Production of long chain alkyl esters from carbon dioxide and electricity by a two-stage bacterial process

Microbial electrosynthesis (MES) is a promising technology for the reduction of carbon dioxide into value-added multicarbon molecules. In order to broaden the product profile of MES processes, we developed a two-stage process for microbial conversion of carbon dioxide and electricity into long chain alkyl esters. In the first stage, the carbon dioxide is reduced to organic compounds, mainly acetate, in a MES process by Sporomusa ovata. In the second stage, the liquid end-products of the MES process are converted to the final product by a second microorganism, Acinetobacter baylyi in an aerobic bioprocess. In this proof-of-principle study, we demonstrate for the first time the bacterial production of long alkyl esters (wax esters) from carbon dioxide and electricity as the sole sources of carbon and energy. The process holds potential for the efficient production of carbon-neutral chemicals or biofuels.

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Effect of alkylaminophenols on growth inhibition and apoptosis of bone cancer cells

In this work, we report the anticancer properties of a series of 11 chemically synthesized alkylaminophenols against human osteosarcoma U2OS tumor cell line. Several assays including cytotoxicity, inhibitor kinetic study, cell migration, Annexin-V/PI double staining, reactive oxygen species (ROS) and caspase 3/7 assays were conducted on this cell line. Cytotoxic 2-((3,4-dihydroquinolin-1(2H)-yl)(p-tolyl)methyl)phenol was determined to have an IC50 value of 36.6μM against U2OS cells and it also inhibits the cell growth in time-dependent manner. The potent activity of lead compound against the growth of multiple cell lines, U2OS, MG-65 and HEK-293T, confirms the osteosarcoma cell specific inhibition. Further studies indicated that such compound is an inhibitor of metastatic property of tumor cells and inducing apoptosis agent. The ability of increasing ROS and inducing caspases 3 and 7 further confirm the contribution of programmed cell death in
U2OS and HEK-293T cells. Additionally, four compounds based on the 2-(indolin-1-yl(aryl)methyl)-4-nitrophenol core were also identified to be cytotoxic with IC50 values in the 66-88μM range. This work further demonstrates the anticancer properties of phenol derivatives, adding one more entry to the collection of promising chemotherapeutic agents for cancer treatment.

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Scopus rating (2005): SJR 0.93 SNIP 1.409  
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**Arsenic Removal from Mine Waters with Sorption Techniques**

Potential low-cost sorption materials (mostly industrial by-products) were screened for removal of arsenic from mine effluent water. First, the maximum adsorption capacities were determined in batch tests with various liquid to solid ratios. The highest arsenic sorption capacity, 46 mg As/g of sorption material, was measured for cast iron chips. The most promising materials were also studied in batch tests that assessed the reaction kinetics and in kinetic column tests for their behavior in a filter or reactive barrier application. The column tests revealed the cast iron chips caused clogging in the percolation column when operating with real mine water. A commercial ferric oxi-hydroxide sorption material developed for As removal for drinking water showed good As removal in the column tests. Around 10,000 bed volumes of mine process water containing 2 mg/L of arsenic was treated with this material, and treated water concentrations ranged between 0 and 0.05 mg/L before breakthrough. The measured adsorption capacity for the commercial ferric oxi-hydroxide sorption material was 8.3 mg As/g.
The effect of poised anode potential on electricity production and tetrathionate degradation was studied in two-chamber flow-through electrochemical (ES) and bioelectrochemical systems (BES). The minimum anode potential (vs. Ag/AgCl) for positive current generation was 0.3 V in BES and 0.5 V in the abiotic ES. The anode potential required to obtain average current density above 70 mA m-2 was 0.4 V in BES and above 0.7 V in ES. ES provided higher coulombic efficiency, but the average tetrathionate degradation rate remained significantly higher in BES (above 110 mg L-1 d-1) than in the abiotic ES (below 35 mg L-1 d-1). This study shows that at anode potentials below 0.7 V, the electrochemical tetrathionate degradation is only efficient with microbial catalyst and that significantly higher tetrathionate degradation rates can be obtained with bioelectrochemical systems than with electrochemical systems at the tested anode potentials.
Growth and wax ester production of an Acinetobacter baylyi ADP1 mutant deficient in exopolysaccharide capsule synthesis

Acinetobacter baylyi ADP1 naturally produces wax esters that could be used as a raw material in industrial applications. We attempted to improve wax ester yield of A. baylyi ADP1 by removing rmlA, a gene involved in exopolysaccharide production. Growth rate, biomass formation and wax ester yield on 4-hydroxybenzoate were not affected, but the rmlA (-) strain grew slower on acetate, while reaching similar biomass and wax ester yield. The rmlA (-) cells had malformed shape and large size and grew poorly on glucose without expression of the gene for pyruvate kinase (pykF) from Escherichia coli. The pykF-expressing rmlA (-) strain had similar growth rate, lowered biomass formation and improved wax ester production on glucose as compared to the wild-type strain expressing pykF. Cultivation of the pykF-expressing rmlA (-) strain on an elevated glucose concentration in a medium supplemented with amino acids resulted in doubled molar wax ester yield and acetate production.
Two-step bioleaching of copper and gold from discarded printed circuit boards (PCB)

