Unidad de Vigilancia Tecnológica e Inteligencia Competitiva

Microalgas

Marzo 2016

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Publicaciones

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BioProductos-Biomasa algal-Biogas

Comparison of Chlorella vulgaris and cyanobacterial biomass: cultivation in urban wastewater and methane production

Fecha de Publicación: 2016 (en prensa)

Fuente: Bioprocess and Biosystems Engineering

Autor(es): Mendez, L.; Sialve, B.; Tomás-Pejó, E.; Ballesteros, M.; Steyer, J.P.; González-Fernández, C.

Enlace:
http://syndic8.scopus.com/action/redirectFile?&zone=main&currentActivity=feed&usageType=outward&url=http%3A%2F%2Fwww.scopus.com%2Finward%2Frecord.url%3Feid%3D2-s2.0-84956868987%26rel%3DR4.0.0%26partnerID%3D35%26md5%3D8537b7d856dec852c4eb9b42ade37bf0

Abstract

Abstract Anaerobic digestion of microalgae is hampered by its complex cell wall. Against this background, cyanobacteria cell walls render this biomass as an ideal substrate for overcoming this drawback. The aim of the present study was to compare the growth of two cyanobacteria (Aphanizomenon ovalisporum and Anabaena planctonica) and a microalga (Chlorella vulgaris) in urban wastewater when varying the temperature (22, 27 and 32 C). Cyanobacterial optimal growth for both strains was attained at 22 C, while C. vulgaris did not show remarkable differences among temperatures. For all the microorganisms, ammonium removal was higher than phosphate. Biomass collected was subjected to anaerobic digestion. Methane yield of C. vulgaris was 184.8 mL CH4 g COD in-1 while with A. ovalisporum and A. planctonica the methane production was 1.2-

and 1.4-fold higher. This study showed that cyanobacteria growth rates could be comparable to microalgae while presenting the additional benefit of an increased anaerobic digestibility.

Enzymatic pretreatment of Chlorella vulgaris for biogas production: Influence of urban wastewater as a sole nutrient source on macromolecular profile and biocatalyst efficiency

Fecha de Publicación: 2016 (en prensa)

Fuente: Bioresource Technology

Autor(es): Mahdy, A.; Ballesteros, M.; González-Fernández, C.

Enlace:
http://syndic8.scopus.com/action/redirectFile?&zone=main&currentActivity=feed&usageType=outward&url=http%3A%2F%2Fwww.scopus.com%2Finward%2Frecord.url%3Feid%3D2-s2.0-84956575981%26rel%3DR4.0.0%26partnerID%3D35%26md5%3D6896dc9367f2def218dcdfc0e52538ac

Abstract

Two biocatalysts, namely carbohydrases and proteases, were assessed for organic matter solubilisation and methane yield enhancement of microalgae biomass. This study evidenced Chlorella vulgaris carbohydrate accumulation (40% on VSS basis) when grown in urban wastewater. Despite of the carbohydrate prevailing fraction, protease pretreatment showed higher organic matter hydrolysis efficiency (54%). Microscopic observation revealed that carbohydrases affected slightly the cell wall while protease was not selective to wall constituents. Raw and pretreated biomass was digested at 1.5 kg tCOD m3 day1 organic loading rate (OLR1) and 20 days hydraulic retention time (HRT). The highest methane yield (137 mL CH4 g COD in1) was achieved in the reactor fed with protease pretreated C. vulgaris. Additionally, anaerobic digestion was conducted at OLR2 (3 kg tCOD m3 day1) and HRT (15 days). When compared to raw biomass, methane yield increased 5- and 6.3-fold at OLR1 and OLR2, respectively. No inhibitors were detected during the anaerobic digestion.

A novel one-stage cultivation/fermentation strategy for improved biogas production with microalgal biomass

Fecha de Publicación: 2015 (En prensa)

Fuente: Journal of Biotechnology

Autor(es): Klassen, V.; Blifernez-Klassen, O.; Hoekzema, Y.; Mussgnug, J.H.; Kruse, O.

Enlace:
http://syndic8.scopus.com/action/redirectFile?&zone=main&currentActivity=feed&usageType=outward&url=http%3A%2F%2Fwww.scopus.com%2Finward%2Frecord.url%3Feid%3D2-s2.0-84930152129%26rel%3DR4.0.0%26partnerID%3D35%26md5%3D081285c06986a607bbc837d5da3904c1

Abstract

The use of alga biomass for biogas generation has been studied for over fifty years but until today, several distinct features, like inefficient degradation and low C/N ratios, limit the applicability of algal biomass for biogas production in larger scale. In this work we investigated a novel, one-stage combined cultivation/fermentation strategy including inherently progressing nitrogen starvation conditions to generate improved microalgal biomass substrates. For this strategy, comparable low amounts of nitrogen fertilizers were applied during cultivation and no additional enzymatic, chemical or physical pretreatments had to be performed. The results of this study demonstrate that progressing nitrogen limitation leads to continuously increasing C/N ratios of the biomass up to levels of 24–26 for all three tested alga strains (Chlamydomonas reinhardtii, Parachlorella kessleri and Scenedesmus obliquus). Importantly, the degradation efficiency of the algal cells increased with progressing starvation, leading to strain-specific cell disintegration efficiencies of 35–100% during the fermentation process. Nitrogen limitation treatment resulted in a 65% increase of biogas yields for C. reinhardtii biomass (max. 698 ± 23 mL biogas g−1 VS) when compared to replete conditions. For P. kessleri and S. obliquus, yields increased by 94% and 106% (max. 706 ± 39 mL and 586 ± 36 mL biogas g−1 VS, respectively). From these results we conclude that this novel one-stage cultivation strategy with inherent nitrogen limitation can be used as a pretreatment for microalgal biomass generation, in order to produce accessible substrates with optimized C/N ratios for the subsequent anaerobic fermentation process, thus increasing methane production and avoiding the risk of ammonia inhibition effects within the fermenter.

Enhanced methane production from microalgal biomass by anaerobic bio-pretreatment

Fecha de Publicación: 2016 (en prensa)

Fuente: Bioresource Technology

Autor(es): He, S.; Fan, X.; Katukuri, N.R.; Yuan, X.; Wang, F.; Guo, R.-B.

Enlace:
http://syndic8.scopus.com/action/redirectFile?&zone=main&currentActivity=feed&usageType=ou

tward&url=http%3A%2F%2Fwww.scopus.com%2Finward%2Frecord.url%3Feid%3D2-s2.0-84953880722%26rel%3DR4.0.0%26partnerID%3D35%26md5%3D530394f5941cd846c09e36a1d8eaf468

Abstract

Anaerobic digestion (AD) of microalgal biomass is one of the most energy efficient technologies to convert microalgae to biofuels. In order to improve the biogas productivity, breaking up the tough and rigid cell wall of microalgae by pretreatment is necessary. In this work, Bacillus licheniformis, a facultative anaerobic bacterial with hydrolytic and acidogenic activities, was adopted to pretreat Chlorella sp. In the established pretreatment process, pure bacterial culture (0%, 1%, 2%, 4%, 8%, v/v) were used to pretreat Chlorella sp. under anaerobic condition at 37 °C for 60 h. The soluble chemical oxygen demands (SCOD) content was increased by 16.4-43.4%, while volatile fatty acids (VFAs) were improved by 17.3-44.2%. Furthermore, enhancement of methane production (9.2-22.7%) was also observed in subsequent AD. The results indicated that the more dosages of bacteria were used to pretreat the microalgal biomass in the range of 1-8%, the more methane was produced.

BioProductos-Biomasa algal-Proteínas

Continuous biodiesel conversion via enzymatic transesterification catalyzed by immobilized Burkholderia lipase in a packed-bed bioreactor

Fecha de Publicación: 15 Abril 2016

Fuente: Applied Energy, Volume 168

Autor(es): Dang-Thuan Tran, Ching-Lung Chen, Jo-Shu Chang

Enlace:
http://rss.sciencedirect.com/action/redirectFile?&zone=main&currentActivity=feed&usageType=outward&url=http%3A%2F%2Fwww.sciencedirect.com%2Fscience%3F_ob%3DGatewayURL%26_origin%3DIRSSSEARCH%26_method%3DcitationSearch%26_piikey%3DS0306261916300691%26_version%3D1%26md5%3Dc75ef1b796d4915b45fa5bb5a18e0325

Abstract

Methanolysis of sunflower oil catalyzed by a synthesized immobilized lipase (denoted as celite-alkyl-lipase) was carried out in a packed-bed reactor (PBR) (H =167cm, I.D =1.5cm) to produce biodiesel. Although complete conversion of the triglyceride can be achieved in a long-single column PBR with prolonged reaction time, the biodiesel production still reached a plateau of 67% conversion due to glycerol accumulation, which led to an increase in the mass transfer resistance. The biodiesel conversion was enhanced to 85% by carrying out the transesterification in a series of

three packed-bed reactors integrated with glycerol removal devices. In the first column (H =67cm, I.D =1.5cm), triglyceride was converted to fatty acid methyl esters (FAME), glycerol, as well as a considerable amount of intermediate products, while the second (H =67cm, I.D =2.0cm) and third columns (H =67cm, I.D =2.5cm) continuously converted intermediate products to FAME with the supply of methanol and without the accumulation of glycerol. The PBR series system was able to continuously produce biodiesel at the yield of 4413kgkg^{-1} celite-alkyl-lipase, without deactivation of the biocatalyst.

Efficient recovery of nitrate and phosphate from wastewater by an amine-grafted adsorbent for cyanobacterial biomass production

Fecha de Publicación: Abril 2016

Fuente: Bioresource Technology, Volume 205

Autor(es): Jungmin Kim, Min-Jin Hwang, Sang-Jun Lee, Won Noh, Jung Min Kwon, Jin Soo Choi, Chang-Min Kang

Enlace:
http://rss.sciencedirect.com/action/redirectFile?&zone=main&currentActivity=feed&usageType=outward&url=http%3A%2F%2Fwww.sciencedirect.com%2Fscience%3F_ob%3DGatewayURL%26_origin%3DIRSSSEARCH%26_method%3DcitationSearch%26_piikey%3DS0960852416300311%26_version%3D1%26md5%3D2c5425eb80230660b7be24b9e0a370bb

Abstract

Various types of wastewater have been widely utilized in microalgae and cyanobacteria cultivation for environmental and economic reasons. However, the problems of low cell growth and biomass contamination due to direct use of wastewater remain unresolved. In the present study, nitrate and phosphate were separated from wastewater by adsorption and subsequently used for cyanobacterial biomass production. To this end, an amine-grafted magnetic absorbent was synthesized. The synthesized absorbent recovered ca. 78% nitrate and 93% phosphate from wastewater. Regenerated medium was prepared using recovered nutrients as nitrogen and phosphate sources, which were efficiently assimilated by cyanobacterial culture. Compared to synthetic medium, there was no difference in growth and nutrient removal using regenerated medium. The proposed indirect method of wastewater utilization would prevent contamination of the produced biomass by unfavorable substances, which will broaden its potential applications.

Graphical abstract

Catalytic pyrolysis of amino acids: Comparison of aliphatic amino acid and cyclic amino acid09:13

Fecha de Publicación: 2016

Fuente: Energy Conversion and Management 112, 220–225

Autor(es): Liu, G.; Wright, M.M.; Zhao, Q.; Brown, R.C.; Wang, K.; Xue, Y.

Enlace:
http://syndic8.scopus.com/action/redirectFile?&zone=main&currentActivity=feed&usageType=outward&url=http%3A%2F%2Fwww.scopus.com%2Finward%2Frecord.url%3Feid%3D2-s2.0-84955488739%26rel%3DR4.0.0%26partnerID%3D35%26md5%3D4abb98b481a51036b0f3d0bb301cece5

Abstract

Catalytic pyrolysis (CP) of protein-rich biomass such as microalgae is a promising approach to biofuel production. CP of amino acids can help understand the cracking of protein-rich biomass in the presence of zeolite catalysts. In this study, as representatives of aliphatic amino acid and cyclic amino acid, respectively, leucine and proline were pyrolyzed with ZSM-5 catalyst in a Tandem micro-furnace reactor coupled with a MS/FID/TCD. At 650 C, leucine produced more hydrocarbons (aromatic hydrocarbons of 29.6%, olefins of 34.9% and alkanes of 8.1%) than proline (aromatic hydrocarbons of 25.3%, olefins of 14.0% and alkanes of 5.5%) because its relatively simpler amino structure readily detached as ammonia during CP. However, with an N-cyclic structure, proline produced large quantities of nitrogencontaining heterocyclic compounds that favored coke formation in CP. Accordingly, 28.2% of the nitrogen in proline was retained in the solid residue while most of the nitrogen in leucine was converted into ammonia leaving only 4.3% in the solid residue. In addition, though decarboxylation to carbon dioxide was favored in non-catalytic pyrolysis of leucine and proline, decarbonylation to carbon monoxide became the primary

deoxygenation pathway in CP. These results indicate that the chemical structures of amino acids have significant effects on product distributions during CP and N-cyclic amino acid is less favored in CP for production of hydrocarbons and ammonia.

Whole-Cell Protein Profiles of Disintegrated Freshwater Green Algae and Cyanobacterium

Fecha de Publicación: 2016 (Manuscrito Aceptado)

Fuente: Journal of Aquatic Food Product Technology

Autor(es): Samek, D.; Mišurcová, L.; Machu˚, L.; Buňková, L.; Minařík, A.; Fišera, M.

