame ignition; according to the invention, the auger is constituted by a tubular element or shaft, which has a substantially cylindrical shape and on which is wound, in correspondence of at least one portion of the shaft, at least one brush or comb, which is spiral-shaped and which is provided with metallic teeth or filaments.

PIRÓLISIS/GASIFICACIÓN

Nº Publicación	Solicitante (País)	Contenido técnico
EP2843309	Savoie Déchets(FR)	**Vitrification method by separate gasification of a carbonaceous material.** The method involves supplying an amount of first-type waste i.e. biomass solid fuel, that comprises a carbonaceous material, and gasifying the quantity of waste for producing combustible synthesis gas using a heavy fluidized bed-type gasification reactor, where the quantity of waste to be gasified is continuously introduced. Amount of second-type waste i.e. vitrified slag, is transformed continuously into a vitrified product using heat that is released by complete oxidation of the combustible synthesis gas produced at the gasification process during vitrification process.
WO2015015433	Commissariat Energie Atomique (FR)	**Method for thermochemically converting a carbonaceous feedstock into synthesis gas containing mainlyH2 and CO.** The present invention concerns a method for thermochemically converting a carbonaceous feedstock into synthesis gas containing mainly hydrogen (H_2) and carbon monoxide (CO), comprising the following steps: a/ oxy-combustion of the carbonaceous feedstock in order to cause the cogeneration of electricity and heat; b/ simultaneous electrolysis of water and carbon dioxide (CO_2) at a high temperature (EHT), referred to as co-electrolysis, from at least the heat produced in step a/ and at least the carbon dioxide (CO_2) produced in step a/. Use: The method is useful for the thermochemical conversion of a carbonaceous feedstock, preferably lignocellulosic biomass with a moisture content of less than 50%, into synthesis gas mainly containing hydrogen and carbon monoxide (all claimed) , where the synthesis gas is useful to produce liquid fuels such as Fischer-Tropsch diesel, dimethyl ether and methanol or gas such as synthetic natural gas.
WO2015019330	Ronda Engineering SRL (IT)	**Facility and method for the treatment of organic compounds.** A facility for the treatment of organic compounds comprising a first unit including drying means suitable for treating organic compounds (A) to obtain a substantially anhydrous material (B); a second unit including a first reactor to carry out a process of pyrolysis of the substantially anhydrous material (B) to obtain a gaseous fraction (Bl) and a solid fraction (B2) therefrom; a third unitincluding a second reactor to carry out a process of gasification of the solid fraction (B2) from the substantially anhydrous material (B) in order to obtain a gaseous fraction (CI) and a solid fraction (C2) therefrom, and suitable for obtaining a gaseous mixture (D) comprising the gaseous fraction (CI) obtained from the gasification process and a gaseous fraction (Bl) of the substantially anhydrous material (B) for the generation of electrical energy (EEL) and/or thermal energy. The first and second reactors comprise corresponding control means suitable for maintaining the pressure within the first and second reactors during the pyrolysis and gasification processes at a value slightly above the atmospheric pressure in such a way as to prevent the ingress of air from the exterior to interior of the reactors, so that the processes take place substantially in the absence of ingress of oxidising agents coming from the external environment, and a secondary part (D2) of the gaseous mixture (D) is intended to feed combustion means to feed the pyrolysis and gasification processes when these processes reach steady-state conditions.

PIRÓLISIS/GASIFICACIÓN		
Nº Publicación	Solicitante (País)	Contenido técnico
WO2015004773	Mitsubishi Heavy Ind Environmental & Chemical Eng CO Ltd (JP)	**Method for inhibiting occurrence of pyrolysis deposit in pyrolysis gasification system, and pyrolysis gasification system.** This method for inhibiting the occurrence of a pyrolysis deposit in a pyrolysis gasification system includes: gasifying biomass (S2) through pyrolysis in a pyrolysis gasification furnace to form a pyrolysis gas (G1) and a carbide (C) continuously; subjecting the pyrolysis gas (G1) and the carbide (C) to separation in a solid-gas separation unit; feeding an oxygen-containing gas (G3) to the separated pyrolysis gas (G1); and introducing the pyrolysis gas (G1) together with the oxygen-containing gas (G3) to a combustion furnace through a pipe (9) which constitutes a pyrolysis gas line.
WO2015018742	Errani Marco (IT)	**Apparatus for generating energy by gasification.** An apparatus for generating energy by gasification, comprising an updraft gasifierprovided with a main body that is internally hollow so as to define a reaction chamber into which are fed a flow of combustible material (M), which falls downwardly, and a flow of a first oxidizer medium (C1), which flows upwardly against the current, in order to generate synthesis gas (G) that flows out from at least one outlet that is arranged upward, and with a substantially boxlike supporting body that is arranged outside the main body, the apparatus further comprising means for the combustion of the synthesis gas (G) mixed with a flow of a second oxidizer medium (C2), which are associated via connection with the at least one outlet, the gasifier comprising separation means interposed between the supporting body and the main body; so as to define a first chamber for introducing the first oxidizer medium (C1), connected to the reaction chamber, and a second chamber for introducing the second oxidizer medium (C2), proximate to the at least one outlet, the first and second chambers being mutually isolated and respective first and second adjustable means for supplying the first and second oxidizer medium (C1, C2) being provided.
WO2015007285	Pyroneer AS (DK)	**Apparatus and methods for gasification.** Provided are apparatus and methods of gasification using a circulating fluidized bed reactor comprising a separate pyrolysis reaction chamber, one or more primary char gasification chambers, and one or more secondary char gasification chambers which comprise an internal vertical reaction volume suitable for containing a particle bed fluidized by a predominantly vertical upwards gas flow. The vertical reaction volume is advantageous in that this provides the possibility for increased retention time of particles, facilitating comparatively slow "productive" temperature moderation based on endothermic char conversion.
WO2015038025	Jamalova Gulya Abaevna (KZ); et al	**Method and installation for utilizing solid household waste in landfills.** The invention relates to the utilization of solid household waste by using a multifunctional installation in landfills. The technical result consists in accelerating the utilization of solid household waste, in broadening and improving the engineering and technological capabilities of the proposed installation, and in preventing contaminants from being released into the surrounding environment. The technical result is achieved in that, prior to loading the solid household waste, the same undergoes radiation and dosimetry monitoring, the utilization of the solid household waste is carried out in two stages, wherein waste from one utilization zone moves into another zone naturally and continuously under the influence of its own weight, in the process of a portion of recycled or spent waste mass falling during unloading. In the first stage, the solid household waste undergoes aerobic and anaerobic treatment, resulting in the formation of biogas, which is then used for producing thermal and electrical energy. In the second stage of utilization, the solid household waste undergoes thermal decomposition, during which a portion of the waste which was not treated in a biodegradation area undergoes intensive drying and heating under the influence of hot gas, then undergoes pyrolysis, resulting in pyrogas which, following cooling and purification, is also used for producing thermal and electrical energy. Pyrocarbonate produced as a result of the pyrolysis is used in purifying a filtrate which is released in the process of biodegradation. Other solid household waste, which was rendered harmless by the installation, is cooled, unloaded and send for disposal.