An effective strategy for environmentally sound biological recovery of copper and gold from discarded printed circuit boards (PCB) in a two-step bioleaching process was experimented. In the first step, chemolithotrophic acidophilic Acidithiobacillus ferrivorans and Acidithiobacillus thiooxidans were used. In the second step, cyanide-producing heterotrophic Pseudomonas fluorescens and Pseudomonas putida were used. Results showed that at a 1% pulp density (10 g/L PCB concentration), 98.4% of the copper was bioleached by a mixture of A. ferrivorans and A. thiooxidans at pH 1.0-1.6 and ambient temperature (23 ± 2 °C) in 7 days. A pure culture of P. putida (strain WCS361) produced 21.5 (±1.5) mg/L cyanide with 10 g/L glycine as the substrate. This gold complexing agent was used in the subsequent bioleaching step using the Cu-leached (by A. ferrivorans and A. thiooxidans) PCB material, 44.0% of the gold was mobilized in alkaline conditions at pH 7.3-8.6, and 30 °C in 2 days. This study provided a proof-of-concept of a two-step approach in metal bioleaching from PCB, by bacterially produced lixiviants.
Impacts of sulfur source and temperature on sulfur-driven denitrification by pure and mixed cultures of Thiobacillus

This study investigated the impacts of thiosulfate (S2O32−) as well as chemically synthesized and biogenic elemental sulfur (S0) on the rates of sulfur-based denitrification in batch bioassays. The use of S2O32− resulted in the highest denitrification rate (52.5 mg N-NO3−/L d), whereas up to 10 times slower nitrate (NO3−) removal was observed with S0. Biogenic S0 was tested for the first time as electron donor for chemolithotrophic denitrification, resulting in 1.7-fold faster NO3− removal than that achieved with chemically synthesized S0. The effects of increasing concentrations of S2O32− and chemically synthesized S0 on denitrification were evaluated testing three different sulfur-to-nitrogen (S/N) molar ratios (1.8, 3.5 and 5.1) on a pure culture of Thiobacillus denitrificans and a mixotrophic enrichment dominated by Thiobacillus thioparus. S2O32− concentrations exceeding 2.2 g/L inhibited the activity of T. denitrificans, whereas a stimulatory effect was observed on mixotrophic denitrification. The increase in S0 concentration slightly enhanced denitrification by both microbial cultures due to the low solubility of chemically synthesized S0. The temperature dependence of the thiosulfate-driven denitrification by T. denitrificans was investigated to further optimize the process and modeled by the Arrhenius equation with an apparent activation energy Ea of 76.6 kJ/mol and a temperature coefficient Q10 of 3.0.

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Scopus rating (2014): SJR 0.989 SNIP 1.438 CiteScore 3.05
Scopus rating (2013): SJR 0.994 SNIP 1.493 CiteScore 3.06
Scopus rating (2012): SJR 1.191 SNIP 1.455 CiteScore 2.93
Scopus rating (2011): SJR 1.165 SNIP 1.419 CiteScore 3.05
Scopus rating (2010): SJR 1.278 SNIP 1.464
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Scopus rating (2008): SJR 1.472 SNIP 1.941
Scopus rating (2007): SJR 1.336 SNIP 1.682
Scopus rating (2006): SJR 1.176 SNIP 1.552
Thermo-catalytic decomposition of methane: The effect of reaction parameters on process design and the utilization possibilities of the produced carbon

The study presents a path for selecting the reaction and reactor parameters of a process applying thermo-catalytic decomposition of methane (TDM). Temperature and catalyst are the main reaction parameters affecting the type of TDM carbon and defining the reaction's theoretical heat requirement. Secondly, the reaction parameters affect the reactor design including the selection of reactor type and heating source as well as the reactor dimensioning. The reactor dimensioning is discussed by highlighting the methane residence time requirement at different reaction conditions. Finally, the economic value of the TDM products is analyzed. According to the analyses, the reaction temperature and catalyst have a significant effect on reactor design and on the value and utilization possibilities of the TDM carbon. The prices of carbon products vary greatly as does the global demand of those. The utilization possibilities of carbon highly affect the overall viability of the TDM process and therefore should be carefully considered during process design.

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Scopus rating (2013): SJR 1.669 SNIP 2.558 CiteScore 4.49
Scopus rating (2012): SJR 1.732 SNIP 2.277 CiteScore 3.72
Scopus rating (2011): SJR 1.292 SNIP 1.846 CiteScore 3.03
Scopus rating (2010): SJR 1.372 SNIP 1.75
Scopus rating (2009): SJR 1.339 SNIP 1.797
Scopus rating (2008): SJR 1.508 SNIP 1.905
Scopus rating (2007): SJR 1.196 SNIP 1.811
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Scopus rating (2005): SJR 1.577 SNIP 1.799
Scopus rating (2004): SJR 1.049 SNIP 1.466
Scopus rating (2003): SJR 0.903 SNIP 1.321
Scopus rating (2002): SJR 1.089 SNIP 1.463
Scopus rating (2001): SJR 0.81 SNIP 0.855
Scopus rating (2000): SJR 0.576 SNIP 0.688
Solid phase changes in chemically and biologically leached copper smelter slag