Enlace:
http://syndic8.scopus.com/action/redirectFile?&zone=main&currentActivity=feed&usageType=outward&url=http%3A%2F%2Fwww.scopus.com%2Finward%2Frecord.url%3Feid%3D2-s2.0-84955367240%26rel%3DR4.0.0%26partnerID%3D35%26md5%3D5a738f193b151469e0b2919fab288d05

Abstract

Influence of cultivation methods and post-harvesting treatment on protein profiles of green freshwater microalgae Chlorella kessleri, Scenedesmus quadricauda, and Chlorella sp. and cyanobacterium Spirulina platensis were evaluated. The comparison of protein profiles in algal biomass originated from the autotrophic cultivation in an outdoor open circulating cascadetype cultivation apparatus in thin-layer, a solar photobioreactor and from the heterotrophic cultivation regime in a fermenter. All tested algae contained protein bands in the area between 14.3 – 27 kDa and 70 – 116 kDa. Protein profiles revealed much higher heterogenity in the area between 30 – 70 kDa.

BioProductos-Biomasa algal-Hidratos de Carbono

Simultaneous production assessment of triacylglycerols for biodiesel and exopolysaccharides as valuable co-products in Navicula cincta10:52 24/02/2016, Bioproductos, Biomasa, HdC

Fecha de Publicación: Abril 2016

Fuente: Algal Research, Volume 15

Autor(es): Guadalupe Barnech Bielsa, Cecilia A. Popovich, María C. Rodríguez, Ana M. Martínez, Lucas A. Martín, María C. Matulewicz, Patricia I. Leonardi

Enlace:
http://rss.sciencedirect.com/action/redirectFile?&zone=main&currentActivity=feed&usageType=outward&url=http%3A%2F%2Fwww.sciencedirect.com%2Fscience%3F_ob%3DGatewayURL%26_origin%3DIRSSSEARCH%26_method%3DcitationSearch%26_piikey%3DS2211926416300248%26_version%3D1%26md5%3D7c59e33fa988ee767a3e91acb6fec4e7

Abstract

The marine benthic diatom Navicula cincta was cultured in order to evaluate its capacity to produce both neutral lipid-triacylglycerols (TAG) for biodiesel, and exopolysaccharides (EPS), as valuable co-products, under the same environmental conditions. The species was cultured without applying stress conditions, except for the ones naturally created by the culture age. Peaks of neutral lipid accumulation were estimated by fluorimetry by Nile Red. Consequently, lipids were extracted and fractionated into neutral and polar fractions and the fatty acid profile of each fraction analysed by GC. The stationary phase began on day 6, when phosphate and silicate reached limiting values for diatom growth. Total lipids and lipid fractions did not show differences between harvesting time points, reaching total lipid up to 41% of ash-free dry weight (AFDW) and TAG the dominant fraction (ca. 90% of total lipids). Particularly noticeable was the storage of palmitoleic acid (ca. 54% of total fatty acid methyl esters) and a lower level of polyunsaturated fatty acids, which may impart overall favourable properties to a biodiesel fuel, especially cold flow and oxidative stability. The maximum concentrations of EPS corresponded to soluble fraction, which was most significant when the cultures reached the stationary phase and when the medium was almost phosphate and silicate depleted. The characterization of soluble EPS indicated the presence of N-glycopeptides. According to the present results, a hypothetical scheme of demonstrative cultures under a biorefinery approach is proposed for N. cincta.

Cultivation of Chlorella vulgaris in wastewater with waste glycerol: Strategies for improving nutrients removal and enhancing lipid production09:44 22/02/2016, Bioproductos, Biomasa, HdC

Fecha de Publicación: Mayo 2016

Fuente: Bioresource Technology, Volume 207

Autor(es): Xiaochen Ma, Hongli Zheng, Min Addy, Erik Anderson, Yuhuan Liu, Paul Chen, Roger Ruan

Enlace:
http://rss.sciencedirect.com/action/redirectFile?&zone=main&currentActivity=feed&usageType=outward&url=http%3A%2F%2Fwww.sciencedirect.com%2Fscience%3F_ob%3DGatewayURL%26_origin%3DIRSSSEARCH%26_method%3DcitationSearch%26_piikey%3DS0960852416301390%26_version%3D1%26md5%3Da8a99475a11d52843374ffb85b4bd28b

Abstract

To improve nutrients removal from wastewater and enhance lipid production, cultivation of Chlorella vulgaris in wastewater with waste glycerol generated from biodiesel production using scum derived oil as feedstock was studied. The results showed that nutrients removal was improved and lipid production of C. vulgaris was enhanced with the addition of waste glycerol into wastewater to balance its C/N ratio. The optimal concentration of the pretreated glycerol for C. vulgaris was 10gL−1 with biomass concentration of 2.92gL−1, lipid productivity of 163mgL−1 d−1, and the removal of 100% ammonia and 95% of total nitrogen. Alkaline conditions prompted cell growth and lipid accumulation of C. vulgaris while stimulating nutrients removal. The application of the integration process can lower both wastewater treatment and biofuel feedstock costs.

Butanol fermentation from microalgae-derived carbohydrates after ionic liquid extraction

Fecha de Publicación: Abril 2016

Fuente: Bioresource Technology, Volume 206

Autor(es): Kai Gao, Valerie Orr, Lars Rehmann

Enlace:
http://rss.sciencedirect.com/action/redirectFile?&zone=main&currentActivity=feed&usageType=outward&url=http%3A%2F%2Fwww.sciencedirect.com%2Fscience%3F_ob%3DGatewayURL%26_origin%3DIRSSSEARCH%26_method%3DcitationSearch%26_piikey%3DS0960852416300025%26_version%3D1%26md5%3De19996f34edd1456314426b61aec8bf3

Abstract

Lipid extracted algae (LEA) is an attractive feedstock for alcohol fuel production as it is a non-food crop which is largely composed of readily fermented carbohydrates like starch rather than the more recalcitrant lignocellulosic materials currently under intense development. This study compares the suitability of ionic liquid extracted algae (ILEA) and hexane extracted algae (HEA) for acetone, butanol, and ethanol (ABE) fermentation. The highest butanol titers (8.05gL−1) were achieved with the fermentation of the acid hydrolysates of HEA, however, they required detoxification to support product formation after acid hydrolysis while ILEA did not. Direct ABE fermentation of ILEA and HEA (without detoxification) starches resulted in a butanol titer of 4.99 and 6.63gL−1, respectively, which significantly simplified the LEA to butanol process. The study demonstrated the compatibility of producing biodiesel and butanol from a single feedstock which may help reduce the feedstock costs of each individual process.

Bioethanol production from carbohydrate-enriched residual biomass obtained after lipid extraction of Chlorella sp. KR-1

Fecha de Publicación: Noviembre 2015

Fuente: Bioresource Technology, Volume 196

Autor(es): Ok Kyung Lee, You-Kwan Oh, Eun Yeol Lee

Enlace:
http://rss.sciencedirect.com/action/redirectFile?&zone=main&currentActivity=feed&usageType=outward&url=http%3A%2F%2Fwww.sciencedirect.com%2Fscience%3F_ob%3DGatewayURL%26_origin%3DIRSSSEARCH%26_method%3DcitationSearch%26_piikey%3DS0960852415009931%26_version%3D1%26md5%3Dd34484995df53629da5ab50c1cfa2fd9

Abstract

The residual biomass of Chlorella sp. KR-1 obtained after lipid extraction was used for saccharification and bioethanol production. The carbohydrate was saccharified using simple enzymatic and chemical methods using Pectinex at pH 5.5 and 45°C and 0.3N HCl at 121°C for 15min with 76.9% and 98.2% yield, respectively, without any pretreatment. The residual biomass contained 49.7% carbohydrate consisting of 82.4% fermentable sugar and 17.6% non-fermentable sugar, which is valuable for bioethanol fermentation. Approximately 98.2% of the total carbohydrate was converted into monosaccharide (fermentable+non-fermentable sugar) using dilute acid saccharification. The fermentable sugar was subsequently fermented to bioethanol through separate hydrolysis and fermentation with a fermentation yield of 79.3%. Overall, 0.4g ethanol/g fermentable sugar and 0.16g ethanol/g residual biomass were produced.

BioProductos-Antioxidantes

A developmental toxicity study of 3S, 3′S-Astaxanthin in New Zealand white rabbits

Fecha de Publicación: Abril 2016

Fuente: Food and Chemical Toxicology, Volume 90

Autor(es): Schneider, Werner Mellert, Stefan Schulte, Bennard van Ravenzwaay Steffen

Enlace:
http://rss.sciencedirect.com/action/redirectFile?&zone=main&currentActivity=feed&usageType=outward&url=http%3A%2F%2Fwww.sciencedirect.com%2Fscience%3F_ob%3DGatewayURL%26_origin%3DIRSSSEARCH%26_method%3DcitationSearch%26_piikey%3DS0278691516300242%26_version%3D1%26md5%3Dce6ececb84a81477bbc4697e6a385e02

Abstract

Astaxanthin, a naturally occurring pigment used to give the characteristic orange-pink colour to salmonid fish reared in aquaculture, is also marketed as a dietary supplement. Synthetic 3S, 3'S-Astaxanthin was tested for potential harmful effects on the in utero development of New Zealand white rabbits in a study according to international regulatory guidelines. There were two control groups, one being a placebo administration and three dose levels corresponding to 100, 200, and 400 mg of 3S, 3'S-Astaxanthin per kg body weight/day. The group sizes varied from 23 to 27 litters, providing approximately 200 fetuses per group for evaluation of developmental toxicity. There were no significant effects on the health of the does, nor on the size and viability of the litters. Malformations, both external and internal, were rare and occurred in all groups, including controls with no indication of a treatment relationship. Variations were much more common, being found in all litters. However, when examined by type and frequency, no pattern emerged indicating a relationship to administration of the test substance. It is concluded that administration of 3S, 3'S-Astaxanthin in a gelatin/carbohydrate powder formulation throughout pregnancy up to 400 mg/kg body weight/day is without harmful effects on reproduction or fetal development.

Antioxidant activity of supercritical extracts from Nannochloropsis gaditana: Correlation with its content of carotenoids and tocopherols10:41 12/02/2016, Bioproductos, Antioxidantes

Fecha de Publicación: Mayo 2016

Fuente: The Journal of Supercritical Fluids, Volume 111

Autor(es): Sonia Millao, Edgar Uquiche

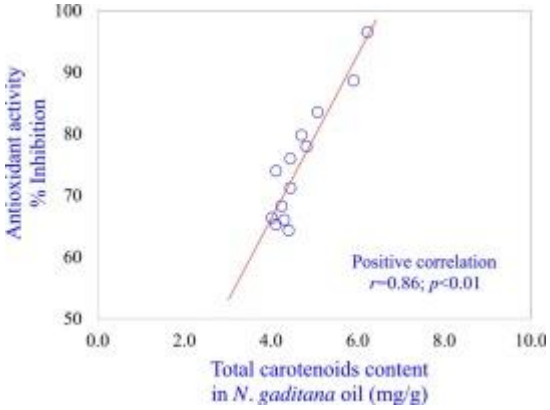
Enlace:
http://rss.sciencedirect.com/action/redirectFile?&zone=main&currentActivity=feed&usageType=outward&url=http%3A%2F%2Fwww.sciencedirect.com%2Fscience%3F_ob%3DGatewayURL%26_origin%3DIRSSSEARCH%26_method%3DcitationSearch%26_piikey%3DS0896844616300249%26_version%3D1%26md5%3D85ace5cb3d7f9e8db32937371204e29c

Abstract

Nannochloropsis gaditana is a microalga characterized by its high lipid content and as an important source of carotenoids, recognized as potent natural antioxidants. The objective of this work was to study the effects of temperature (36–64°C) and CO2 density (914–956kg/m3) on the content of carotenoids and tocopherols (minor lipids), and the antioxidant activity of oil extracted from N. gaditana using supercritical CO2. Antioxidant activity was measured by the DPPH assay, FRAP assay and β-carotene bleaching assay. A process development unit was used for extraction experiments, performed under a central composite rotatable design. The experimental data were analyzed by means of the response surface methodology. Content of carotenoids and tocopherols showed differences of 1.5- and 2.3-fold, respectively. The minor lipid content and the antioxidant activity increased with the increase of the temperature and CO2 density, reaching the highest

values at 64°C and 956kg/m3 for all responses studied. Important antioxidant properties in the oil showed a positive correlation with the content of minor lipids.