PIRÓLISIS/GASIFICACIÓN		
Nº Publicación	Solicitante (País)	Contenido técnico
WO2015035084	Energy Solutions INC AG (US)	**Apparatuses, systems, mobile gasification systems, and methods for gasifying residual biomass.** Apparatuses, systems, mobile gasification systems, and methods for gasifying residual biomass are described. An example system may include a mobile gasification system configured to gasify feedstock generated from residual biomass to provide syngas. The mobile gasification system may be configured to generate electrical power using the syngas. The mobile gasification system may be configured to be installed in a transportable structure.
WO2015035077	Agblevor Foster (US); et al	**Catalytic pyrolysis of olive mill waste.** Methods and apparatus for producing bio-oil that include providing a catalyst that includes red mud in a catalyst bed in a fluid state, the catalyst being maintained at a temperature suitable for pyrolysis; providing a flow of a non-reactive fluid into the catalyst bed; entraining a biomass that includes olive mill waste in the flow of non-reactive fluid, so that the biomass is delivered to the catalyst bed; pyrolyzing the biomass; collecting gases and vapors that result from pyrolysis; and condensing the gases and vapors into bio-oil.
WO2015024102	Services Kengtek INC (CA)	**Method of distributing small scale pyrolysis for production of renewable fuels from waste.** The present document describes a method and a system of distributing pyrolysis by-products comprising the step of producing pyrolysis by-products produced by small scale pyrolysis of waste at a production site to a by-product processor. The by-product processor may be the production site itself.
WO2015020827	KIOR INC (US)	**Catalysts for thermo-catalytic conversion of biomass, and methods of making and using.** Disclosed are catalyst compositions including zeolite and silica components, methods of making, and processes of using in the thermo-catalytic conversion of biomass. Such disclosed methods of making include treating the zeolite with phosphorous during formation of the catalyst rather than prior to or after catalyst formation.
WO2015014459	LINDE AG (DE)	**Method and system for enriching a synthesis gas with hydrogen, said gas having been produced by gasification.** The invention relates to a method and a device for enriching a synthesis gas,generated by gasification of forest residue e.g. wood chip and agricultural residue such as straw or chaff, with hydrogen using solid organic as feedstock.with hydrogen, said gas having been produced by gasification, wherein hydrogen produced by means of electrolysis is added to the synthesis gas.
EP2829517	Kopf Syngas GmbH& Co KG (DE)	**Use of a granulate from the gasification of solids.** Use of particulate solid as an activated carbon adsorbent in a wastewater treatment or a sewage treatment plant, where particulate solid is obtained by solid gasification of biomass and sewage sludge
WO2015010668	Az Eco Energy Spol SRO (CZ)	**A method of pyrolysis (thermal decomposition) of a solid bulk organic waste and a reactor for performing the method.** The invention relates to a method of pyrolysis of solid bulk organic waste, especially sewage sludge and sludge from a biogas station in a reactor, in which solid bulk organic waste is fed to the reaction space of the reactor, around which a heated hollow casing of the reaction space is arranged, which forms a duct of the heat transfer medium separated from the inner space of the reactor, and during the passage of the solid bulk organic waste through this reaction space its pyrolysis takes place, whereby the movement of the subsequently delivered solid bulk organic waste in this reaction space is decelerated by counter flow of steam and gas products formed by the pyrolysis of the preceding solid bulk organic waste.; The invention also relates to a reactor for pyrolysis of solid bulk organic waste, especially sewage sludge and sludge from a biogas station, in whose inner space a reaction space is created, around which is arranged a heated hollow casing of the reaction space, which is connected to the inlet of the heat transfer medium to the reactor and the outlet of the heat transfer medium from the reactor, and which is separated from the inner space of the reactor.