Pyrometallurgical processes for sulfide concentrates produce slag waste materials that contain multiple metals as carry-over impurities. Varied quantities of the metal content can be solubilized from the slag through chemical acid leaching or bioleaching. In this study, copper smelter slags were leached with and without iron- and sulfur-oxidizing bacteria in acid, sulfate-rich solutions and solid phase changes were determined. The samples (10% pulp density) were leached at 28 °C in stirred tanks at pH 2.5 and 3.0. The duration of the experiment was 37 d and the adjusted pH decreased to 2.3 in both sets of experiments. The primary metals of interest in the slag were Cu and Zn, with minor amounts of Ni and Co, and As, Sb, and Pb at trace levels. The metals in the slag were distributed in fayalite, glassy silicates and magnetite phases as well as minor amounts in oxides, metallic Cu and sulfides. Based on the solution analyses, the dissolution yields were 44% and 34% for Cu, 14% and 13% for Zn and Co, and 4.5% and 4.0% for Ni at initial pH values of 2.5 and 3.0, respectively. Fayalite was the most reactive mineral and Cu-sulfides were particularly refractory. The elemental composition of leached residues was matched with solid phase changes and the distribution of metals in the mineral phases.
Metal biorecovery in acid solutions from a copper smelter slag

Slags from metallurgical processes represent a potential resource of metals but also waste materials that have not been successfully beneficiated to date. For this study, a bulk slag sample from a copper smelter was evaluated under chemical and bacterial leaching conditions to test the solubilization of Cu and Zn in acidic, sulfate-rich solutions. Fayalite, magnetite and glassy silicates as well as Cu-sulfides and sphalerite were the major phases of the slag. The acid demand of the slag was satisfied with a 24 h contact time with sulfuric acid. A mixed mesophilic culture capable of oxidizing iron and sulfur and dominated by Acidithiobacillus thiooxidans, A. ferrooxidans, and Leptospirillum ferriphilum was used for bioleaching. The maximum extent of Zn leaching was 14%, contrasted with 83% Cu in experiments with an initial pH of 2.1–2.2, 10% pulp density, 10 g L−1 S0 addition, 5% inoculum, and 25 d contact time. Biological S0 oxidation was an important source of acid in bioleaching experiments. Ferric iron did not enhance the solubilization of Cu and Zn appreciably.

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Scopus rating (2013): SJR 1.626 SNIP 2.967 CiteScore 2.95
Scopus rating (2012): SJR 1.523 SNIP 2.4 CiteScore 2.6
Scopus rating (2011): SJR 1.521 SNIP 1.796 CiteScore 2.42
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Scopus rating (2009): SJR 1.185 SNIP 2.458
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Scopus rating (2005): SJR 1.076 SNIP 1.605
Scopus rating (2004): SJR 1.089 SNIP 1.869
Scopus rating (2003): SJR 0.843 SNIP 1.565
Scopus rating (2002): SJR 0.833 SNIP 1.308
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Liquid fertilizer products from anaerobic digestion of food waste: Mass, nutrient and energy balance of four digestate liquid treatment systems

This study compared four different digestate liquid treatment systems of a theoretical anaerobic digestion plant in order to facilitate the utilization of municipal food waste nutrients in agriculture. The mass, nutrient and energy balances of a theoretical plant digesting 60 kt/y of food waste were used to evaluate the feasibility of the treatments to concentrate nutrients into liquid fertilizer products. The studied technologies for digestate liquid treatment were ammonia stripping, ammonia stripping combined with reverse osmosis (RO), evaporation combined with RO, and stripping combined with both evaporation and RO. As a result, processing of digestate into concentrated fertilizer products consumed less than 10% of the produced energy from food wastes and was also sufficient for the heat-demanding digestate liquid treatments, evaporation and stripping. The digestate liquid treatment systems were considered as nitrogen and potassium...
concentration methods which were able to concentrate up to 67% of the feedstock nitrogen into transportable fertilizer products with low mass. Of the studied digestate systems evaporation combined with RO was evaluated as the most efficient nutrient recovery technology for the production of transportable fertilizer products due to the high concentration of nutrients and nutrient availability as well as low product mass and energy consumption. Overall, the selection of the treatment technology is dependent on the location of the anaerobic digestion plant relative to the agricultural land and the type of fertilizer products needed.

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- Scopus rating (2012): SJR 1.706 SNIP 2.328 CiteScore 4.07
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**Effect of temperature on selenium removal from wastewater by UASB reactors**