Graphical abstract



Disruption of thermo-tolerant Desmodesmus sp. F51 in high pressure homogenization as a prelude to carotenoids extraction

Fecha de Publicación: 15 Mayo 2016

Fuente: Biochemical Engineering Journal, Volume 109

Autor(es): Youping Xie, Shih-Hsin Ho, Ching-Nen Nathan Chen, Chun-Yen Chen, Keju Jing, I-Son Ng, Jianfeng Chen, Jo-Shu Chang, Yinghua Lu

Enlace:
http://rss.sciencedirect.com/action/redirectFile?&zone=main&currentActivity=feed&usageType=outward&url=http%3A%2F%2Fwww.sciencedirect.com%2Fscience%3F_ob%3DGatewayURL%26_origin%3DIRSSSEARCH%26_method%3DcitationSearch%26_piikey%3DS1369703X16300018%26_version%3D1%26md5%3D96479c9a4e0961b5c3a12aa47f0c2792

Abstract

Six methods for microalgal cell disruption were compared for the optimization of carotenoids extraction from the lutein-rich thermo-tolerant microalga Desmodesmus sp. F51. Among them, both bead-beating and high pressure homogenization (HPH) were found to have potential to disrupt Desmodesmus sp. F51 cells with high efficiency, but this study focused only on HPH treatment. Effects of homogenization pressure, cycle number and cell density on cell disruption efficiency were investigated. The degree of cell disruption increased with increasing high homogenization pressure (10–40kpsi) and cycle number (1–4). Cell density in the range of 2.0–90g/L did not affect the performance of cell disruption process, while a higher specific energy

consumption arised when using a lower cell concentration. The HPLC analysis showed that the main carotenoids present in Desmodesmus sp. F51 were neoxanthin, violaxanthin, lutein, α-carotene and β-carotene. Moreover, the developed HPH model could well describe the cell disruption behavior at various high homogenization pressures (10–40 kpsi) and cycle numbers (1–4). The obtained parameters indicate that homogenization pressure is a more significant factor than cycle number in achieving high cell disruption efficiency.

Marine bioactive compounds and health promoting perspectives; innovation pathways for drug discovery

Fecha de Publicación: Abril 2016

Fuente: Trends in Food Science & Technology, Volume 50

Autor(es): Hafiz Ansar Rasul Suleria, Glenda Gobe, Paul Masci, Simone A. Osborne

Enlace:
http://rss.sciencedirect.com/action/redirectFile?&zone=main&currentActivity=feed&usageType=outward&url=http%3A%2F%2Fwww.sciencedirect.com%2Fscience%3F_ob%3DGatewayURL%26_origin%3DIRSSSEARCH%26_method%3DcitationSearch%26_piikey%3DS0924224416000224%26_version%3D1%26md5%3D13dab3d681adc592e7675c6327c81624

Abstract

Background Marine organisms are one of the most important sources of bioactive compounds for the food and pharmaceutical industries. Bioactive compounds can be isolated from various sources including marine plants, animals and microorganisms. Scope and approach Marine bioactive compounds exhibit significant and biological properties contributing to their nutraceutical and pharmaceutical potential and are also considered to be safer alternatives to some existing synthetic drugs. As such, some marine bioactive compounds are currently under investigation at an advanced stage of clinical trials with a few of them already being marketed as safer drugs. Key findings and conclusions Marine bioactive compounds that have been the most extensively studied include carbohydrates, pigments, polyphenols, peptides, proteins and essential fatty acids. These compounds have rheological properties, deeming them useful in the food industry, as well as various biological functions like anti-oxidant, anti-thrombotic, anti-coagulant, anti-inflammatory, anti-proliferative, anti-hypertensive, anti-diabetic and cardio-protection activities making them attractive nutraceuticals and pharmaceutical compounds. This review summarises current research on bioactive compounds from different marine sources and brings into focus the potential use of these compounds in the food industry and in drug discovery to treat and prevent various chronic diseases.

Hydrolysate of lipid extracted microalgal biomass residue: An algal growth promoter and enhancer

Fecha de Publicación: Mayo 2016

Fuente: Bioresource Technology, Volume 207

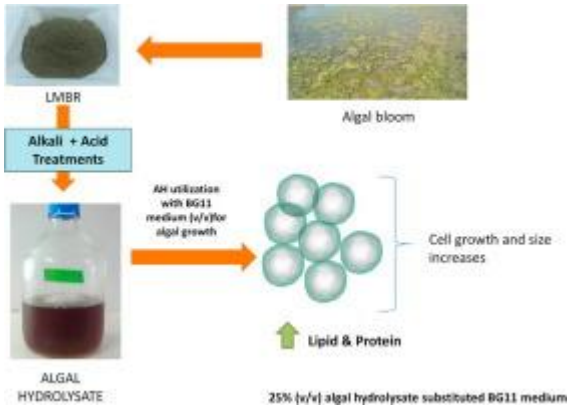
Autor(es): Rahulkumar Maurya, Chetan Paliwal, Kaumeel Chokshi, Imran Pancha, Tonmoy Ghosh, Gour Gopal Satpati, Ruma Pal, Arup Ghosh, Sandhya Mishra

Enlace:
http://rss.sciencedirect.com/action/redirectFile?&zone=main&currentActivity=feed&usageType=outward&url=http%3A%2F%2Fwww.sciencedirect.com%2Fscience%3F_ob%3DGatewayURL%26_origin%3DIRSSSEARCH%26_method%3DcitationSearch%26_piikey%3DS0960852416301444%26_version%3D1%26md5%3D2ea2431b0a5f51b21c6b2eb87dbb719d

Abstract

The present study demonstrates the utilization of the algal hydrolysate (AH) prepared from lipid extracted residual harmful bloom-forming cyanobacteria Lyngbya majuscula biomass, as a growth supplement for the cultivation of green microalgae Chlorella vulgaris. BG-11 replacements with AH in different proportions significantly affects the cell count, dry cell weight (DCW), biomass productivity (BP) and pigments concentration. Among all, 25% AH substitution in BG11 media was found to be optimum which enhanced DCW, BP and pigments content by 39.13%, 40.81% and 129.47%, respectively, compared to control. The lipid content (31.95%) was also significantly higher in the 25% AH replacement. The volumetric productivity of neutral lipids (ideal for biodiesel) and total protein content of the cells significantly increased in all AH substitutions. Thus, lipid extracted microalgal biomass residue (LMBR) hydrolysate can be a potential growth stimulating supplement for oleaginous microalgae C. vulgaris.

Graphical abstract



Thermochemical liquefaction of algae for bio-oil production in supercritical acetone/ethanol/isopropanol

Fecha de Publicación: Mayo 2016

Fuente: Journal of Supercritical Fluids, Volume 111

Autor(es): Halil Durak, Tevfik Aysu

Enlace:
http://rss.sciencedirect.com/action/redirectFile?&zone=main&currentActivity=feed&usageType=outward&url=http%3A%2F%2Fwww.sciencedirect.com%2Fscience%3F_ob%3DGatewayURL%26_origin%3DIRSSSEARCH%26_method%3DcitationSearch%26_piikey%3DS0896844615301947%26_version%3D1%26md5%3Ddcd371868794ab44cc7052a263f69b31

Abstract

Thermochemical conversion processes such as supercritical fluid extraction are used for producing biofuels from biomass. Supercritical fluid extraction process is decomposition process of lignocellulose or other organic materials thermally under supercritical conditions at 250–400°C temperature range under high pressure (4–5MPa). In this study, the supercritical fluid extraction was used to produce bio-oils from algae. Supercritical fluid extraction trials were performed in a cylindrical reactor (75mL) in organic solvents (acetone, ethanol and isopropanol) under supercritical conditions with (ferric chloride, potassium hydroxide) and without catalyst at the temperatures of 255, 275 and 295°C. The effects of process variables including temperature and catalyst on product yields were investigated. The produced liquids at 295°C in supercritical liquefaction were analyzed and characterized by elemental, GC–MS and FT-IR. 160, 122 and 108 different types of compounds were identified by GC–MS obtained in acetone, ethanol and isopropanol respectively. Bio-oils from supercritical liquefaction were composed of various organics including aromatics, nitrogenated and oxygenated compounds. Bio-oils obtained from supercritical liquefaction were found to have higher calorific values and superior fuel properties compared to feedstock.

Graphical abstract

Efficient algal lipid extraction via photocatalysis and its conversion to biofuel

Fecha de Publicación: 15 Abril 2016

Fuente: Applied Energy, Volume 168

Autor(es): R. Shwetharani, R. Geetha Balakrishna

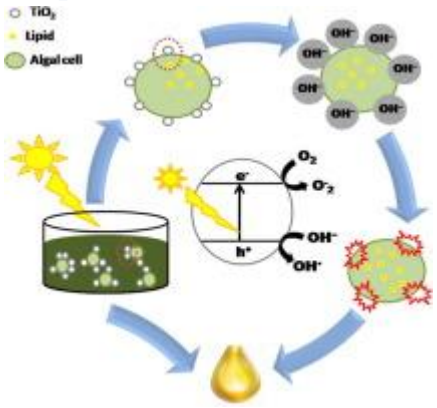
Enlace:
http://rss.sciencedirect.com/action/redirectFile?&zone=main&currentActivity=feed&usageType=outward&url=http%3A%2F%2Fwww.sciencedirect.com%2Fscience%3F_ob%3DGatewayURL%26_origin%3DIRSSSEARCH%26_method%3DcitationSearch%26_piikey%3DS0306261916300745%26_version%3D1%26md5%3Dd0bb86e33f0bbefbb9a27069efeb2a08

Abstract

Microalgae play an important role in energy production to solve the major energy crisis. The present study demonstrates an efficient and environmental friendly route for bio-oil extraction from wet Nannochloropsis oculata algal biomass through photocatalysis. The method uses abundant solar energy and catalytic amount of titanium dioxide photocatalyst for the rupturing of wet algal cells and reduces most of the cost by avoiding dewatering and drying, for algal oil production. The various spectroscopy and microscopy techniques used show destruction of algal cell membrane by the photocatalyst, with a release of 52.2% lipid yield. The obtained lipid by photocatalysis on esterification yields biofuel which is in complete agreement with results obtained from conventional techniques. Algal oil is converted to biofuel through acid catalyzed transesterification. Bio-oil and biofuel samples were analyzed by ATR-IR, NMR and GCMS. The physicochemical characterization of photocatalyst was carried out by UV–Visible spectroscopy,

XRD, EDS, BET and electron microscopy studies. The results suggest that the nanoparticles are efficient catalysts for rupturing the rigid micro algal cell membrane in an aqueous environment, using sunlight and hence prove to be a potential economic method for large scale bio-oil extraction.

Graphical abstract



Nitrate repletion strategy for enhancing lipid production from marine microalga Tetraselmis

Fecha de Publicación: Abril 2016

Fuente: Bioresource Technology, Volume 205

Autor(es): Garam Kim, Jinsung Bae, Kisay Lee

Enlace:
http://rss.sciencedirect.com/action/redirectFile?&zone=main&currentActivity=feed&usageType=outward&url=http%3A%2F%2Fwww.sciencedirect.com%2Fscience%3F_ob%3DGatewayURL%26_origin%3DIRSSSEARCH%26_method%3DcitationSearch%26_piikey%3DS0960852416300219%26_version%3D1%26md5%3Dbdc779b850078a70a4fc748f2d09771d

Abstract

The cell growth rate and cellular lipid content of microalgae are affected by the nitrogen levels during cultivation. The growth rate and lipid content of marine microalga Tetraselmis sp. was found to increase under nitrate replete conditions, but not under deplete conditions. Thus, in order to enhance the lipid productivity of Tetraselmis sp., a two-stage culture process utilizing nitrate replete condition was applied. When the cells were cultivated in F/2 medium for five days in the first stage, the obtained lipid content and productivity were 22.4% and 26.7mgL−1 d−1, respectively. After second stage of cultivation for a further 36h under nitrate replete conditions

with 8.82mM NaNO3, increased biomass concentration of 1.32gL−1 and lipid content of 30.5% were obtained, with an enhanced lipid productivity of 47.3mgL−1 d−1.

BioProductos-Bioetanol

Sustainable production of bioethanol using lipid-extracted biomass from Scenedesmus dimorphus

Fecha de Publicación: 11 Febrero 2016 (disponible online)

Fuente: Journal of Cleaner Production

Autor(es): Lee Muei Chng, Derek J.C. Chan, Keat Teong Lee

Enlace:
http://rss.sciencedirect.com/action/redirectFile?&zone=main&currentActivity=feed&usageType=outward&url=http%3A%2F%2Fwww.sciencedirect.com%2Fscience%3F_ob%3DGatewayURL%26_origin%3DIRSSSEARCH%26_method%3DcitationSearch%26_piikey%3DS095965261600161X%26_version%3D1%26md5%3Dc5e962dd31e9f235b1acf519f2874653

Abstract

Bioconversion technologies of biomass to bioethanol require intensive energy process due to several pretreatment steps to break down the biomass in order to obtain fermentable sugar for subsequent fermentation. Hence, a feasible approach to the production of bioethanol from lipid-extracted biomass of Scenedesmus dimorphus will be presented in this study in a biorefinery concept. The lipid-extracted biomass was directly subjected to simultaneous saccharification and fermentation thereby avoiding the costly pretreatment, lowering the contamination risk and reducing the complication of high sugar content. The technological challenges for this fermentation process were investigated to identify optimum conditions for amyloglucosidase enzyme activity and Sacchromyces cerevisiae yeast ethanolic fermentation. As a result, the optimum key parameters for the fermentation were identified at an enzyme concentration of 60 units/ml, pH 5, temperature at 36 °C and yeast loading of 3 g/L. At the optimum condition, an overall conversion of more than 90% of the theoretical yield was achieved with maximum bioethanol yield of 0.26 g bioethanol/g lipid-extracted biomass. The direct usage of lipid-extracted biomass into simultaneous saccharification and fermentation with single enzyme ensures the feasibility of the biofuel produced.