PIRÓLISIS/GASIFICACIÓN		
Nº Publicación	Solicitante (País)	Contenido técnico
EP2824164	Agency of University of Latvia (LV); et al	**Method for treatment of plant raw material pellets.** The present invention relates to the technology of plant raw material treatment for obtaining fuel. An object of this invention is to enhance the heating value of the fuel, simultaneously decreasing the energy costs. According to the present invention, the object is achieved by exposure plant raw material pellets to a high-frequency electromagnetic field at frequency in a range of 13.5 MHz to 2.45 GHz during 120-200 s, until the temperature of surface of pellets reaches 410-450K. In the proposed method, the treatment of pellets is carried out at relatively low temperatures (up to 450K), when a thermal decomposition of hemicelluloses and celluloses still does not occur, but the moisture content in the pellets decreases, while increasing the rate of thermal decomposition of pellets, and increasing a heating value thereof, intensifying the burnout of volatile compounds and providing more complete combustion in a domestic heating boiler The activation of the thermal decomposition of pellets and the enhancement of heating value due to microwave pre-treatment may be used also to increase the gasifier capacity and the amount of the energy generated by the integrated gasifier and internal combustion engine.
WO2015003273	ANAERGIA INC (CA)	**Anaerobic digestion and pyrolysis system.** An anaerobic digester is fed a feedstock, for example sludge from a municipal wastewater treatment plant, and produces a digestate. The digestate is dewatered into a cake. The cake may be dried further, for example in a thermal drier. The cake is treated in a pyrolysis system to produce a synthesis gas and biochar. The gas is sent to the same or another digester to increase its methane production. The char may be used as a soil enhancer.
WO2015012302	Fuji Furukawa Engineering & Construction CO Ltd (JP)	**Charcoal syngas manufacturing method and apparatus, and fuel cell power generation system using said manufacturing method and apparatus.** To provide a charcoal syngas manufacturing method and apparatus, and a fuel cell power generation system using said manufacturing method and apparatus, which are designed to improve water gas reaction stability and gasification efficiency and to improve the controllability of operation when combined with a fuel cell. [Solution] A charcoal syngas manufacturing apparatus equipped with: an upright cylindrical charcoal syngas-generating unit having a combustion chamber, a reducing layer, and a drying layer; and various supply means for supplying charcoal, water, and air to the charcoal syngas-generating unit. The reducing layer and the combustion chamber are disposed as concentric cylinders with the combustion chamber on the outside and a heat transfer wall therebetween. A heat exchanger is provided inside the combustion chamber. Water is supplied to said heat exchanger to generate high temperature/high pressure superheated water vapor, or water from a raw water tank is supplied to the heat exchanger to generate water vapor and, by heating said water vapor via an induction heating unit, superheated water vapor is generated. The water gas reaction is conducted by introducing said superheated water vapor into the reducing layer.
WO2015006871	Torrefusion Technologies Inc (CA)	**Process for preparing torrefied biomass material using a combustible liquid.** A process for preparing torrefied densified biomass and/or torrefied densified biosolids comprising about 2% to about 25% w/w combustible liquid is disclosed. The process involves densifying biomass and/or biosolids, or providing a densified biomass and/or densified biosolids, and submerging the densified material in a hot combustible liquid for about 2 to about 120 minutes until the densified material is torrefied. The combustible liquid may be derived from any source exemplified by an oil such as those derived from plant, marine and animal sources, or alternatively, a petroleum product. The combustible liquid is heated to a temperature in the range of about 160 DEG C to about 320 DEG C prior to submersion of the densified biomass material. Also disclosed is a torrefied densified biomass and/or torrefied densified biosolid comprising about 2% to about 25% w/w combustible liquid.

PIRÓLISIS/GASIFICACIÓN		
Nº Publicación	Solicitante (País)	Contenido técnico
WO2014209973	Univ Louisiana State (US); et al	**Catalysts useful for biomass pyrolysis and bio-oil upgrading.** Catalysts useful in transforming biomass to bio-oil are disclosed, as are methods for making such catalysts, and methods of transforming biomass to bio-oil. The catalysts are especially useful for, but are not limited to, microwave- and induction-heating based pyrolysis of biomass, solid waste, and other carbon containing materials into bio-oil. The catalysts can also be used for upgrading the bio-oil to enhance fuel quality.
WO2015011826	Japan Blue Energy CO Ltd (JP);et al	**Hydrogen collection method.** The present invention provides a method for collecting hydrogen from a pyrolysis gas that is produced using a biomass as a raw material, whereby it becomes possible to collect a hydrogen gas having significantly high purity, to reduce power required for the collection significantly compared with the conventional techniques, and to also collect carbon dioxide that has been discarded conventionally. The present invention is a method for collecting hydrogen from a pyrolysis gas that is produced by thermally treating a biomass. The method is characterized by comprising: a first purification step of removing carbon dioxide from the pyrolysis gas by adsorption under pressurized conditions to purify the pyrolysis gas; and a second purification step of further increasing the pressure of a purified gas obtained in the first purification step while maintaining the pressure achieved in the first purification step and then removing a gas other than hydrogen from the purified gas by adsorption under pressurized conditions to further purify the purified gas, thereby collecting hydrogen from the purified gas. The method is also characterized in that carbon dioxide that is removed by adsorption in the first purification step is also collected.