The effect of temperature on selenium (Se) removal by upflow anaerobic sludge blanket (UASB) reactors treating selenate and nitrate containing wastewater was investigated by comparing the performance of a thermophilic (55 °C) versus a mesophilic (30 °C) UASB reactor. When only selenate (50 μM) was fed to the UASB reactors (pH 7.3; hydraulic retention time 8 h) with excess electron donor (lactate at 1.38 mM corresponding to an organic loading rate of 0.5 g COD L⁻¹ d⁻¹), the thermophilic UASB reactor achieved a higher total Se removal efficiency (94.4 ± 2.4%) than the mesophilic UASB reactor (82.0 ± 3.8%). When 5000 μM nitrate was further added to the influent, total Se removal was again better under thermophilic (70.1 ± 6.6%) when compared to mesophilic (43.6 ± 8.8%) conditions. The higher total effluent Se concentration in the mesophilic UASB reactor was due to the higher concentrations of biogenic elemental Se nanoparticles (BioSeNPs). The shape of the BioSeNPs observed in both UASB reactors was different: nanospheres and nanorods, respectively, in the mesophilic and thermophilic UASB reactors. Microbial community analysis showed the...
Metal chalcogenide quantum dots: Biotechnological synthesis and applications

Metal chalcogenide (metal sulfide, selenide and telluride) quantum dots (QDs) have attracted considerable attention due to their quantum confinement and size-dependent photoemission characteristics. QDs are one of the earliest products of nanotechnology that were commercialized for tracking macromolecules and imaging cells in life sciences. An array of physical, chemical and biological methods have been developed to synthesize different QDs. Biological production of QDs follow green chemistry principles, thereby use of hazardous chemicals, high temperature, high pressure and production of by-products is either minimized or completely avoided. In the past decade, significant progress has been made wherein a diverse range of living organisms, i.e. viruses, bacteria, fungi, microalgae, plants and animals have been explored for synthesis of all three types of metal chalcogenide QDs. However, better understanding of the biological mechanisms that mediate the synthesis of metal chalcogenides and control the growth of QDs is needed for improving their yield and properties as well as addressing issues that arise during scale-up. In this review, we present the current status of the biological synthesis and applications of metal chalcogenide QDs. Where possible, the role of key biological macromolecules in controlled production of the nanomaterials is highlighted, and also technological bottlenecks limiting
Microbial electrochemical technologies have gained much attention in the recent years during which basic research has been carried out to provide proof of concept by utilizing microorganisms for generating bioenergy in an electro redox active environment. However, these bio-electrocatalyzed systems pose significant challenges towards up-scaling and practical applications. Various parameters viz., electrodes, materials, configuration, biocatalyst, reaction kinetics, fabrication and operational costs, resistance for electron transfer etc. will critically govern the performance of microbial catalyzed electrochemical systems. Majorly, the surface area of electrode materials, biofilm coverage on the electrode surface, enrichment of electrochemically active electrode respiring bacteria and reduction reactions at cathode will aid in increasing the reaction kinetics towards the upscaling of microbial electrochemical technologies. Enrichment of electroactive microbial community on anode electrode can be promoted with electrode pretreatment, controlled anode potential or electrical current, external resistance, optimal operation temperature, chemical additions and bioaugmentation. Inhibition of the growth of methanogens also increases the columbic efficiency, an essential parameter that determines the efficacy of bioelectricity generation. Considering the practical implementation of these microbial electrochemical technologies, the current review addresses the challenges and strategies to improve the performance of bio-electrocatalyzed systems with respect to the operational, physico-chemical and biological factors towards scale up. Besides, the feasibility for long term operation, the scope for future research along with the operational and maintenance costs are discussed to provide a broad spectrum on the role of the system components for the implementation of these bio-electrochemical technologies for practical utility.

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A study on raw, torrefied, and steam-exploded wood: Fine grinding, drop-tube reactor combustion tests in N₂/O₂ and CO₂/O₂ atmospheres, particle geometry analysis, and numerical kinetics modeling

The purpose of this study was to compare the fine grinding properties and combustion behavior of three wood pellet products: raw, torrefied, and steam-exploded wood. The energy required to fine grind the pellets was tested, and so was the geometry and size distribution of the resulting ground products. Out of all the samples the steam-exploded wood pellet required the most energy for grinding. However, it also produced more sphere-like particles compared to the other two types of samples. The combustion behavior of the samples was tested in a laminar drop-tube reactor (DTR). The samples were preground and the particles were sieved with vibration sieves with an opening of 112–125 μm. The pyrolysis process was examined separately at a temperature range of 973–1173 K. The combined pyrolysis and combustion tests were carried out at a reactor temperature of 1123 K. The O₂ concentrations used in the measurements were 3–21 vol-% in either N₂ or CO₂ atmospheres. The initial size distribution of the sample particles as well as their diameter evolution during pyrolysis and combustion was studied by using optical techniques. The surface temperature of the combusting particles was measured with a two-color pyrometer from within the DTR. The density, specific surface area, and pore diameter were measured from the ground samples with a mercury porosimeter. The chemical kinetic parameters, which describe the pyrolysis and char oxidation rates of the samples, were determined by using the data from the measurements.
Chemical and bacterial leaching of metals from a smelter slag in acid solutions