Wastewater Treatment in Microbial Fuel Cells – An Overview

Fecha de Publicación: Disponible online, 12 Febrero 2016

Fuente: Journal of Cleaner Production

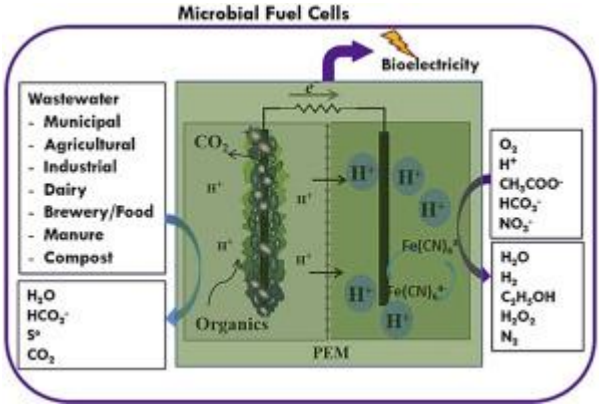
Autor(es): Veera Gnaneswar Gude

Enlace:
http://rss.sciencedirect.com/action/redirectFile?&zone=main&currentActivity=feed&usageType=outward&url=http%3A%2F%2Fwww.sciencedirect.com%2Fscience%3F_ob%3DGatewayURL%26_origin%3DIRSSSEARCH%26_method%3DcitationSearch%26_piikey%3DS0959652616001670%26_version%3D1%26md5%3D29510bfe609265a4bc1b9e78c536d466

Abstract

Environmental issues associated with water sanitation are not confined to developing countries alone but are the most basic human and environmental necessities all over the world. Wastewater sources are major causes for environmental pollution in surface and ground water bodies. Current wastewater treatment technologies are not sustainable to meet the ever growing water sanitation needs due to rapid industrialization and population growth, simply because they are energy and cost intensive leaving latitude for development of technologies that are energy conservative or energy yielding. For the present and future context, microbial fuel cells technology may present a sustainable and an environmentally friendly route to meet the water sanitation needs. Microbial fuel cell based wastewater systems employ bioelectrochemical catalytic activity of microbes to produce electricity from the oxidation of organic, and in some cases inorganic, substrates present in urban sewage, agricultural, dairy, food and industrial wastewaters. This article presents the potential for energy generation and comprehensive wastewater treatment in microbial fuel cells. The article provides an overview of recent literature with two specific aims. First, it provides an overview of current energy needs for wastewater treatment and potential energy recovery options followed by a comprehensive review of the principles of wastewater treatment, substrate utilization (organic removal), recent process developments, nutrient and metal removal capacities in microbial fuel cells. Several issues related to process performance, organic removal capacities and potential environmental impacts were discussed in detail. From the economic and life cycle assessment point of view, although recent developments in power production are encouraging, important discoveries in electrode materials, innovative and integrated process configurations along with experience in pilot scale studies are urgently required to determine the real potential of the microbial fuel cell technology to provide sustainable and energy positive wastewater treatment.

Graphical abstract



Life cycle value analysis for sustainability evaluation of bioenergy products

Fecha de Publicación: 1 Febrero 2016

Fuente: Journal of Cleaner Production, Volume 113

Autor(es): Mengshan Lee, Walter Den

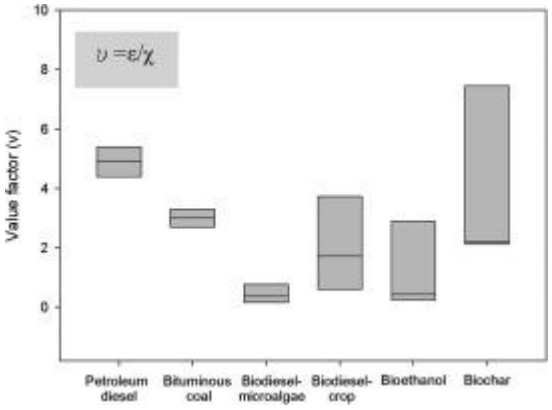
Enlace:
http://rss.sciencedirect.com/action/redirectFile?&zone=main&currentActivity=feed&usageType=outward&url=http%3A%2F%2Fwww.sciencedirect.com%2Fscience%3F_ob%3DGatewayURL%26_origin%3DIRSSSEARCH%26_method%3DcitationSearch%26_piikey%3DS0959652615017436%26_version%3D1%26md5%3D037df841f39b4af4fe7088bd5e3c46d5

Abstract

Bioenergy products appear to be practical, effective, and environmentally sustainable renewable energy resources which simultaneously reduce fuel-associated environmental impacts and increase economic value of the products. The use of bioproducts may not always have a net positive environmental or economic attributes, therefore, an adequate sustainability evaluation tool for the products which incorporates life-cycle approach is generally desired. This paper presents an informative value analysis which couples concepts of life cycle energy efficiency and production cost ratios, for a feasible assessment of function value for bioenergy products. Bioenergy products that are selected for the value assessment in this study include biodiesel, bioethanol and biocharcoal. This study is divided into two parts: value factor development along with discussions on the results of value analysis for bioenergy products, and, a sensitivity analysis in determining influential factors for value factor estimations. The results showed that microalgae biodiesel and biochar had the lowest and the highest function values, respectively, among assessed bioenergy systems. This was mainly due to the significant difference in energy input in manufacturing design and production cost. Future improvements in bioenergy production can be anticipated for developing bioenergy products with high value factors which demonstrate high

economic viability, environmental performance and social acceptability. This analysis can be of interest to bioenergy production planners for sustainable product development.

Graphical abstract



Economic, energy, and environmental impacts of alcohol dehydration technology on biofuel production from brown algae

Fecha de Publicación: 15 Diciembre 2015

Fuente: Energy, Volume 93, Part 2

Autor(es): Peyman Fasahati, J. Jay Liu

Enlace:
http://rss.sciencedirect.com/action/redirectFile?&zone=main&currentActivity=feed&usageType=outward&url=http%3A%2F%2Fwww.sciencedirect.com%2Fscience%3F_ob%3DGatewayURL%26_origin%3DIRSSSEARCH%26_method%3DcitationSearch%26_piikey%3DS0360544215015017%26_version%3D1%26md5%3Dd7b9b1d2b4e2372ff765abe72cde0d39

Abstract

This study evaluates the impact of alcohol recovery technology on the economics, energy consumption, and environment of bioethanol production from brown algae. The process under consideration is the anaerobic digestion of brown algae to produce VFAs (volatile fatty acids), which are then hydrogenated to produce mixed alcohols. Three alternative processes, i.e., hybrid pervaporation/distillation (PV), hybrid vapor-permeation/distillation (VP), and classical molecular-sieves/distillation (classical), are considered for the dehydration and recovery of ethanol. The alternatives are analyzed in terms of product value (i.e., minimum ethanol selling price – MESP), capital costs, energy consumption, and carbon footprint. For a plant scale of 400,000 ton/year of dry brown algae, the MESPs for the PV (Pervaporation), VP (vapor permeation), and classical processes were calculated to be $1.06/gal, $1.08/gal, and $1.24/gal, respectively. Results show that the PV, VP, and classical processes have $2.0, $2.6, and $4.6 million/year utility costs,

respectively, for the recovery of alcohols and produce 23.1, 30.2, and 62.2 kton CO2-eq/year greenhouse gases. Therefore, PV is more economical and environmentally friendly process, with lower MESP, CO2 emissions, and utility requirements. A sensitivity analysis indicates that the selling price of the heavier alcohols and biomass price have the highest impact on the economics of bioethanol production from brown algae.

BioProducos-Hidrógeno

Producing carbohydrate-rich microalgal biomass grown under mixotrophic conditions as feedstock for biohydrogen production

Fecha de Publicación: 23 Febrero 2016

Fuente: International Journal of Hydrogen Energy, Volume 41, Issue 7

Autor(es): Chun-Yen Chen, Hung-Yu Chang, Jo-Shu Chang

Enlace:
http://rss.sciencedirect.com/action/redirectFile?&zone=main&currentActivity=feed&usageType=outward&url=http%3A%2F%2Fwww.sciencedirect.com%2Fscience%3F_ob%3DGatewayURL%26_origin%3DIRSSSEARCH%26_method%3DcitationSearch%26_piikey%3DS0360319915014044%26_version%3D1%26md5%3D998d1d6cb03e2de1631b0acff594c35b

Abstract

Three indigenous microalgae strains (Scenedesmus subspicatus GY-16, Chlorella vulgaris FSP-E, and Anistrodesmus gracilis GY-09) were evaluated for their ability to accumulate carbohydrates to subsequently serve as feedstock for biohydrogen production. The results of photoautotrophic growth show that among the three strains examined, C. vulgaris FSP-E displayed the highest biomass productivity (825.6 mg/L/d) and carbohydrate productivity (365.8 mg/L/d). Mixotrophic growth of C. vulgaris FSP-E with the addition of 2.0 g/l of sodium acetate further increased the biomass and carbohydrate productivity to 1022.3 mg/L/d and 498.5 mg/L/d, respectively. Moreover, operating photobioreactor on semi-batch mode enhanced the stability for prolonged incubation of the carbohydrate-rich C. vulgaris FSP-E and the biomass and carbohydrate productivity obtained were 1063.3 and 384.8 mg/L/d, respectively. The biomass of C. vulgaris FSP-E was then used as feedstock for biohydrogen production via separate hydrolysis and fermentation processes. The acidic hydrolysate (hydrolyzed with 1% H2SO4) was fermented with Clostridium butyricum CGS5, giving a maximum H2 yield of 2.87 mmol H2/g biomass and a H2 production rate of 176.9 ml/h/l, which are higher than most reported values. The results obtained

in this work indicate that carbohydrate-based microalgae feedstock shows good potential for biohydrogen production.

Optimization of combined (acid + thermal) pretreatment for enhanced dark fermentative H2 production from Chlorella vulgaris using response surface methodology

Fecha de Publicación: Marzo 2016

Fuente: International Biodeterioration & Biodegradation, Volume 108

Autor(es): Jae-Min Choi, Sun-Kee Han, Ji-Tae Kim, Chae-Young Lee

Enlace:
http://rss.sciencedirect.com/action/redirectFile?&zone=main&currentActivity=feed&usageType=outward&url=http%3A%2F%2Fwww.sciencedirect.com%2Fscience%3F_ob%3DGatewayURL%26_origin%3DIRSSSEARCH%26_method%3DcitationSearch%26_piikey%3DS0964830515300330%26_version%3D1%26md5%3Da838827391b9dde294a7767ebaee4016

Abstract

This study was performed to optimize the combined (acid + thermal) pretreatment of Chlorella vulgaris for enhanced dark fermentative H2 production. Using response surface methodology, the maximum H2 yield of 47.7 mL H2/g dry cell weight (dcw) was predicted at the optimum conditions of HCl concentration (1.0%), heating temperature (92 °C), and reaction time (47 min). In a confirmation test, the similar result of 48.4 mL H2/g dcw was obtained at the optimum conditions. Meanwhile, only sucrose of 13 g/g dcw was detected from C. vulgaris without pretreatment, while glucose of 21 g/g dcw, fructose of 3 g/g dcw, and maltose of 16 g/g dcw were found from C. vulgaris with combined pretreatment. Fluorescence in situ hybridization (FISH) and polymerase chain reaction-denaturing gradient gel electrophoresis (PCR-DGGE) analyses revealed that Clostridium sp. cluster I such as Clostridium butyricum and C. perfringens accounted for 71.7% of total bacteria in a reactor with combined pretreatment.

Hydro-upgrading of n-octadecane over Pt–Mg/HY catalysts

Fecha de Publicación: 1 Mayo 2016

Fuente: Catalysis Today, Volume 265

Autor(es): Euna Jung, Seonghun Jeon, Chul-Ung Kim, Soon-Yong Jeong, Young-Kwon Park, Jong-Ki Jeon

Enlace:
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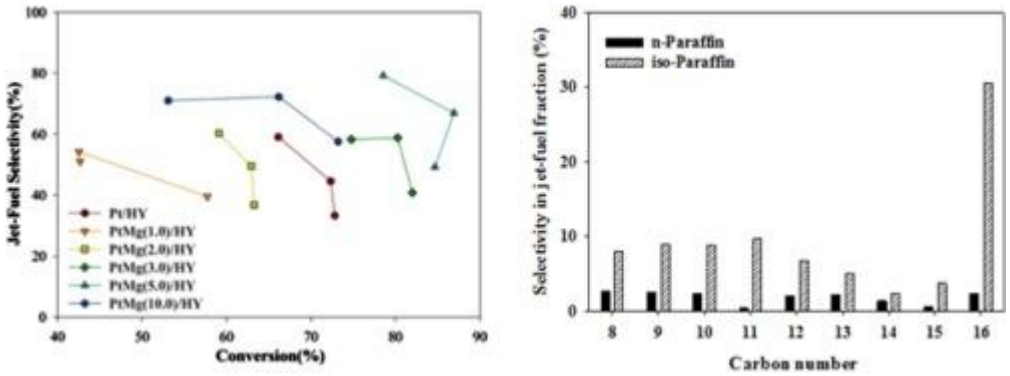
Abstract

This work is aimed at investigating the effect of the addition of Mg to Pt/HY catalyst for hydro-upgrading of n-octadecane for production of jet-fuel. Characterizations of catalysts were performed with N2 adsorption–desorption, temperature-programmed reduction in H2 flow, ammonia temperature-programmed desorption, and Fourier transform infrared spectroscopy of adsorbed pyridine. When 3–5wt% magnesium was added to the Pt/HY catalyst, the conversion of n-octadecane increased, which could be attributed to the increase of dispersion of Pt metal. When magnesium loading was increased over the Pt/HY catalyst, the strength and the number of strong acid sites over the catalyst surface decreased and the number of weak acid sites increased. These results were caused by increasing of the ratio of Lewis acid sites to Brönsted acid sites, which was confirmed by NH3-TPD and FT-IR spectroscopy of adsorbed pyridine. The high yield of jet-fuel over the PtMg(5.0)/HY can be attributed not only to the higher dispersion of Pt metal, but also the higher number of weak strength acid sites. The selectivity to iso-paraffin in the jet-fuel fraction could be reached above 80wt% over the optimized PtMg/HY catalyst.