TECNOLOGÍAS BIOQUÍMICAS
Patentes

DIGESTIÓN ANAERÓBICA		
Nº Publicación	Solicitante (País)	Contenido técnico
WO2015037989	Haskoningdhv Nederland BV (NL)	**Digestion of organic sludge.** Sludge originating from e.g. wastewater treatment plants, manure or biomass waste streams can be serially treated by anaerobic digestion in at least three anaerobic reactors,wherein a major part of the influent sludge stream is fed to a first reactor, the major part of the liquid effluent of the first reactor is fed to a second reactor, the major part of the liquid effluent of the second reactor is fed to a last reactor, and the major part of the liquid effluent of the last reactor is disposed and/or optionally further treated, and wherein a controlled variable part of the effluent of the last reactor is fed to the first reactor, and a controlled variable part of the influent sludge stream is fed to the second reactor; the level (volume per time unit) of the variable parts being controlled by means the pH and/or redox values in the reactors possibly combined with flow and/or composition values of the gas produced in the reactors.
ES2523792	Zufiaur Fernandez de Betono, A (ES)	**Depuración de aguas residuales completa de flujo vertical.**El procedimiento y el dispositivo de depuración de aguas residuales completo en flujo vertical se caracterizan porque conjuntan muchos biotopos ecológicos. El dispositivo de los reactores en serie se caracteriza porque los procesos de tratamiento de agua residual físico y biológico se dan en unos reactores cuyo flujo del efluente de agua se da en la vertical. Los procesos metabólicos, anaerobios aerobio, anóxico son realizados por la biomasa suspendida en el filtro inundado, forman comunidades de bacterias tal que es el sistema el que regula el proceso de tratamiento de depuración, es decir tenemos una sucesión de etapas con sinergias para ganar en eficiencia energético y economía. El proceso de bulking filamentoso es fácil de atajar porque el agua no permanece retenida en un reactor, sino que fluye continuamente. La materia ni se crea ni se destruye sino que se transforma.
WO2015031913	Verliant Energy LLC (US)	**System and method for improved anaerobic digestion.** A method for improved anaerobic digestion is presented. The method includes mixing a volume of waste material with water to form a feedstock mixture. The volume of waste material includes an initial amount of biomass and the feedstock mixture includes methanogenic bacteria either naturally present in the waste material or introduced artificially. The method also includes introducing one or more promoter substances to the feedstock mixture. The one or more promoter substances are capable of modifying the methanogenic bacteria. Modifying includes stimulating novel enzyme production in the methanogenic bacteria.
ES2524522	Univ Burgos (ES)	**Procedimiento para el tratamiento anaerobio de fluidos residuales orgánicos que contengan aceites y grasas.** El procedimiento que se presenta está diseñado para el tratamiento anaerobio de fluidos residuales caracterizados por su elevado contenido de lípidos, mediante fangos suspendidos que son retenidos mediante técnicas de microfiltración o ultrafiltración integradas en el propio sistema que operan con una ligera succión. Consiste en un dispositivo anaerobio de flujo ascendente combinado con un tanque de filtración cerrado en serie en la que se utilizan módulos de membranas sumergidas para la separación del agua tratada con retorno de la biomasa y materiales no digeridos del fluido residual al reactor anaerobio.; La superficie filtrante de las membranas se encuentra agitada intensamente mediante el burbujeo de un gas exento en oxígeno, preferentemente mediante la recirculación del biogás generado en el proceso biológico anaerobio. La corriente de gas introducida en el tanque de filtración induce un flujo ascendente de la fase líquida y biomasa suspendida en ella, por el efecto conocido come gas-lift, que rebosando de este tanque es recirculada a la parte inferior del reactor anaerobio mediante una conducción vertical. Este modo de recirculación de la biomasa minimiza las fuerzas de cizalladura características de otros métodos de bombeo. Dado que la separación se realiza por filtración no se ve afectado por las cualidades de sedimentación de los agregados de biomasa, alteradas por la presencia de aceites y grasas.; Por otra parte, el burbujeo empleado en el tanque de filtración proporciona condiciones adecuadas para el proceso anaerobio de betaoxidación de ácidos grasos de cadena larga.

DIGESTIÓN ANAERÓBICA		
Nº Publicación	Solicitante (País)	Contenido técnico
WO2015019382	Kyowa Chemical Plant Mfg Co Ltd (JP); et al	**Two-stage methane gas generating system having front end aggregation step.** To achieve an easily operated treatment system for treatment of organic waste with a high water content such as sewage and livestock waste, that has little treated water and a low residual environmental impact, is efficient with a high yield for methane gas generation, has comparatively small equipment, and has inexpensive construction costs. [Solution] A two-stage methane gas generating system has an aggregation step disposed in a preliminary stage of a fermentation step formed from a solubilization tank in which sludge is solubilized by aerobic fermentation and a methane generating tank in which the solubilized sludge is made to undergo anaerobic methane fermentation, and the water content of the sludge is made 70 wt% or less so that a drying treatment can be carried out.
WO2015017875	Tech Universität Wien (AT)	**Method and system for storing energy.** The invention relates to an energy storage method in which H2 is produced by electrolysis of water with electrical current, CO2 is additionally produced, and CH4 is produced by methanization from the H2 and CO2, and which is characterized in that: a) the CO2 is produced alongside CH4 in a biogas plant; b) the CO2 and CH4 in the biogas are separated in a membrane separation system by means of selective gas separation membranes into a CH4-rich gas stream and a CO2-rich gas stream, the CO2-rich gas stream being converted by methanization with the H2 produced to a product gas comprising CH4, CO2 and H2; c) at least a portion of the product gas is separated in a membrane separation system, in order to separate CO2 and H2 selectively from CH4; and d) the separation of the biogas and the separation of the product gas from the methanization are conducted simultaneously or alternately in the same membrane separation system using gas separation membranes capable of selective separation of CO2 and H2 from CH4.
WO2015009861	Biogas And Electric Llc (US)	**Exhaust scrubber.** Provided herein are methods, devices and systems for decreasing emissions in exhaust comprising contacting the exhaust with a liquid waste stream from a biogas production unit, the liquid waste stream being contacted with the exhaust, optionally, in a plurality absorbers operatively connected in-line and/or in parallel.
WO2015004146	Renew Energy AS (DK)	**Method and plant for treatment of organic waste.** The present invention relates to methods and plants for the treatment of an organic waste material, wherein waste is subjected to anaerobic fermentation in a biogas digester; effluent is mechanically separated from the biogas digester into a concentrated fraction and a liquid fraction; the liquid fraction is heated to a high temperature below the boiling point of the liquid; the heated liquid is introduced to a flash column to partially remove volatile carbon dioxide, the pH of the liquid is elevated and ammonia is removed from the liquid.
WO2015010192	Greenfield Specialty Alcohols Inc (CA)	**Method and system for production of hydrogen, methane, volatile fatty acids, and alcohols from organic material.** A method for producing H2, methane, VFAs and alcohols from organic material, including the steps of introducing organic material and microorganisms into a completely mixed bioreactor for producing H2, CO2, VFAs, and alcohols; recovering H2 and CO2; recovering a first liquid effluent including microorganisms, VFAs, and alcohols; introducing the first liquid effluent into a gravity settler for separating into a first biomass including microorganisms and a second liquid effluent including VFAs, alcohols and microorganisms; introducing the second liquid effluent into a separation module for separating into a second biomass including microorganisms and a third liquid effluent including VFAs and alcohols; recovering at least a portion of the third liquid effluent; and providing a recovered biomass by recovering at least a portion of the first biomass, the second biomass, or both, and introducing the recovered biomass into a biomethanator for production of CH4 and CO2.
WO2015007290	Advanced Substrate Technologies AS (DK)	**Method for cycling biomasses between mushroom cultivation and anaerobic biogas fermentation, and for separating and drying a degassed biomass.** The present invention is related to recycling of fermentable and metabolizable biomass materials for sequentially performing a cultivation of fungal cells and for producing biogas by anaerobic fermentation of said biomass materials.