The purpose of this study was to assess the dissolution of Si, Fe, Cu and Zn from a smelter slag sample under acidic chemical and bacterial leaching conditions. The Cu-containing solid phases were Cu-sulfides (57% distribution), fayalite (18%) and metallic Cu (16%). Zn was mostly associated with fayalite, magnetite and Na-silicate phases (94%). Two mixed cultures (HB1 and HB2) were enriched from samples taken from the slag lagoon site at the smelter location. Comparable results of metal dissolution were obtained with the two mixed cultures. The enrichment culture HB1 was characterized further by denaturing gradient gel electrophoresis (DGGE) of polymerase chain reaction amplified 16S rRNA genes. Based on the 16S rRNA gene sequences, culture HB1 contained at least Acidithiobacillus ferrooxidans and Allocllobacillus cycloheptanicus, with sequences of three DGGE bands matching distantly with Allocllobacillus tolerans and Allocllobacillus herbarium in the database. Allocllobacillus spp. have not been previously associated with slag lagoons or slag bioleaching. Approximately 80% Cu and 25% Zn were dissolved from the slag (10% pulp) in shake flasks when S0 was provided for the bacteria to produce H2SO4. Bioleaching in stirred tanks was conducted at controlled pH values and was practiced at pH levels promoting metal dissolution and suppressing iron and silicate solubilization from fayalite and Na-silicate. Chemical leaching at pH 2.3-4.0 did not yield substantial dissolution of valuable metals.

General information

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Organisations: Department of Chemistry and Bioengineering, Research group: Industrial Bioengineering and Applied Organic Chemistry, CSIRO Land and Water Flagship, Boliden Harjavalta Oy, Department of Microbiology, Ohio State University
Authors: Kaksonen, A. H., Särkijärvi, S., Puhakka, J. A., Peuraniemi, E., Junnikkala, S., Tuovinen, O. H.
Pages: 46-53
Publication date: 2016
Peer-reviewed: Yes
Early online date: 1 Jan 2015
Use of diluted urine for cultivation of Chlorella vulgaris

Our aim was to study the biomass growth of microalga Chlorella vulgaris using diluted human urine as a sole nutrient source. Batch cultivations (21 days) were conducted in five different urine dilutions (1:25-1:300), in 1:100-diluted urine as such and with added trace elements, and as a reference, in artificial growth medium. The highest biomass density was obtained in 1:100-diluted urine with and without additional trace elements (0.73 and 0.60 g L(-1), respectively). Similar biomass growth trends and densities were obtained with 1:25- and 1:300-diluted urine (0.52 vs. 0.48 gVSS L(-1)) indicating that urine at dilution 1:25 can be used to cultivate microalgal based biomass. Interestingly, even 1:300-diluted urine contained sufficiently nutrients and trace elements to support biomass growth. Biomass production was similar despite pH-variation from <5 to 9 in different incubations indicating robustness of the biomass growth. Ammonium formation did not inhibit overall biomass growth. At the beginning of cultivation, the majority of the biomass consisted of living algal cells, while towards the end, their share decreased and the estimated share of bacteria and cell debris increased.

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Authors: Jaatinen, S., Lakaniemi, A., Rintala, J.
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Scopus rating (2014): SJR 0.618 SNIP 0.781 CiteScore 1.39
Fluorescent Protein Toolbox: Protein Engineering Broadens the Range of in vitro and in vivo Applications of Fluorescent Proteins

In the last two decades, fluorescent proteins have become one of the most widely studied and exploited protein in biochemistry and cell biology. Fluorescent protein is a protein that upon excitation at low wavelength light emits fluorescence at higher wavelength. Its ability to generate high intracellular visibility together with the stable internal fluorophore and non-invasive measurement technologies made it the finest tool to monitor cellular processes and molecular events in living cells at its normal physiological conditions. Protein engineering and identification of novel fluorescent proteins have resulted in the development of color variants ranging from the blue to near-infrared region of the spectrum. Protein engineering has also lead to the development of highly stable fluorescent proteins with improved photochemical properties and sensing abilities.

The fluorescent proteins have made a strong impact in cell biology research due to its ability to participate in energy transfer interactions, such as Fluorescence resonance energy transfer (FRET) and thus allowing to measure and study molecular-scale distances and dynamics through changes in fluorescence. Development of novel FRET based techniques, FRET sensors and FRET pairs will provide opportunity to understand the cellular processes and dynamics with high precision at nano-scale level. This thesis focusses on FRET studies by developing novel FRET based sensor, novel FRET pairs and analyzing intramolecular FRET. The study also focuses on analyzing the potential of fluorescent proteins in sensing applications outside the cell environment, an area which has not yet been exploited. This was accomplished by protein engineering of fluorescent proteins with specific objectives followed by steady-state and time-resolved fluorescence spectroscopy measurements.

In one of the specific objective, intramolecular FRET in fluorescent proteins was studied by demonstrating FRET between fluorescent protein and conjugated chemical fluorophores whereby FRET occurs from inside to outside of the protein and vice versa. For this study, novel FRET pairs MDCC–Citrine and Citrine–Alexafluor 568 was generated. FRET analyzed using steady-state and ultra-fast time-resolved spectroscopy measurements revealed strong intramolecular FRET with high efficiencies. To my knowledge, this is the first and only study on bidirectional FRET between fluorescent protein and conjugated chemical labels. This study was made possible by genetically engineering Citrine to incorporate cysteine residues on the surface of the protein and this enabled site-specific bioconjugation of the labels to the fluorescent protein.