Graphical abstract



Autotrophic hydrogen photoproduction by operation of carbon-concentrating mechanism in Chlamydomonas reinhardtii under sulfur deprivation condition

Fecha de Publicación: 10 Marzo 2016

Fuente: Journal of Biotechnology, Volume 221

Autor(es): Min Eui Hong, Ye Sol Shin, Byung Woo Kim, Sang Jun Sim

Enlace:
http://rss.sciencedirect.com/action/redirectFile?&zone=main&currentActivity=feed&usageType=o

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Abstract

Under autotrophic conditions, starch plays an important role in establishing anoxic conditions during PSII-dependent hydrogen (H2) photoproduction in microalgae. This is because starch is the sole organic substrate during respiratory consumption of internal oxygen (O2) from PSII-dependent direct pathway. Herein, we propose a novel approach to further facilitate the internal starch synthesis of Chlamydomonas reinhardtii through the operation of carbon-concentrating mechanism (CCM) along with a two-stage process based on sulfur (S) deprivation, thereby resulting in enhanced anaerobic capacity during PSII-dependent H2 photoproduction. When CCM-induced cells were exposed to high levels of carbon dioxide (CO2) (5%, v/v) with S deprivation, internal levels of starch were significantly elevated by retaining a functional CCM with the boosted photosynthetic activity during 24h of O2 evolution phase (I) of S deprivation. Consequently, during H2 production phase of S deprivation at irradiance of 50μEm−2 s−1, the concentrations of starch and H2 in CCM-induced cells were remarkably enhanced by 65.0% and 218.9% compared to that of CCM-uninduced cells, respectively. The treatment of low-CO2-driven CCM induction prior to S deprivation is a cost-effective and energy-efficient strategy that significantly improves the solar-driven H2 production by microalgae; this is particularly realizable in an industrial scale.

Patentes

En esta sección del presente boletín se presentan las publicaciones de las ramas del árbol seleccionadas para esta edición.

Las ramas son:
BioProductos-Biomasa algal-Biogas
BioProductos-Biomasa algal-Proteínas
BioProductos-Biomasa algal-Hidratos de Carbono
BioProductos-Antioxidantes
BioProductos-Lípidos
BioProductos-Bioetanol
BioProducos-Hidrógeno

BioProductos-Biomasa algal-Biogas

Biogas slurry ecological purification method based on microalgae cultivation

CN103396950B

Fecha de Publicación: 6 Enero 2016

Aplicación: CN201310347109A (9 Agosto 2013)

Aplicante:
UNIV YANTAI

Abstract:

The invention discloses a biogas slurry ecological purification method based on microalgae cultivation. The method comprises the following steps: (1) biogas slurry pretreatment; (2) habituated culture of autotrophic microalgae, namely, obtaining algae strains capable of rapidly growing in 70%-100% biogas slurry; (3) preparation of a seed solution; (4) a biogas slurry purification method during growing of microalgae, namely, after expanded cultivation, inoculating the habituated algae species into an open photobioreactor for cultivation, obtaining chlorella biomass growing by high density through a semi-continuous culture method and optimized methods such as fed-batch cultivation, and purifying the biogas slurry; (5) biochemical breaking of microalgae cell walls, namely, introducing the microalgae cells into a biochemical wall breaking pool, putting freshwater fish into the pool, and obtaining algae slurry subjected to wall breaking; and (6) collection of the microalgae cells and recycling of the biogas slurry. According to the method, not only is a method provided for purifying the biogas slurry, but also the obtained algae

cells and the biogas slurry can be recycled, so that ecologicalization treatment of the biogas slurry is realized, the environment is improved, and furthermore, the economic and social benefits are produced.

Dirección: http://www.patentinspiration.com/redirect?url=/patent/CN103396950B

Microalgae biorefinery for biofuel and valuable products production

WO2015044721A1

Fecha de Publicación: 2 Abril 2015

Aplicación: IB2013059014W (30 Sep 2013)

Aplicante: DESERT BIOENERGY [CL]

Abstract:

The invention relates to downstream processing of microalgal biomass to produce different products in a biorefinery process. The invention establishes interconnected stages from harvesting of microalgal biomass, following several productive processes, including alternatives to use the remaining biomass. The invention allows improving the overall downstream process by adapting each stage of the production process for a complete microalgal biomass use producing various added-value products of commercial interest: proteins, biodiesel, and biogas or biomethane. In addition, the invention includes wastewater reutilization alternatives to be reused in the same processes. The invention has application in processing biomass such as microalgae and other biomass types, for the production of biofuels and co-products.

Dirección: http://www.patentinspiration.com/redirect?url=/patent/WO2015044721A1

Method for treating high-concentration ammonia nitrogen pig breeding biogas slurry

CN104445816A

Fecha de Publicación: 25 Mar 2015

Aplicación: CN201410683858A (25 Nov 2014)

Aplicante: UNIV NANCHANG

Abstract:

A method for treating a high-concentration ammonia nitrogen pig breeding biogas slurry comprises the following steps: (1) performing heat treatment on pig breeding biogas slurry at a temperature of 70-100 DEG C for 10-25 min, cooling and carrying out centrifugation to obtain the high-concentration ammonia nitrogen pig breeding biogas slurry; (2) adding activated permutite into the high-concentration ammonia nitrogen pig breeding biogas slurry obtained in the step (1), adsorbing for 20-30h at the room temperature, and filtrating permutite out to obtain a biogas slurry subjected to permutite adsorption treatment, wherein the adding amount of the permutite is 15-25 g/L; (3) inoculating scendesmus obliquus at the logarithmic growth phase to the biogas slurry subjected to permutite adsorption treatment and obtained in the step (2), enabling the initial OD<680> to be 0.15-0.3, placing the biogas slurry inoculated with the scendesmus obliquus till the temperature is 24-26 DEG C, cultivating for 10-15 days with air and lighting according to the ventilation of 1-2 L/min at a 1000-10000 lx environment, and carrying out solid-liquid separation on the culture, wherein the liquid is the purified biogas liquid, and the solid is an energy microalgae biomass. According to the method, deep purification and resource utilization of the high-concentration ammonia nitrogen pig breeding biogas slurry are realized, so that not only are environmental management benefits obtained, but also the production cost of the energy microalgae is reduced.

Dirección: http://www.patentinspiration.com/redirect?url=/patent/CN104445816A

Process of producing bioenergy with low emission of carbon dioxide and waste-zero of biomass

KR20150026772A

Fecha de Publicación: 11 Marzo 2015

Aplicación: KR20140062683A (26 May 2014)

Aplicante:

UNIV DAEGU IACF [KR]
KOREA INST SCI & TECH [KR]
UNIV KEIMYUNG IACF [KR]
MYONGJI UNIV IND & ACAD COOP [KR]

Abstract:

The present invention relates to a bioenergy production system for reducing CO_2 exhaust and process wastes, wherein the bioenergy production system is operated by a combination of: a process of producing bioalcohol and biogas by passing through a biosaccharification/alcohol fermentation process including a pre-treatment process of biomass including wooden plants, herbaceous plants, fruit barks, freshwater, marine algae, cereals, aerobic/anaerobic sludge, sugars, polyhydric alcohol (polyol), and carbohydrates, and a process combined with anaerobic digestion; and a process of producing methane biogas with reduced carbon dioxide and hydrogen sulfate through an algae cultivation process for purifying carbon dioxide and hydrogen sulfate contained in the biogas. Here, in cases where the algae cultivation is microalgae cultivation, the harvested microalgae is allowed to pass through a biodiesel preparing process to produce biodiesel, and glycerol and sugar-containing waste, which are byproducts, is returned to the biosaccharification/alcohol fermentation process. In cases where the algae cultivation is macroalgae cultivation, the harvested macroalgae is returned to the biosaccharification/alcohol fermentation process. The present invention has an excellent effect of providing a system for producing waste-zero type bioenergy to maximize the reduction of CO_2, which is a representative greenhouse gas contributing to global warming, and biomass treatment efficiency.

Dirección: http://www.patentinspiration.com/redirect?url=/patent/KR20150026772A

BioProductos-Biomasa algal-Proteínas

Novel microalgal food compositions

AU2015271929A1

Fecha de Publicación: 21 Enero 2016

Aplicación: 18 Diciembre 2015

Aplicante: SOLAZYME INC

Abstract:

The invention provides novel microalgal food compositions comprising microalgal biomass that have been processed into flakes, powders and flours. The microalgal biomass of the invention is low in saturated fats, high in monounsaturated triglyceride oil and can be a good source of fiber. The invention also comprises microalgal biomass that is suitable as a vegetarian protein source and also as a good source of fiber. Novel methods of formulating food compositions with the microalgal biomass of the invention are also disclosed herein including beverages, baked goods, egg products, reduced fat foods and gluten-free foods. The provision of food compositions incorporating the microalgal biomass of the invention to a human have the further benefit of providing healthful ingredients while achieving levels of satiety sufficient to reduce further caloric intake. The invention also provides novel strains of microalgae that have been subject to non

transgenic methods of mutation sufficient to reduce the coloration of the biomass produced by the strains. Oil from the microalgal biomass can be extracted and is an edible oil that is heart-healthy. The novel microalgal biomass and oil therefrom can be manufactured from edible and inedible heterotrophic fermentation feedstocks, including corn starch, sugar cane, glycerol, and depolymerized cellulose that are purpose-grown or byproducts of existing agricultural processes from an extremely broad diversity of geographic regions.

Dirección: http://www.patentinspiration.com/redirect?url=/patent/AU2015271929A1

Method for extracting soluble proteins from microalgal biomass

WO2016009146A1

Fecha de Publicación: 21 Enero 2016

Aplicación: 16 Julio 2015

Aplicante: ROQUETTE FRERES [FR]

Abstract:

The invention relates to a method for preparing a protein isolate of the biomass of microalgae of the genus Chlorella, characterised in that it comprises the following steps: supplying a microalgal biomass produced by fermentation, washing the biomass so as to eliminate the soluble interstitial compounds and concentrating the biomass, mechanically grinding the washed and concentrated biomass in a horizontal ball grinder-type system in order to produce an emulsion, destructuring the emulsion thus produced, triple-phase separation so as to separate the soluble fraction from the fractions containing the lipids and the cell debris, recovery of the soluble fraction thus produced in order to produce the soluble protein isolate, then evaporation, pasteurisation and atomisation of said protein isolate.

Dirección: http://www.patentinspiration.com/redirect?url=/patent/WO2016009146A1

Recombinant vector for increasing biomass and lipid productivity of microalgae and uses thereof

KR101567308B1

Fecha de Publicación: 9 Noviembre 2015

Aplicación: 13 Enero 2014

Aplicante: No Aparece

Abstract:

The present invention relates to a recombination vector characterized by promoter that is induced in the condition without ammonium or with nitrate and that can include protein coding DNA called GAPDH(glyceraldehyde-3-phosphate dehydrogenase) below the promoter, transformed microalgae manufacturing method with increased biomass and lipid productivity by performing transformation of microalgae cells by using the recombination vector, composition to increase biomass and lipid productivity of microalgae containing the transformed microalgae manufactured by the method and the recombination vector as active ingredients and a method for producing lipid by using the transformed microalgae and a method for manufacturing biodiesel by using the transformed microalgae.

Dirección: http://www.patentinspiration.com/redirect?url=/patent/KR101567308B1

Freshwater microalga and application thereof

CN104805015A

Fecha de Publicación: 29 Julio 2015

Aplicación: 26 Enero 2014

Aplicante: QINGDAO INST BIOENERGY & BIOPROCESS TECHNOLOGY CAS

Abstract:

The invention relates to a microalga screening method, and concretely relates to a freshwater microalga and an application thereof. A microalga strain is a freshwater microalga strain Didymogenes sp. HN-4, is preserved on Oct. 24, 2013, and has a preservation number of CGMCC No.8401. The microalga strain is used for producing oil, biodiesel, algal proteins, fatty acids or biomasses. The invention also discloses growth conditions and oil contents of the microalga strain under different medium components. The application of the microalga provides an environmentally-friendly cheap technology for producing biodiesel and reducing insect pests of microalgae.