DIGESTIÓN ANAERÓBICA

Nº Publicación	Solicitante (País)	Contenido técnico
WO2014210071	Biovessel Technologies Inc (US)	**Waste processing system with anaerobic mechanism and method of operation thereof.** A waste processing system includes: an input module for converting input organic waste into processed input waste; a digester module, coupled to the input module, for generating biogas and digester effluent from the processed input waste, including: a digester tank; baffles affixed within the digester tank; a digester process solution in the digester tank including, hydrolytic bacteria, acidogenic bacteria, acetogenic bacteria, methanogenic bacteria, or a combination thereof, for converting the processed input waste into the biogas and the digester effluent; and an output module, coupled to the digester module, for collecting the biogas and digester effluent after a residence period.
WO2015006882	Univ Beijing Chemical (CN)	**Method for implementing zero emission biogas slurry in pure straw anaerobic digestion.** Disclosed in the present invention is a method for implementing zero emission biogas slurry in pure straw anaerobic digestion, comprising pretreating a pure straw feedstock; adjusting the C/N of the pretreated straw, and feeding; discharging fermentation residues from the anaerobic digestion reactor, and isolating biogas slurry therefrom; performing an aerobic nitrification treatment on the biogas slurry outside the anaerobic digestion reactor; refluxing 100% of the biogas slurry in the straw feeding process, after the aerobic treatment, to the anaerobic digestion system, and performing a denitrification treatment on the biogas slurry in the anaerobic digestion reactor. The method of the present invention combines the in vitro aerobic nitrification and in vivo denitrification of the biogas slurry, thereby effectively reducing the COD and ammonia nitrogen concentration of the biogas slurry, no additional carbon source needs to be added in the denitrification process, and the inhibitory effect of reusing the biogas slurry on the system is eliminated, thereby achieveing zero emission biogas slurry and 100% reuse, and avoiding secondary pollution; at the same time, completely replacing the straw with biogas slurry for feeding regulates water, thereby achieving significant water conservation, reducing operating costs and being capable of maintaining the long-term stable operation of the anaerobic digestion reactor.
WO2014203047	Ecogas Israel Ltd (IL); et al	**Lightweight assemblable appliance and respective method for production of biogas and liquid fertilizer.** A system and method of recycling organic waste into biogas, implementing an anaerobic digestion processes, is disclosed. The system includes structural scaffolding and a pliable collapsible anaerobic digester. The aerobic digester includes at least one suspension tab, rendering the anaerobic digester suspendable from the structural scaffolding. A respective kit-of-parts is disclosed for assembling the aforementioned system.
WO2015000043	Biowaste Energy Lda (PT); et al	**A process for garbage and sewage treatment through a method able to accelerate the anaerobic digestion output and product resulting therefrom further allowing the use of varying feedstock.** The present invention discloses a system stimulating the increase in efficiency of anaerobic digestion of a plurality of feedstock streams upon stimulation of microbial feedstock ability and methanogen predominance in the digestion microbial mass.

FERMENTACIÓN

Nº Publicación	Solicitante (País)	Contenido técnico
WO2015011285	Biomethodes (FR)	**Novel variant trichoderma reesei endoglucanases.** The present invention provides T. reesei endoglucanase I variants exhibiting improved cellulase and/or xylanase activity, in particular at 30 DEG C and/or pH 6. These variants are particularly useful in industrial processes comprising simultaneous degradation of cellulosic biomass into monomeric sugars and fermentation of said sugars, for example to produce ethanol.