The surface exposed cysteine on the fluorescent protein was also exploited in this study to generate self-assembled monolayer (SAM) of Citrine on the surface of etched optical fibers (EOF). The conjugation of Citrine to the surface of EOF demonstrated a proof-of-concept for the use of this bio-conjugated protein in in vitro bio-sensing applications. To the best of our knowledge, this is the first and only study on the formation of fluorescent protein SAM on EOF. Steady-state and fluorescence lifetime measurements confirm the formation of SAM on EOF and revealed that the bioconjugation is site-specific and covalent in nature. The study also demonstrates that the proteins retains its photochemical properties on bioconjugation and are stable at physiological conditions.

The engineered surface exposed cysteine was further used in this study for the development of a FRET based redox sensor. This was developed aiming to overcome the disadvantages of the current FRET based redox sensors which includes low FRET efficiency and dynamic range, and to monitor the redox status in bacteria. For the sensor development, fluorescent proteins Citrine and Cerulean were genetically engineered to expose reactive cysteine residues on the protein
surface. The proteins were fused using a biotinylation domain as a linker to generate the FRET sensor. The redox titrations and the fluorescence measurements confirmed the redox response and reversibility of the sensor. The FRET sensor exhibited high FRET efficiency and dynamic range in intensity based measurements. Intracellular studies with Escherichia coli revealed the capability of the FRET sensor in detecting real-time redox variations at single cell level.

In the final study, novel FRET pairs were developed aiming at improved fluorescence lifetime dynamic range and high FRET efficiency for the use in fluorescence lifetime imaging microscopy (FLIM) studies. The fluorescent protein with the longest reported fluorescence lifetime NowGFP was used as a FRET donor and various red-fluorescent protein variants were screened for the optimal FRET acceptor. Among the FRET pairs screened, NowGFP-tdTomato and NowGFP-mRuby2 were found to be superior FRET pairs with high lifetime dynamic range and FRET efficiency. NowGFP-tdTomato pair was found to have the highest reported Förster radius and fluorescence lifetime dynamic range for any fluorescent protein based FRET pairs yet used in biological studies.

In summary, we have developed novel FRET based tools and in vitro techniques using fluorescent proteins which can assist in deepening the knowledge on intracellular environment and dynamics, and also in developing novel fluorescent protein based sensors which can be used outside the cellular environment.
Selecting an indigenous microalgal strain for lipid production in anaerobically treated piggery wastewater

The aim of this study was to select a potential microalgal strain for lipid production and to examine the suitability of anaerobically treated piggery wastewater as a nutrient source for production of lipid-rich biomass with the selected microalga. Biomass and lipid productivity of three microalgal strains (Chlorella sorokiniana CY1, Chlorella vulgaris CY5 and Chlamydomonas sp. JSC-04) were compared by using different media, nitrogen sources, and nitrogen concentrations. The highest lipid content and productivity (62.5 wt%, 162 mg/L/d) were obtained with C. vulgaris with BG-11 with 62 mg N/L. Secondly, C. vulgaris was cultivated in sterilized, diluted (1–20×), anaerobically treated piggery wastewater. Biomass production decreased and lipid content increased, when wastewater was more diluted. The highest lipid content of 54.7 wt% was obtained with 20× dilution, while the highest lipid productivity of 100.7 mg/L/d with 5× dilution. Piggery wastewater is a promising resource for mass production of oleaginous microalgal biomass.
Abstract Copper and iron dissolution of Zijinshan low-grade copper sulfide ores was investigated in ore-packed columns. At 60 °C and pH 1.0, 37.1 g Fe(III) L⁻¹ permitted effective copper dissolution and inhibited the activity of iron-oxidizing microorganisms. At 30 °C, microorganisms stimulated Fe(II) and pyrite oxidation, resulting in 85 and 54% of copper and pyrite extraction yields, respectively. Bacteria belonging to the genera Acidithiobacillus and Leptospirillum were dominant as observed by real-time PCR assay. Aeration and inoculation of columns were not necessary. Solutions had a higher pH of 1.7 in the columns operated without recirculation. Under these conditions, copper extraction was not affected and Fe(III) precipitated as jarosite, indicating a novel method for iron control in Zijinshan copper mine.
Lipid production by eukaryotic microorganisms isolated from palm oil mill effluent

Microbial oil production combined with wastewater management is one option for a more sustainable future. Micrographs of microbial cultures enriched from palm oil mill effluent (POME) showed lipid inclusion in the eukaryotic cells, indicating the cells can accumulate lipids. However, enriching the culture did not increase the total lipids. Therefore, eukaryotic microorganisms were isolated from POME to investigate whether these microorganisms are potential lipid producers. Four strains were isolated, and their lipid synthesis capabilities were compared with known oleaginous yeasts in a synthetic oil-free medium. Two strains (identified as Galactomyces geotrichum and Graphium penicillioides) had the potential to accumulate lipid accumulation based on the increase in triacylglycerol content. G. penicillioides was the most promising strain for lipid production as this strain accumulated more lipids than the well-known oleaginous yeast Cryptococcus curvatus (29.1 ± 3.0. wt% vs. 20.2 ± 2.9. wt%). To our knowledge, oil synthesis and accumulation by G. penicillioides have not previously been reported.