Dirección: http://www.patentinspiration.com/redirect?url=/patent/CN104805015A

BioProductos-Biomasa algal-Hidratos de Carbono

Process of producing bioenergy with low carbon dioxide emissions and zero-waste of biomass

US2015064761A1

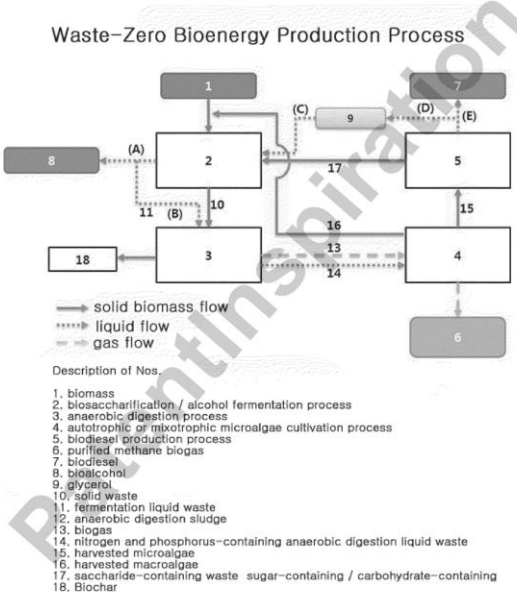
Fecha de Publicación: 5 Marzo 2015

Aplicación: 26 Agosto 2014

Aplicante:
UNIV DAEGU IACF [KR]
MYONGJI UNIV IND & ACAD COOP [KR]
KOREA INST SCI & TECH [KR]
UNIV KEIMYUNG IACF [KR]

Abstract:

FIG. 1



Disclosed herein is a bioenergy production system with reduced carbon dioxide emissions and process wastes; including a process for producing a bioalcohol and a biogas by subjecting a biomass, such as: herbaceous and woody plants, fruit pulp, freshwater and sea algae, grains, aerobic and anaerobic sludge, saccharides, polyols and carbohydrates, to a combined process of a biosaccharification/alcohol fermentation, including a biomass pretreatment process; and a process for producing a methane biogas with a reduced level of carbon dioxide and hydrogen sulfide, via an algae cultivation process with a view to purifying the carbon dioxide and hydrogen sulfide contained in the biogas; wherein, when the algae to be cultivated is microalgae, biodiesel is produced by subjecting the harvested microalgae to a biodiesel manufacturing process while recycling the glycerol and the saccharide-containing waste produced as byproducts to the biosaccharification/alcohol fermentation process, and when the algae to be cultivated is macroalgae the harvested macroalgae is recycled to the biosaccharification/alcohol fermentation process. The method of the present invention is effective in reducing carbon dioxide emissions, a representative green house gas contributing to the global warming, and also in optimizing a zero-waste bioenergy production system.

Dirección: http://www.patentinspiration.com/redirect?url=/patent/US2015064761A1

Method to enhance growth of biomass constituents of photosynthetic microorganisms

WO2012145848A1

Fecha de Publicación: 1 Noviembre 2012

Aplicación: 30 Abril 2012

Aplicante:

UNIV WESTERN ONTARIO [CA]
WAN WANKEI [CA]
SMALL DARCY [CA]

Abstract:

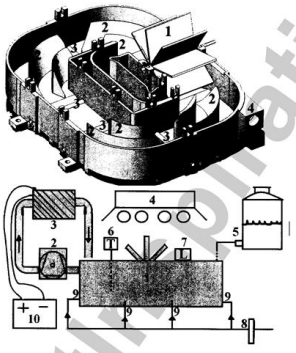


FIGURE 1

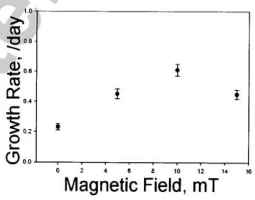


FIGURE 2

This invention relates to a process for the production of microalgal biomass for species of the genus Haematococcus. Using this process the rate of biomass production and the biomass astaxanthin content are increased. An embodiment of the process includes inoculating a light-exposed bioreactor with Haematococcus culture; growing the microalgae in the light exposed bioreactor; subjecting a portion of the bioreactor to a magnetic field during the course of growth; and harvesting the contents of the bioreactor. Proper application of a magnetic field is critical to increase the production rate of astaxanthin, carotenoids, carbohydrate and chlorophyll in the biomass. The biomass can then be used whole, or fractionated to varying degrees of purity of these components, which can be used in nutritional, agricultural, or aquacultural applications.

Method for producing biodiesel using high-cell-density cultivation of microalga Chlorella protothecoides in bioreactor

US2009211150A1

Fecha de Publicación: 27 Agosto 2009

Aplicación: 4 Abril 2008

Aplicante:

Applicants
WU QINGYU
ZHOU WENGUANG
XIONG WEI

Abstract:

A method is provided to produce biodiesel from algae using a strain of microalga chlorella protothecoids, by screening a specific strain with characteristics of high yield of biomass and high oil content, cultivating the screened strain for high-cell-density growth for up to 108 grams of dry cell weight per liter of the suspension in a bioreactor using solutions containing carbohydrates as feed, harvesting and drying the high density cultivated algal cells to extract oil from the dried algal cells, and producing the biodiesel by reaction of catalyzed transesterification using the extracted oil as feedstock.

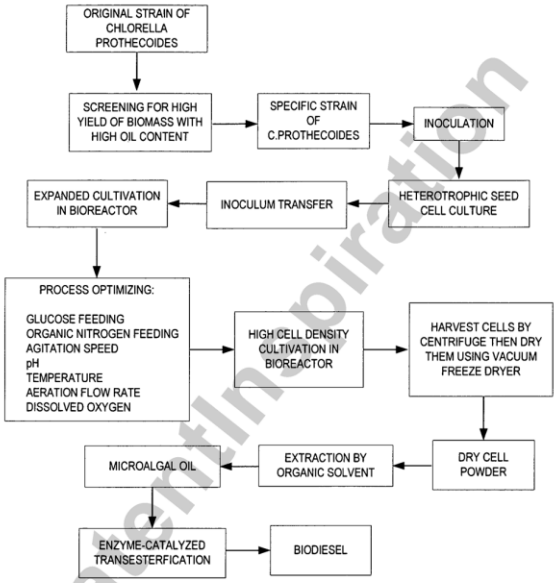


Fig. 1

Dirección: http://www.patentinspiration.com/redirect?url=/patent/US2009211150A1

Syrup with microalgae and method for production thereof

RU2283003C1

Fecha de Publicación: 10 Septiembre 2006

Aplicación: 2 Agosto 2005

Aplicante: MISHENKOV IGOR JUR EVICH [RU]

Abstract:

FIELD: syrup with native microalgae biomass, microalgae cultivation. ^ SUBSTANCE: claimed method includes preparation of washed and filtered microalgae biomass having humidity of 60-95 % and blending thereof with carbohydrate-containing syrup. Carbohydrate-containing syrup is added to obtained biomass in at least two steps. In the first step carbohydrate-containing syrup is added in amount of (0.8-1.2) based on biomass volume; and in the second one in amount of (3.8-21) based on biomass volume, wherein carbohydrate-containing syrup contains not less 50 % of dry matters and is heated up to 20-45°C. In the firs step food supplements such as citric and/or ascorbic acids may be used, and in the second one syrup may be added sequentially by equal portions. Biomass after blending with syrup optionally is homogenized and then optionally pasteurized. As carbohydrate-containing syrup glucose/fructose syrup may be used. As microalgae Spirulina platensis microalgae may be used. ^ EFFECT: syrup of decreased cost, improved digestibility, taste and color. ^ 8 cl, 1 dwg, 3 ex

Dirección: http://www.patentinspiration.com/redirect?url=/patent/RU2283003C1

BioProductos-Antioxidantes

Fermented microalgae for antioxidant effect and a functional product composition containing the same

KR101373191B1

Fecha de Publicación: 14 Marzo 2014

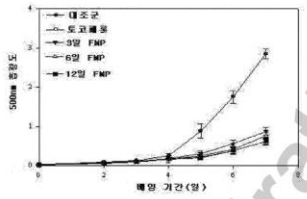
Aplicación: 15 Septiembre 2011

Aplicante: UNIV CHOSUN IACF [KR]

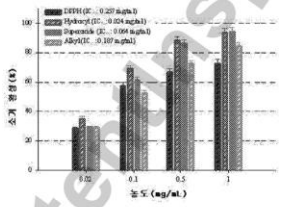
Abstract:

도면

도면1



도면2



PURPOSE: A microalgae fermentation is provided to enhance antioxidation by fermenting Haptophyceae with Hansenula polymorpha. CONSTITUTION: A microalgae fermentation is prepared by fermenting Haptophyceae with Hansenula polymorpha and freeze-drying the fermented microalgae. The microalgae fermentation has an antioxidative activity in vivo. A pharmaceutical composition with an antioxidative activity contains 0.01-99 wt% of the microalgae fermentation as an active ingredient. A health functional composition with an antioxidative activity contains the microalgae fermentation as an active ingredient. [Reference numerals] (AA) Scavenging activity(%); (BB) Concentration(mg/mL)

Dirección: http://www.patentinspiration.com/redirect?url=/patent/KR101373191B1

STRAIN OF UNICELLULAR ALGAE Dunaliella salina IPPAS D-295-PRODUCER OF BIOLOGICALLY ACTIVE SUBSTANCES HAVING ANTIOXIDANT ACTIVITY

RU2497945C2

Fecha de Publicación: 10 Noviembre 2013

Aplicación: 20 Marzo 2012

Aplicante:

FEDERAL NOE G BJUDZHETNOE UCHREZHDENIE NAUKI INST KLETOCHNOGO I VNUTRIKLETOCHNOGO SIMBIOZA URAL SKOG [RU]

Abstract:

FIELD: biotechnology.SUBSTANCE: strain of unicellular algae Dunaliella salina IPPAS D-295-producer of biologically active substances having antioxidant activity was deposited in the culture collection of microalgae of the Institute of Plant Physiology n.a. K.A.Timiryazev RAS (IPP RAS (IPPAS)) under registration number IPPAS D-295 and can be used to produce biologically active substances having antioxidant activity and antagonistic activity against opportunistic pathogenic bacteria.EFFECT: invention enables to increases the yield of antioxidant substances.3 tbl, 2 ex

Dirección: http://www.patentinspiration.com/redirect?url=/patent/RU2497945C2

Microalga Pavlova lutheri having antioxidative activity fermented by Candida rugopelliculosa, a peptide derived therefrom and health food containing the fermented Pavlova lutheri or the peptide

KR101305136B1

Fecha de Publicación: 6 Septiembre 2013

Aplicación: 20 Octubre 2011

Aplicante: NAT UNIV PUKYONG IND UNIV COOP [KR]

Abstract:

CAC CAC-3'.

[0106] 상기 반응은 전술한 바와 동일한 조건 하에 프라이머를 사용하여 실시하였다. 증폭 사이클은 95℃에서 45초, 60℃에서 1분 및 72℃에서 45초이었다. 30회 사이클 후에, 1.5% 아가로즈 겔 상에서 45분동안 100 V로 전기영동하여서 PCR 생성물을 분리하였다. 이어서, 겔은 1 mg/mL 에티듐 브로마이드를 사용하여 염색하고, AlphaEase1 겔 이미지 분석 소프트웨어(Alpha Innotech, 미국 캘리포니아주)를 사용하여 UV 빛으로 시각화하였다.

[0107] 본 분해물은 Hiprep 16/10 DEAE FF 이온-교환 컬럼 (1.6 x 10 cm, Amersham Biosciences, Piscataway, NJ, USA) 상에서 FPLC (Fast Protein Liquid Chromatography)(FPLC AKTA, Amersham Bioscience Co., Uppsala, Sweden)를 사용하여 분해물로부터 정제하였다. 분해물을 20 mM 아세트산나트륨 완충용액 (pH 4.0)으로 평형화시킨 HiPrep 16/10 DEAE FF 이온-교환 컬럼 상에 부하시키고, 62m/h 유속으로 동일 완충용액에서 NaCl (0 - 2 M)의 선형구배로 용출시켰다. 280 nm UV 흡광도를 4 mL 분획마다 관찰하고, 이어서 동결 건조된 분획물을 -80℃에서 동결 건조하였다. 분리된 분획물의 항산화 활성을 검사하고, 근섬유아세포 분화의 마커(marker)인 ROS 소거능을 가진 분획물을 하기와 같이 추가 정제하였다.

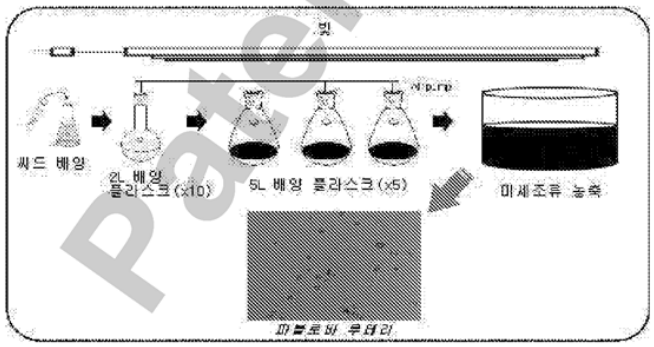
[0108] Primesphere $10C_{18}$ (20 mm×250 mm) 컬럼 상에서 아세토니트릴의 선형 구배(40분동안 0 내지 30%)로 1.0 mL/min 유속으로 역상 고성능 액상 크로마토그래피(RP-HPLC)를 이용하여 추가 정제를 실시하였다. 215 nm에서 용출 피크를 검출하고, 회전 증발기를 이용하여 활성 피크를 농축시켰다. 각각의 피크를 수거하여 동결건조시키고, 이들의 생활성(ROS 소거, 근섬유아세포 분화 표지가 활성을 증가시킴)을 평가하였다. 활성 분획물을 Synchropak RPP-100 분석용 컬럼에 넣고 0.1% FTA를 함유하는 아세토니트릴 선형 구배 (40분동안 14% v/v)로 1 mL/분 속도로 적용하였다. 용출 피크를 평가하고, YMC-Pack Pro C18 (20 mm × 250 mm) 컬럼에 활성 분획물을 로딩하고, 아세토니트릴 선형 구배(10%)로 40 분동안 1 mL/분 유속으로 하였다.

[0109] 각각의 피크를 검출하고, 이들의 활성을 확인하였다. 순수한 펩타이드를 아미노산 서열 분석하였다.