FERMENTACIÓN		
Nº Publicación	Solicitante (País)	Contenido técnico
WO2015028582	DSM IP ASSETS BV (NL)	**Glycerol and acetic acid converting yeast cells with improved acetic acid conversion.**The present invention relates to metabolic engineering in microorganisms such as yeast. In particular the invention relates glycerol and acetic acid converting yeast cells with improved acetic acid conversion. The invention further relates to the processes wherein the yeast cells produce fermentation product such as ethanol. Cell that is genetically modified comprising: a) one or more nucleotide sequence encoding a NAD+-dependent acetylating acetaldehyde dehydrogenase (E.C. 1.2.1.10); b) one or more nucleotide sequence encoding a acetyl-coa synthetase (E.C. 6.2.1.1); c) one or more nucleotide sequence encoding a glycerol dehydrogenase (E.C. 1.1.1.6); and d) one or more nucleotide sequence encoding a dihydroxyacetone kinase (E.C. 2.7.1.28 or E.C. 2.7.1.29).
WO2015026660	Runckel & Associates (US)	**Methods and compositions for making biofuels.**Disclosed herein is the isolation and identification of novel microbial genes and their polypeptide products and their use, for example to expand the ability of biofuel-producing microbes to consume lignocellulosic matter, including fruit and vegetable waste from food processing. Genes were isolated from diverse microbe communities, including compost heaps,and screened using computer andlaboratory techniques to isolate useful genes not previously described. Candidate genes were engineered onto platforms amenable to incorporation in biofuel-producing microbes and their ability to break down plant waste {e.g., to degrade polysaccharides), import degradation products {e.g., oligosaccharides) into the microbe, and/or convert monosaccharides into sugar types the microbe can utilize was confirmed. Combinations of these genetic constructs were shown to provide complementary abilities and efficiencies in terms of feedstock utilization. Finally, these novel genetic constructs were shown to increase fermentation yields of ethanol, a basic biofuel, in many fruit waste types including citrus rind, pineapple peel, and apple peel and pulp.
WO2015026138	Univ Nat Chonnam Ind Found (KR)	**Method for removing limonene and device for removing limonene in biomass saccharification liquid, and bioethanol production method using the removal method.**The present invention relates to a method for removing limonene in biomass. More specifically, the present invention relates to: a method for removing limonene and a device for removing limonene in a biomass saccharification liquid, whereby it is possible to effectively remove the limonene present in biomass such as mandarin peel, orange peel, grapefruit peel, lemon peel and lime peel, and it is possible to improve the production yield of bioethanol; and a bioethanol production method using the removal method.
WO2015025538	SAN NOPCO KK (JP)	**Additive for bioethanol fermentation process and method for producing bioethanol.**The purpose of the present invention is to provide an additive capable of improving production efficiency. The present invention is an additive for a bioethanol fermentation process characterized by containing (A) a polyoxyalkylene alkyl compound having a Griffin HLB value in the 0-6 range and (B) a polyoxyalkylene polyol. Compound (A) is preferably a mixture of a compound represented by formula (1) and a compound represented by formula (2). R1O-(AO)m-R2 (1) R3O-(AO)n-(EO)p-R4 (2) R1 and R3 are an alkyl or alkenyl, R2 and R4 are a hydrogen atom or a monovalent organic group, AO is an oxyalkylene having 3-18 carbon atoms or a reaction residue of glycidol, alkyl glycidyl ether, or alkenyl glycidyl ether, EO is oxyethylene, m and n are 1-100, and p is 1-10.
WO2015019362	Praj Ind Ltd (IN)	**Preparation of ethanol from lignocellulosic materials.** The invention relates to a process and system for the preparation of ethanol from lignoceilulosic materials and more particularly from lignoceilulosic materials like corncob, corn stover, sugarcane/ beet bagasse or any other lignoceilulosic materials.

FERMENTACIÓN		
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WO2015023989	Lallemand Hungary Liquidity Man Llc (HU)	**Methods for the improvement of product yield and production in a microorganism through glycerol recycling.** The present invention provides for novel metabolic pathways to reduce or modulate glycerol production and increase product formation. More specifically, the invention provides for a recombinant microorganism comprising one or more native and/or heterologous proteins that function to import glycerol and one or more native and/or heterologous enzymes that function in one or more engineered metabolic pathways to convert a carbohydrate source, such as lignocellulose, to a product, such as ethanol, wherein the one or more native and/or heterologous proteins or enzymes is activated, upregulated, or downregulated. The invention also provides for a recombinant microorganism comprising one or more native or heterologous proteins that function to regulate glycerol synthesis and one or more native and/or heterologous enzymes that function in one or more engineered metabolic pathways to convert a carbohydrate source to ethanol, wherein said one or more native and/or heterologous proteins or enzymes is activated, upregulated or downregulated. Also provided are methods for increasing cellular glycerol uptake and increasing recombinant production of fuels and other chemicals using the recombinant microorganisms of the invention.
WO2015014364	Inbicon AS (DK)	**Methods of processing lignocellulosic biomass using single-stage autohydrolysis pretreatment and enzymatic hydrolysis.** A method of processing lignocellulosic biomass comprising: - Providing soft lignocellulosic biomass feedstock, - Pretreating the feedstock at pH within the range 3.5 to 9.0 in a single-stage pressurized hydrothermal pretreatment to log severity Ro 3.75 or lower so as to produce a pretreated biomass slurry in which the undissolved solids comprise at least 5.0% by weight xylan, and Hydrolysing the pretreated biomass with or without addition of supplemental water content using enzymatic hydrolysis for at least 24 hours catalysed by an enzyme mixture comprising endoglucanase, exoglucanase, beta-glucosidase, endoxylanase, and beta-xylosidase activities at activity levels in nkat/g glucan of endoglucanase of at least 1100, exoglucanase of at least 280, beta-glucosidase of at least 3000, endoxylanase of at least 1400, and beta-xylosidase of at least 75, so as to produce a hydrolysate in which the yield of C5 monomers is at least 55% of the original xylose and arabinose content of the feedstock prior to pretreatment.
WO2015013132	Ineos Bio SA (CH); et al	**A process and medium for reducing selenium levels in biomass from fermentation of co-containing gaseous substrates.** A process for fermenting syngas and a fermentation medium provides high ethanol productivity while removing medium components that were previously thought to be essential. The process is effective for providing a specific STY of at least about 1 gram of ethanol/(L-day-gram cells) and for providing a selenium content in cell biomass exiting the fermentation of about 1 ppm or less.
WO2015011319	Abengoa Bioenergía Nuevas Tecnologías SA (ES)	**Myceliophthora thermophila host cell expressing a heterologous alpha-xilosidase enzyme and use thereof in a method for the degradation biomass.** The present invention relates to a Myceliophthora thermophila host cell which expresses an alpha-xilosidase, preferably an AtaxI alpha-xilosidase of Aspergillus terreus, the use of said host cell for breaking down lignocellulosic biomass and a method for producing bioethanol which includes the use of said host cell.
WO2014209751	Abengoa Bioenergía Nuevas Tecnologías SA (ES)	**Process for producing potable ethanol from agave bagasse.** The present disclosure relates to a method of preparing ethanol for use in a distilled beverage or for use as a biofuel. The ethanol is prepared from portions of the agave plant, including the blue agave plant, that are generally discarded as waste during the production of a tequila, or more generally, a mezcal. These waste materials include the agave bagasse and the agave leaves.