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Authors: Marjakangas, J. M., Lakaniemi, A. M., Koskinen, P. E. P., Chang, J. S., Puhakka, J. A.
Number of pages: 7
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Bioluminescent whole-cell reporter gene assays as screening tools in the identification of antimicrobial natural product extracts

We describe novel tools, bioluminescent whole-cell reporter gene assays, for facilitating the use of natural products in antimicrobial drug discovery. As proof-of-concept, a plant extract library was screened and follow-up experiments were carried out. Primary results can be obtained in 2-4 h with high sensitivity, leading to significant improvements of the process.

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Authors: Nybond, S., Karp, M., Yrjönen, T., Tammela, P.
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Scopus rating (2013): SJR 0.917 SNIP 1.019 CiteScore 2.5
Scopus rating (2012): SJR 0.87 SNIP 1.004 CiteScore 2.32
Scopus rating (2011): SJR 0.9 SNIP 0.972 CiteScore 2.29
Scopus rating (2010): SJR 0.945 SNIP 1.05
Selenium biomineralization for biotechnological applications

Selenium (Se) is not only a strategic element in high-tech electronics and an essential trace element in living organisms, but also a potential toxin with low threshold concentrations. Environmental biotechnological applications using bacterial biomineralization have the potential not only to remove selenium from contaminated waters, but also to sequester it in a reusable form. Selenium biomineralization has been observed in phylogenetically diverse microorganisms isolated from pristine and contaminated environments, yet it is one of the most poorly understood biogeochemical processes. Microbial respiration of selenium is unique because the microbial cells are presented with both soluble (SeO$_4^{2-}$ and SeO$_3^{2-}$) and insoluble (Se) forms of selenium as terminal electron acceptor. Here, we highlight selenium biomineralization and the potential biotechnological uses for it in bioremediation and wastewater treatment.

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Scopus rating (2012): SJR 3.353 SNIP 3.083 CiteScore 9.77
Scopus rating (2011): SJR 3.321 SNIP 3.05 CiteScore 9.82
Scopus rating (2010): SJR 3.062 SNIP 2.734
Scopus rating (2009): SJR 2.751 SNIP 2.682
Scopus rating (2008): SJR 2.509 SNIP 2.185
Developing Synthetic Biology Tools and Model Chassis: Production of Bioenergy and High-Value Molecules

One of the aims of synthetic biology is the sustainable production of high-value compounds and bioenergy molecules. Synthetic biologists exploit fundamental engineering principles, such as DNA component standardization, modular genetic circuits, and de novo design, to create novel production pathways and products. A well-characterized host cell serves as the chassis for the system construction; generally, the model bacterium Escherichia coli is applied. However, the metabolism and characteristics of E. coli are not ideal for all applications. Furthermore, many E. coli based systems are patent protected which restricts the use in forthcoming applications. Acinetobacter baylyi ADP1 is a potential alternative host for synthetic biology. The metabolism and genetics of the strain are well-understood, and the engineering of its genome is technically straightforward. The versatile and unusual metabolic pathways, including those producing long chain hydrocarbons, can be rerouted, modified, and integrated into novel ones. I exploited A. baylyi ADP1 as a model host for the production of high-value hydrocarbons, triacylglycerols and wax esters. I employed metabolic engineering, novel molecular monitoring tools, and synthetic pathway design to improve the production, and to demonstrate the utility of ADP1 as a synthetic biology host. In particular, the production of triacylglycerols was improved over 5-fold by targeted gene deletions which resulted in redirected carbon flux towards the product and elimination of competitive pathways. The long-chain hydrocarbon metabolism, including alcohol and wax ester biosynthesis, is not yet fully understood. These pathways are regulated through several mechanisms sensitive to specific environmental conditions and the cellular states. However, the lack of robust and straightforward analysis tools has restricted the studies of lipid metabolism and production kinetics. I developed a simple in vivo tool for the investigation of the long chain hydrocarbon metabolism in real-time. The tool is based on a light-producing reporter enzyme, bacterial luciferase. The enzyme utilizes a specific intermediate of the hydrocarbon synthesis pathway as a substrate for bioluminescence production. Initially, the tool was applied for monitoring the wax ester metabolism of A. baylyi ADP1. Subsequently, I modified the monitoring tool for studying the degradation of alkanes. The studies suggest that the tool can be applied for production optimization in different hosts and for a variety of products. I also reconstructed the wax ester synthesis pathway of A. baylyi ADP1 by replacing a natural key enzyme with an alternative well-characterized component, enabling a regulated production of unnatural wax esters. Bioprocess control and scale-up of production systems are challenging. Multispecies cultures are suggested to improve the robustness and performance of bacterial production processes. I exploited the metabolic versatility of A. baylyi ADP1 to construct a rationally engineered synthetic coculture with E. coli. The designed coculture exhibited improved biomass and recombinant protein production compared to the pure culture of E. coli. To conclude, I have shown that the strain ADP1 is a suitable host for synthetic biology applications, especially for long-chain hydrocarbon production, the development of novel tools for metabolic studies, and for exploiting the existing unusual metabolic networks of the cell. Thus, further studies of the remaining challenges related to ADP1 bioprocess and as-of-yet uncharacterized cell mechanisms, are warranted.