[0110] 정제된 펩타이드의 정확한 분자량 및 아미노산 서열은 정전분무 이온화(ESI) 소스가 결합된 Q-TOF 질량 분석계 (Micromass, 영국 알트린캄 소재)를 이용하여 결정하였다. 정제된 펩타이드를 정전분무 소스에 주입하고, 메탄올/물(1:1, v/v)에 용해시키고, 그 분자량을 질량 분광계에서 이중 하전된 (M+2H)2+ 상태로 결정하였다. 분자량 결정 후에, 단편화를 위해 상기 펩타이드를 자동 선별하고,그의 서열 정보를 탠덤(tandem) 질량 분광(MS) 분석에 의해 구하였다. 정제된 펩타이드의 아미노산 서열은 MPGPLSPL로 결정되었다(분획물 IV-2-I, FPP; 793.01 Da, 도 29). ESI/MS 분광기에 의해 결정된 분자량은 서열에 따른 이론적 질량과 잘 일치하였다.

도면

도면1



PURPOSE: Marine microalgae Pavlova lutheri fermented by Candida rugopelliculosa and having antioxidative activity, a peptide originated from Pavlova lutheri, and a composition for an antioxidative functional food thereof are provided to establish optimum conditions for mass production of Pavlova lutheri and to have an excellent antioxidative effect. CONSTITUTION: A manufacturing method of fermented Pavlova lutheri comprises the following steps: cultivating Pavlova lutheri at 26.17 deg. C, 35 ‰, 100.1 Mmolm^-2.s^-1, and pH 9.2; and fermenting the Pavlova lutheri by Candida rugopelliculosa in 33.57 deg.C, 236.38 rpm, and pH 6.17 for 23.82 hours. A peptide having an antioxidative activity is originated from the Pavlova lutheri and has an amino acid sequence of MPGPLSPL. A functional food composition having antioxidative activity contains the fermented Pavlova lutheri or the peptide as an active ingredient. [Reference numerals] (AA) Light; (BB) Seed cultivation; (CC) 2L cultivation flask(x10); (DD) 5L cultivation flask(x5); (EE) Microalgae concentration; (FF) Pavlova lutheri

Dirección: http://www.patentinspiration.com/redirect?url=/patent/KR101305136B1

Method for extracting DHA from cells of algae and fungi by breaking cell walls

CN101817738B

Fecha de Publicación: 14 Agosto 2013

Aplicación: 13 Noviembre 2009

Aplicante: XIAMEN HUISON BIOTECH CO LTD

Abstract:

The invention provides a method for extracting DHA from cells of algae and fungi by breaking cell walls and relates to a method for extracting active ingredients from microorganisms. The method provided by the invention avoids the assistance from any organic solvent and chemical medicaments, breaks the walls of the cells of the algae and the fungi by using a physical method and extracts a grease product DHA (docosahexaenoic acid) from the cells and is suitable for large-scale production at low cost. The method comprises: after fermentation is finished, introducing fermentation liquor of microalgae or fungi to a separation system for separating and collecting the cells, adjusting the pH value of bacterial sludge with an acid to 2.0 to 4.0, keeping the temperature of the bacterial sludge between 10 and 20 DEG C, adding antioxidant into the bacterial sludge, and performing high-pressure homogenization and wall breaking by using a high-pressure homogenizer; and adding water into the bacterial sludge subjected to wall breaking, stirring the bacterial sludge, and separating feed liquor in a three-phase separator to obtain DHA grease. In the invention, physical wall breaking and the physical extracting method are used, the process is simple, the cell breaking is high efficient, the low-temperature treatment and antioxidant treatment of the bacterial sludge can effectively protect thebioactivities of the matters in the cells of the algae and the fungi, and the product is green, nontoxic and free from residues.

Dirección: http://www.patentinspiration.com/redirect?url=/patent/CN101817738B

BioProductos-Lípidos

Microalgae cultivation method using flash light for increase of fatty acids production and wastewater treatment

KR101579222B1

Fecha de Publicación: 22 Diciembre 2015

Aplicación: 10 Septiembre 2013

Aplicante: UNIV KONKUK IND COOP CORP [KR]

Abstract:
The present invention relates to a method and an apparatus for improving lipid production of microalgae using a flash light, and to a method and an apparatus for improving wastewater treatment ability using the same. According to the present invention, a flash light type photostress of microalgae is caused by periodically and intermittently supplying light needed in growth of the microalgae, thereby having an effect of improving lipid production and improving function of removing nitrogen and phosphorous.

Dirección: http://www.patentinspiration.com/redirect?url=/patent/KR101579222B1

Microalgae Chlorella strain high-producing starch and lipid isolated from arctic ocean and uses thereof

KR101575208B1

Fecha de Publicación: 7 Diciembre 2015

Aplicación: 9 Enero 2013

Aplicante:

KOREA RES INST OF BIOSCIENCE [KR]
KOREA INST OCEAN SCI & TECH [KR]
IAC IN NAT UNIV CHUNGNAM [KR]

Abstract:

The present invention relates to new microalgae chlorella (Chlorella sp.) for accumulating high concentration functional starch and lipid. According to the present invention, a chlorella ArM29B cell line is confirmed as a cell line for accumulating high concentration starch and lipid in culturing, and cultured in various temperature conditions. Moreover, a nile red analysis method capable of specifically dyeing a neutral oil drop inside a cell confirms that high concentration lipid is accumulated. Therefore, the cell line can be used as a material of producing functional lipid and biodiesel. The chlorella ArM29B cell line accumulates the high concentration lipid in culturing, so the cell line is suitable for microalgae for biodiesel. All chlorella ArM29B cell lines are growing well above a freezing temperature, so there is no necessity for a specific temperature condition in culturing. All chlorella ArM29B cell lines are growing well in four seasons, so the cell line is produced and cultured throughout the year.

Dirección: http://www.patentinspiration.com/redirect?url=/patent/KR101575208B1

Microbial Oils with Lowered Pour Points, Dielectric Fluids Produced Therefrom, and Related Methods

US2015344917A1

Fecha de Publicación: 3 Diciembre 2015

Aplicación: 4 Junio 2015

Aplicante: SOLAZYME INC [US]

Abstract:

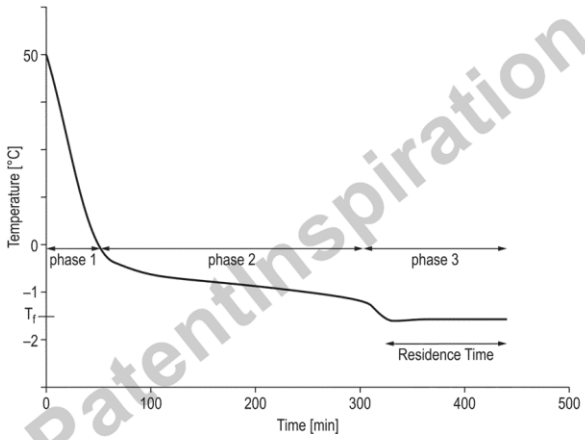


Fig. 1

Methods and compositions for the production of dielectric fluids from lipids produced by microorganisms are provided, including oil-bearing microorganisms and methods of low cost cultivation of such microorganisms. Microalgal cells containing exogenous genes encoding, for example, a sucrose transporter, a sucrose invertase, a fructokinase, a polysaccharide-degrading enzyme, a lipid pathway modification enzyme, a fatty acyl-ACP thioesterase, a desaturase, a fatty acyl-CoA/aldehyde reductase, and/or an acyl carrier protein are useful in manufacturing dielectric fluids.

Dirección: http://www.patentinspiration.com/redirect?url=/patent/US2015344917A1

Microalgae chlamydomonas reinhardtii variant having increased contents of biomass, starch, and lipid through gamma irradiation, and a use thereof

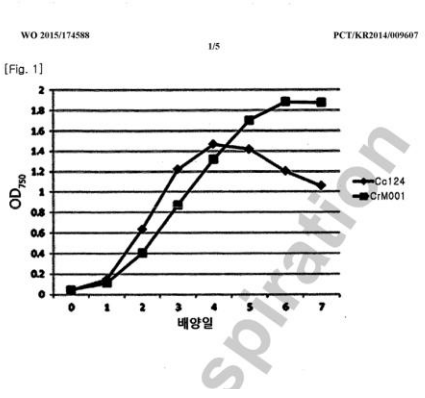
WO2015174588A1

Fecha de Publicación: 19 Noviembre 2015

Aplicación: 14 Octubre 2014

Aplicante: KOREA RES INST OF BIOSCIENCE [KR]

Abstract:



The present invention relates to a microalgae Chlamydomonas reinhardtii variant having increased contents of biomass, starch, and lipid through gamma irradiation, and a use thereof. The present invention provides microalgae which are appropriate to be used as economical biomass with increased bio-energy productivity, and the microalgae can be favorably used to produce lipid for biodiesel and starch for bio-ethanol.

Dirección: http://www.patentinspiration.com/redirect?url=/patent/WO2015174588A1

BioProductos-Bioetanol

Microalga culture method and drainage water treatment method

WO2014208621A1

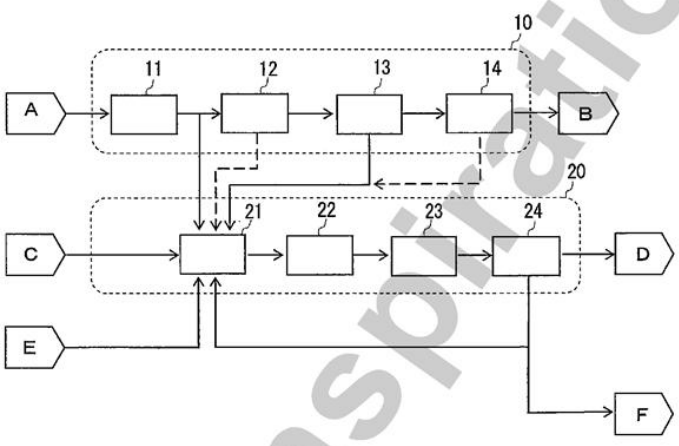
Fecha de Publicación: 31 Diciembre 2014

Aplicación: 25 Junio 2014

Aplicante:

KOBELCO ECO SOLUTIONS CO LTD [JP]
UNIV TSUKUBA [JP]

Abstract:



Provided is a microalga culture method which comprises carrying out heterotrophic culturing or photoheterotrophic culturing of a microalga under dark conditions for the microalga in the presence of an organic carbon source in a liquid that contains at least a residual liquid obtained after the collection of ethanol from a fermentation liquor produced by the alcoholic fermentation of a biomass in the process of producing bioethanol. Also provided is a drainage water treatment

method for removing an organic substance contained in drainage water, which comprises carrying out heterotrophic culturing or photoheterotrophic culturing of a microalga under dark conditions for the microalga in the presence of an organic carbon source in a liquid that contains a distillation residual liquid produced in the process of producing bioethanol, thereby allowing an organic substance contained in the distillation residual liquid to be consumed by the microalga.

Dirección: http://www.patentinspiration.com/redirect?url=/patent/WO2014208621A1

Method used for producing bioethanol with Scenedesmus abundans

CN103421850A

Fecha de Publicación: 4 Diciembre 2013

Aplicación: 26 Mayo 2012

Aplicante: UNIV PEKING SHENZHEN GRAD SCHO

Abstract:

The invention provides a method used for producing bioethanol by saccharomyces cerevisiae fermentation, wherein Scenedesmusabundans is taken as biomass. The method comprises steps of cultivation of microalgae biomass, saccharification and fermentation. In the step of cultivation of microalgae biomass, the biomass of Scenedesmusabundans is enlarged by illumination cultivation in BG11 medium under a constant temperature. In the step of saccharification, Scenedesmusabundans biomass obtained in the step above is treated by acid, cellulase and glucoamylase so as to release saccharides such as cellulose and starch in the Scenedesmusabundans biomass, and transform the saccharides into glucose. In the step of fermentation, the biomass treated by saccharification is inoculated with saccharomyces cerevisiae, and bioethanol is produced in a constant temperature shaking table under amaerobic conditions.

Dirección: http://www.patentinspiration.com/redirect?url=/patent/CN103421850A

Preparing method of bioethanol in hybrid type

KR20130023291A

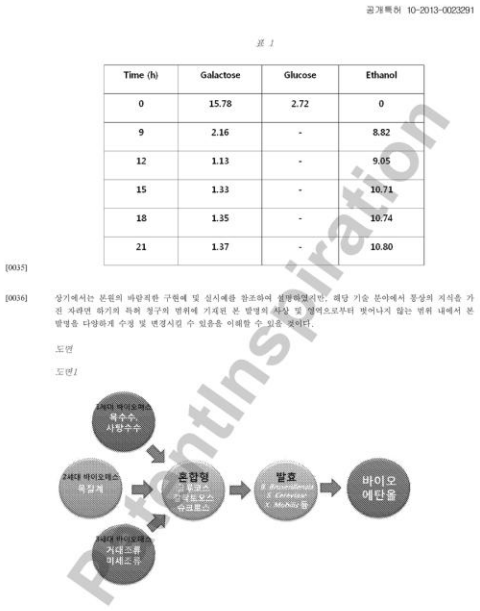
Fecha de Publicación: 7 Marzo 2013

Aplicación: 11 Enero 2013

Aplicante:

DAEWOO SHIPBUILDING & MARINE [KR]
BIOL SYSTEMS CO LTD [KR]

Abstract:



공개특허 10-2013-0023291

표 1

Time (h)	Galactose	Glucose	Ethanol
0	15.78	2.72	0
9	2.16	-	8.82
12	1.13	-	9.05
15	1.33	-	10.71
18	1.35	-	10.74
21	1.37	-	10.80

[0035]

[0036] 상기에서는 본원의 바람직한 구현예 및 실시예를 참조하여 설명하였지만, 해당 기술 분야에서 통상의 지식을 가진 자라면 하기의 특허 청구의 범위에 기재된 본 발명의 사상 및 영역으로부터 벗어나지 않는 범위 내에서 본 발명을 다양하게 수정 및 변경시킬 수 있음을 이해할 수 있을 것이다.