FERMENTACIÓN		
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WO2015013506	Edeniq Inc (US)	**Polymers in biomass saccharification bioprocess.** Methods and systems for increasing the yield of sugars from a biomass, such as a lignocellulosic biomass, are described. A non-ionic organic polymer is contacted with the biomass during the saccharification reaction, and the hydrolyzed mixture is separated using a filter into a permeate and a retentate, where the non-ionic organic polymer is present in the retentate. The retentate with the polymer is recycled to the hydrolysis mixture, which increased the yield of sugars using less saccharification enzymes. The methods thus allow for increased cost savings by reducing the amount of enzymes required to convert the biomass to sugars.
WO2015009986	Univ Washington State (US)	**Hydrothermal flowthrough pretreatment of lignocellulosic biomass to maximize fermentable sugar and lignin yields.** Water-only and dilute acid hydrothermal flowthrough methods of pretreating lignocellulosic biomass are provided. The flowthrough methods are carried out under high temperature and are typically followed by enzymatic hydrolysis of the resulting slurry to release further cellulose breakdown products. The methods result in high yields of desired products, e.g. fermentable sugars and lignin, which may be further processed, for example, to produce biofuels.
WO2015005410	Toray Industries (JP)	**Method for producing alcohol from cellulose-containing biomass.** This method for producing alcohol from cellulose-containing biomass includes the following steps (1) to (8). Step (1): a step for pre-processing cellulose-containing biomass. Step (2): a step for saccharification, by means of a diastatic enzyme, of the cellulose-containing biomass after the pre-processing as obtained by step (1). Step (3): a step for eliminating saccharification residual solids from the saccharification processing product obtained from step (2). Step (4): a step for culturing an alcohol fermentation microorganism with the aqueous saccharide solution obtained in step (3) as the starting material for fermentation. Step (5): a step for eliminating the alcohol fermentation microorganism from the culture liquid containing the alcohol fermentation microorganism obtained in step (4). Step (6): a step for recovering alcohol by distillation of the alcohol fermentation liquid obtained in step (5). Step (7): a step for filtering the distillation residue liquid obtained in step (6) through a reverse osmosis membrane. Step (8): a step for wastewater treatment of the retentate obtained in step (7).
WO2015005589	Korea Res Inst Chem Tech (KR)	**Method for preparing sugar, bioethanol or microbial metabolite from lignocellulosic biomass.** The present invention relates to a method for preparing bioethanol from lignocellulosic biomass. The method of the present invention is capable of: minimizing the impurity content of an enzymatic saccharification raw material, by extracting biomass using hot water, before pretreatment, and removing extractable substances such as inorganic salts; suppressing, to the greatest extent, the production of an excessive degradation product of sugar, by pretreating the biomass, from which the hot water extractable substances have been removed, in a condition for maximizing xylan yield; preparing fermentable sugar at a low cost, without washing a pretreated solid obtained from subsequent solid-liquid separation, but by only concentrating a sugar solution obtained after enzymatic saccharification, using a separation film; and preparing bioethanol therefrom in high yield.