도면

도면1

- 7 -

PURPOSE: A method for preparing a hybrid type bioethanol is provided to produce bioethanol using various ingredients and to save the production cost. CONSTITUTION: A method for preparing a hybrid type bioethanol comprises: a step of pretreating and saccharifying ingredients selected from a group consisting of grains, wood, marine algae, and a combination thereof; and a step of fermenting the fermentation saccharide using microorganisms. The microorganism is selected among Saccharomyces pastorianus, Saccharomyces cerevisiae, Kluyveromyces fragilis, Kluyveromyces marxianus IMB3, Brettanomyces custersii, Clostridium acetobutylicum, and Clostridium tetanomorphum. [Reference numerals] (A1) First generation biomass; (A2) Corn, sugar cane; (B1) Second generation biomass; (B2) Woods; (C1) Third generation biomass; (C2) Large algae; (C3) Microalgae; (D1) Mixed type; (D2) Glucose; (D3) Galactose; (D4) Sucrose; (E1) Fermentation; (E2) B. Bruxenllensis, S. Cereviase, X. Mobilis, and etc; (FF) Bioethanol

Dirección: http://www.patentinspiration.com/redirect?url=/patent/KR20130023291A

BioProducos-Hidrógeno

Method for cultivating microalgae to generate hydrogen

CN104962585A

Fecha de Publicación: 7 Octubre 2015

Aplicación: 25 Junio 2015

Aplicante: No aparece

Abstract:

The invention provides a method for cultivating microalgae to generate hydrogen. The method includes the steps that firstly, an aggregate of the microalgae is constructed, then the aggregate of the microalgae is resuspended in a culture medium, and cultivation is conducted under the illumination condition to generate hydrogen. A method for constructing the aggregate of the microalgae includes the following steps that firstly, microalgae cells are cultivated to a logarithmic phase, and the cell density is not smaller than 1.2*108 cells/mL; secondly, positive ion polyelectrolyte carrying amidogen is added to a microalgae cell solution with the amount of 0.5 g/L-2 g/L to conduct surface modification; thirdly, the microalgae cells are collected and are mixed with a 2-10 mM silicic acid solution, and stirring is conducted until the aggregate of the microalgae is formed. By means of the method, sustainable light hydrogen production of the microalgae under the natural aerobic condition is achieved, and the problems that the hydrogen production sustainable time is short and efficiency is low are solved.

Dirección: http://www.patentinspiration.com/redirect?url=/patent/CN104962585A

Method for producing hydrogen by visible light-driven microalgae electrolytic cell-based decomposition of water

CN103147092B

Fecha de Publicación: 19 Agosto 2015

Aplicación: 7 Diciembre 2011

Aplicante: DALIAN CHEMICAL PHYSICS INST

Abstract:

The invention relates to a method for producing hydrogen by visible light-driven microalgae electrolytic cell-based decomposition of water. The method comprises the following steps that in a microalgae electrolytic cell with an electrolyte solution, in the presence of a microalgae photoelectrode as an anode, an electronic mediator is added into the electrolyte solution and external voltage is applied between the anode and a cathode; under visible light driving,

microalgae cells decompose water into oxygen, electrons and protons by a photosynthetic system II; and the electrons are carried to the anode by the electronic mediator, then are carried to the cathode under the applied voltage and then are bonded with the protons in the electrolyte solution to produce hydrogen. The microalgae electrolytic cell can realize water anodic oxidation under visible light driving. Under synchronous irradiation of light currents and visible light, oxygen and hydrogen are synchronously released from surfaces of the anode and the cathode. The method has a hydrogen production rate of 16.4 microliters per hour and compared with the indirect hydrogen production method, the method provided by the invention improves the hydrogen production rate by 40 times. The method has a low electrode preparation cost and high hydrogen production efficiency, avoids hydrogen-oxygen separation and realizes efficient, sustaining and table preparation of hydrogen energy.

Dirección: http://www.patentinspiration.com/redirect?url=/patent/CN103147092B

Method for treating starch wastewater and simultaneously generating renewable energy source

CN104789603A

Fecha de Publicación: 22 Julio 2015

Aplicación: 19 Mayo 2015

Aplicante: HARBIN INST OF TECHNOLOGY

Abstract:

The invention discloses a method for treating starch wastewater and simultaneously generating renewable energy source and relates to a method for treating starch wastewater and simultaneously generating renewable energy source. The invention solves the problems that the current starch wastewater treatment method is high in cost and the environment pollution can be caused. The method comprises the following steps: 1, processing a hydrogen production inoculum to obtain a hydrogen production flora; 2, taking the starch wastewater, adjusting the pH value and inoculating the hydrogen production flora to obtain the hydrogen and organic acid fermented solution; and 3, removing the hydrogen production flora in the fermented solution, adjusting the pH value, inoculating a microalgae, culturing and harvesting the microalgae, and extracting the grease in the microalgae. The hydrogen production volume is 755.5-883.3 mL H2/L working volume, the oil production volume is 0.31-0.41g/L working volume and the COD removing rate is 79-84%. The method can be applied to the biological energy source and the wastewater treatment fields.

Dirección: http://www.patentinspiration.com/redirect?url=/patent/CN104789603A

Method for preparing acetic acid through hydrothermal oxidation of microalgae by using oxidation state metal compound

CN103739474B

Fecha de Publicación: 14 Octubre 2015

Aplicación: 12 Noviembre 2013

Aplicante: UNIV SHANGHAI JIAOTONG

Abstract:

The present invention provides a method for preparing acetic acid through hydrothermal oxidation of microalgae by using an oxidation state metal compound. The method comprises: conveying an oxidation state metal compound and microalgae powder into a hydrothermal reactor, carrying out a hydrothermal oxidation reaction under an alkaline condition to obtain the high added value product acetic acid and concurrently obtain the elemental reduction metal. According to the method, the traditional oxidants such as hydrogen peroxide, oxygen, air and the like are not used, such that high cost and pollution due to use of the traditional oxidant are avoided; the acetic acid yield can be more than 30%; the considerable economic benefits are provided; and the method has advantages of simple preparation process, low cost, easy operation, no secondary pollution, and high conversion efficiency.

Dirección: http://www.patentinspiration.com/redirect?url=/patent/CN103739474B

Eventos y Cursos

Congresos

European Algae Biomass Conference.
April 20 - 21. Berlin, Germany.
http://www.wplgroup.com/aci/event/european-algae-biomass-conference/

European Networks Conference on Algal and Plant Photosynthesis.
April 26 - 29th of. Malta.
http://encapp2016.eu/home/

The 6th International Conference on Algal Biomass, Biofuels and Bioproducts.
June 26 - 29. Paradise Point, San Diego. EEUU.
http://www.algalbbb.com/

Euro Global Summit and Expo on Biomass.
August 08-09. Birmingham, UK.
http://biomass.global-summit.com/europe/

10th ISEB Conference 2016.
June 01-03 Barcelona, Spain.
http://www.iseb2016.com/es/

2nd International Congress and Expo on Biofuels & Bioenergy.
August 29-31. Sao Paulo, Brazil.
http://biofuels-bioenergy.conferenceseries.com/call-for-abstracts.php

Algae Biomass Summit.
October 23 - 26. Phoenix, Arizona. EEUU.
http://www.algaebiomasssummit.org/?page=Agenda

The 9th Asia-Pacific Conference on Algal Biotechnology. Algae for food, feed, fuel and beyond.
November 15-18. Bankhok, Thailand.
http://www.apcab2016.com/overview.asp

ALGAEUROPE
December 06 - 08 2016, UK.
http://algaecongress.com/

Workshop/ Talleres y cursos

EABA Workshop Novel Foods 2nd Edition
April 1st. Bruselas, Bélgica
http://www.eaba-association.org/en/events/

ATP3 Education and Training Workshops
ATP3 offers a diverse range of topics pertaining to the management and processing of microalgal cultures, and uses of their products. Laboratory and field training are led by highly-trained scientists and engineers. Principal instructors include: Dr. Milt Sommerfeld (ASU/AzCATI), Dr. Thomas Dempster (ASU/AzCATI), and Dr. Schonna Manning (UT-Austin/UTEX). For more information about these and future workshops, please visit www.atp3.org/education

NCMA Training Courses
May 15-20. Algal Culturing Techniques Course.
The Provasoli-Guillard National Center for Marine Algae and Microbiota (NCMA) offers an Algal Culturing Techniques Course. The course is held at Bigelow Laboratory for Ocean Sciences Research and Education campus in East Boothbay, ME. The course is designed for graduate students, faculty members, aquaculturists, biotech professionals and anyone else interested in learning algal culturing techniques.
https://ncma.bigelow.org/training-courses

May 16-20: Spring ATP3 Workshop, AzCATI - Principles and Processes: Algae Culture Maintenance, Production and Downstream Processing.
This workshop covers the fundamentals of selecting and managing microalgal cultures, culturing techniques, acquiring critical biomass measurements, an overview of high-value natural products, demonstrations of harvesting and processing technologies, and operation at the production scale.

Freshwater Algae Identification Intensive Summer Workshop.
Summer Workshop: June 15 to June 29, 2016
This workshop will embark on a study of the largest, most diverse, and arguably the most important group of plants on earth: the algae. NY, USA.
http://www.fordham.edu/info/25156/freshwater_algae_identification_intensive_summer_workshop

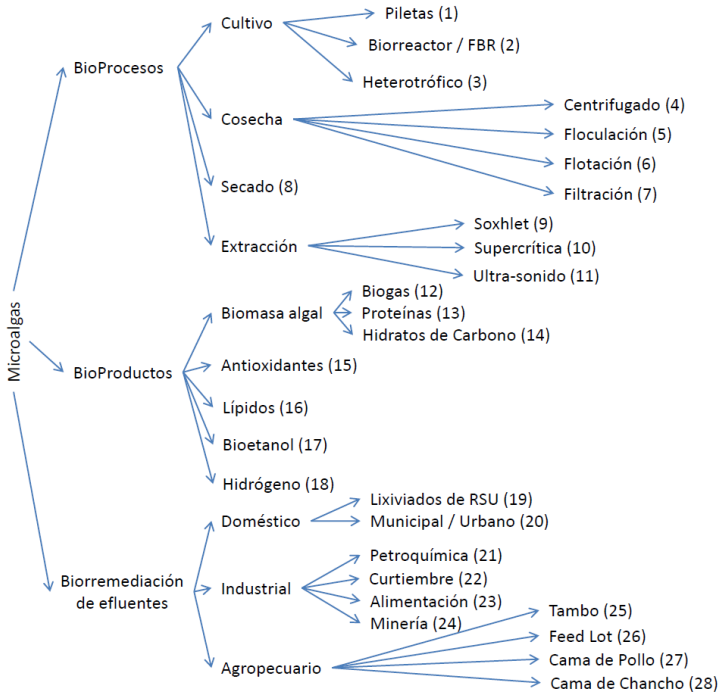
Aug 22-26: Summer ATP3 Workshop, UTEX - Microalgal Culture Management & Strain Selection.
This workshop will provide an introduction to the major classifications of microalgae, including their diversity, nutrition, ecology, and biochemical content. Topics are designed for advanced students, instructors and trainees who are interested in obtaining a broad survey of the microalgae and the field of applied phycology.

Workshop are hosted at AzCATI, a nationally-recognized algae testbed facility, where participants can explore every aspect of growing microalgae at the production scale. The summer workshop will take place at the UTEX Culture Collection of Algae located at the University of Texas at Austin.
http://utex.org/blogs/training-workshops
http://www.psaalgae.org/workshops-and-courses/
National Center for Marine Alage and Microbiota

Biología y Taxonomía de Diatomeas Continentales. UBA.
Maidana Nora Irene, nim@bg.fcen.uba.ar; postgrado.bbe@bg.fcen.uba.ar.
http://www.dbbe.fcen.uba.ar/objetos/biologia-y-taxonomia-de-diatomeas-continentales-P174.html
Taller de identificación de Diatomeas Continentales, UBA.
Este curso teórico y práctico brinda actualización de los conocimientos sobre la biología, taxonomía y ecología de las diatomeas (Bacillariophyceae), con énfasis en los géneros que habitan las aguas continentales. Se estudian las Bacillariophyceae actuales y fósiles, tanto en los aspectos de su biodiversidad como en los limnológicos y micropaleontológicos, así como sus aplicaciones en diversos campos de la ciencia y la industria.
Carga horaria: 60 hs.
Duración: quincenal.
Frecuencia de dictado: anual.
Maidana Nora Irene, nim@bg.fcen.uba.ar; postgrado.bbe@bg.fcen.uba.ar.
http://www.dbbe.fcen.uba.ar/objetos/taller-de-identificacion-de-diatomeas-continentales-P193.html.

Árbol de categorías

Español



Inglés