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WO2015031379	Louisiana Eco Green Llc (US)	**Method of manufacturing bio-diesel and reactor.** A reactor and process for the production of bio-diesel. The reactor includes one or more coiled reaction lines. The lines are positioned within a tank containing a heat transfer media such as molten salt, maintained at about 750 DEG F. A pump circulates the media within the tank. An emulsion of alcohol; refined feed stock, including glycerides and/or fatty acids; and preferably water is pumped through the reaction lines at temperatures and pressures sufficient to maintain the alcohol in a super-critical state. The curvature of the coils, pump pulsing, and the flow rate of the emulsion keep the emulsion in a turbulent state while in the reactor, ensuring thorough mixing of the alcohol and feed stock. The alcohol reacts with the glycerides and fatty acids to form bio-diesel. The reaction is fast, efficient with regard to energy input and waste generation, and requires minimal alcohol.
WO2015012881	Greyrock Energy Inc (US)	**Diesel fuel blends with improved performance characteristics.** The present invention provides a blended fuel and methods for producing the blended fuel, wherein a synthetic fuel derived from a alternative resources such as natural gas, associated gas, biomass, or other feedstocks is blended with a traditional, petroleum derived fuel. A blended fuel which includes greater than 5% by volume of the synthetic fuel has an overall improved lifecycle greenhouse gas content of about 2.5% or more compared to the petroleum derived fuel. Also, blending of the low carbon fuel to the traditional, petroleum fuel improves various performance characteristics of the traditional fuel by at least 5%.
WO2015003655	Wilmar Internat Ltd (SG)	**Escherichia F6 expressing lipase, and F6 lipase and production and application thereof.** Isolated Escherichia F6 expressing lipase, and F6 lipase and production and application thereof, especially for use in biodiesel production.
WO2015015415	SCMS Inst of Bioscience and Biotechnology Res and Dev (IN)	**Process for obtaining ester.** The present disclosure relates to a process for obtaining ester and optionally glycerol from Coconut. The present disclosure also relate to the ester obtained and its use as a biofuel as an alternative for diesel. The process comprising acts of: a) obtaining endosperm from plant source and extracting oil from the endosperm, b) pretreating the oil and adding catalyst to the pre-treated oil to obtain reaction mixture, c) treating the reaction mixture to obtain ester fraction and glycerol fraction, wherein the glycerol fraction is heavier than the ester fraction, d) separating 25 the ester fraction from the glycerol fraction, obtaining and optionally quantifying ester from the ester fraction, and e) optionally obtaining and optionally quantifying glycerol from the glycerol fraction; methyl ester obtained from the said process.
WO2015016587	Korea Res Inst of Bioscience (KR)	**Continuous biodiesel production reactor using immobilized enzyme and biodiesel production method.** The present invention provides a continuous reactor and a biodiesel production method, which are designed to more efficiently produce biological biodiesel by using lipase, which is a lipolytic enzyme, instead of a chemical catalyst, in order to solve excessive energy consumption and a large amount of wastewater generation problems due to a high-temperature and high-pressure process according to a chemical reaction, which is the general biodiesel production method.
WO2015011556	Masdar Inst of Science and Technology (AE)	**System and method for continuous transesterification of oils.** A multi-chamber continuous tubular reactor for the transesterification of oil (e.g., waste cooking oil and the like) and methanol into glycol and fatty acid methyl (ethel) ester. The reactor includes a plurality of tubes, a plurality of fluidly coupled chambers, an inlet fluidly coupled to a first chamber of the plurality of chambers for receiving reactants, and an outlet fluidly coupled to a second chamber of the plurality of chambers for receiving products generated during a reaction within the plurality of chambers. At least one of the plurality of tubes is at least partially disposed within a lumen of another one of the plurality of tubes. The plurality of fluidly coupled chambers are defined, at least in part, by the plurality of tubes. The reactor is configured to generate a generally helical flow pattern through at least one of the plurality of chambers.

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WO2015012538	SK Chemicals Co Ltd (KR)	**Method for preparing fatty acid alkyl ester using fat.** Disclosed is a method for preparing fatty acid alkyl ester for a biodiesel fuel by reacting alcohol with fatty acid, which is prepared by reacting a raw material containing fat with water. The method for preparing fatty acid alkyl ester for a biodiesel fuel, comprises the steps of: subjecting water and a raw material containing fat to a hydrolysis reaction at a temperature of 200 to 280[deg.C] and a pressure of 30 to 80 bars, thereby preparing fatty acid and glycerin; layer-separating the glycerin and the fatty acid; and subjecting the separated fatty acid and alcohol to an esterification reaction at a temperature of 200 to 350[deg.C] and normal pressure to a pressure of 35 bars.
WO2015007345	Catalytec (US)	**Method for producing biodiesel.** Producing biodiesel, comprises reacting a mixture comprising fatty acid glycerol ester and polyol in presence of zeolite to obtain biodiesel and separating the biodiesel product
WO2015001141	Repsol SA (ES)	**Compositions and methods for biofuel production using pseudomonas brassicacearum.** The invention relates to a microorganism of Pseudomonas brassicacearum strain CECT 8162 or a mutant strain of same, which maintains the ability to accumulate up to at least 20 % of its dry weight in the form of lipids. The invention also relates to a method for producing a microbial biomass of said strain that is rich in triglycerides, and to methods for producing a lipid composition from the microbial biomass and for producing paraffins or biodiesel from said lipids.
WO2014209830	Shell Oil Co (US); et al	**Direct method of producing fatty acid esters from microbial biomass.** A method of producing fatty acid esters in situ from microbial biomass such as algae is provided by treating microbial biomass with a solution containing an alcohol and at least one [alpha]-hydroxysulfonic acid. Fatty acid ester can be directly recovered from the treated microbial biomass. The [alpha]-hydroxysulfonic acid can be easily removed from the treated microbial biomass and recycled. The method is useful for producing fatty acid esters, which is used as biofuel, preferably biodiesel, from microbial biomass such as microalgae, yeast, fungi or bacteria.
WO2014202980	Argent Energy Group Ltd (GB)	**Process for producing biodiesel and related products.** There is described a process for producing biodiesel and related products from mixtures. There is also described a process for producing precursors and feedstock materials for producing biodiesel and related products. The processes use esterification and trans-esterification, separation and purification. Other process steps such as acidification and distillation can also be used.
ES2526617	Neol Biosolutions SA (ES)	**Production of microbial oils.** The invention relates to the Rhodosporidium toruloides CECT 3085 strain, and to the uses thereof in order to obtain triglyceride-rich microbial biomass and to produce oils of microbial origin in the presence of lignocellulosic biomass hydrolysates.

VT BIOMASA PATENTES

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