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Authors: Santala, S.
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Publication information
Biohydrogen Production: A Protein to Community Level Perspective Study

Excessive usage of traditional energy reserves leading to increased environmental pollution and global warming has strongly urged for alternative sustainable energy sources. Due to non-polluting nature and high energy yields, hydrogen (H₂) gas is considered as an ideal candidate for alternative fuel. Biohydrogen (bioH₂) production from organic wastes is a sustainable approach, addressing energy production through organic waste disposal. Organic wastes such as lignocellulosic biomass and industrial glycerol, a by-product of biodiesel manufacturing process, have been recently investigated for their bioconversion potential. However, bioconversion of such organic wastes is a challenge due to the presence of impurities, toxic degradation products and complex nature. In comparison to pure bacterial strains, natural microflora could be an ideal inoculum choice offering better adaptability, substrate utilization efficiency and bioconversion rates. Another challenge to ensure efficient fermentation is to optimize various physico-chemical factors such as pH, temperature, substrate selection and concentration, medium compounds, and H₂ removal and collection due to individual and interactive effects on microbial growth, metabolism and hydrogenase enzyme. Hydrogenases are metalloenzymes that reversibly catalyzes proton reduction to H₂, and are divided into three classes based on the metal cofactor at the active site, [Fe-Fe], [Ni-Fe] and [Fe] hydrogenase. Among the hydrogenase classes, [Fe-Fe] hydrogenases exhibit highest catalytic activity involving mostly in H₂ production. Apart from their pivotal role in fermentative H₂ production, [Fe-Fe] hydrogenases promise an alternative catalyst choice in fuel cells. However, in spite of their preference towards H₂ production, [Fe-Fe] hydrogenases are extremely prone to catalytic inactivation upon oxygen exposure. This is the major challenge, at the protein level, that hinders a cost-effective approach for biotechnological applications and suggests the requirement of targeted tools to investigate the inactivation process at the molecular level. The purpose of the present study was to investigate bioH₂ production in protein to community level perspective. More specifically the aims were to (1) establish an anaerobic biopanning procedure to enrich antibody binders specific against clostridial [Fe-Fe] hydrogenase protein, (2) develop and standardize a novel enrichment system, (3) implement the enrichment technique to enrich functional inoculum capable of degrading complex substrates, (4) enrich crude glycerol fermenting microbial community and finally, (5) optimize the physico-chemical factors influencing fermentative H₂ production for efficient bioprocess. In the present study, biopanning with synthetic ‘mixed’ single chain variable fragment (scFv) libraries against active and inactive clostridial [Fe-Fe] hydrogenases aided the enrichment of anti-hydrogenase antibodies. Out of ninety four (from inactive hydrogenase) and ninety two (from active hydrogenase) random clones screened, nine potential antibody clones with recognition specificity towards Clostridium acetobutylicum [Fe-Fe] hydrogenase were selected. The enriched binders also recognized [Fe-Fe] hydrogenase from C. butyricum. Based on the results from this study, it could be reasoned that the binders with generic specificity against closely related clostridial [Fe-Fe] hydrogenases can be used as novel molecular tools for quantitative monitoring [Fe-Fe] hydrogenases at the protein level. Another of-note observation was the specificity of the antibody binders towards active and inactive hydrogenases. Preliminary experiments indicated 7Ac binder (enriched against active hydrogenase) specificity towards the catalytically active [Fe-Fe] hydrogenase rather to the inactive state and 48In (enriched against inactive hydrogenase) recognized both catalytic states. These findings indicate the possibility to apply the isolated antibody clones for functional detection of clostridial [Fe-Fe] hydrogenases. The study progresses in investigating bioH₂ production in perspective of microbial community. The novel microbial enrichment system was developed and the proof-of-principle experiments conducted using artificial mixed microbial community and varied
selection criteria allowed the enrichment of the best \( H_2 \) producer. The system was implemented in enriching cellobiose degrading \( H_2 \) producer from an environmental sample. The bacterial strain isolated by spread plate technique on agar plates containing CMC was affiliated with Citrobacter sp. and named as Citrobacter sp. CMC-1. Citrobacter sp. CMC-1 utilized glucose, cellobiose and CMC and followed mixed-acid fermentation profile producing \( H_2 \) and carbon dioxide (CO\(_2\)) as gaseous metabolites and acetate, formate, lactate and ethanol as liquid metabolites. At optimized values of cultivation conditions (pH 6.0 and 34 °C) the \( H_2 \) yield was 1.82 mol-\( H_2 \)/mol-glucose. The isolate efficiently fermented monomeric hemi-cellulose sugars to \( H_2 \) (mol-\( H_2 \)/mol-substrate): Galactose, 1.18; Mannose, 1.23; Xylose, 1.22; Arabinose, 0.94 and Rhamnose, 1.01). Except for arabinose, an increase in cultivation period improved the biomass and \( H_2 \) yield (mol-\( H_2 \)/mol-substrate): Galactose, 1.68; Mannose, 1.93 and Xylose, 1.63) followed with observations of reduced formate accumulation in the medium, indicating that Citrobacter sp. CMC-1 produced \( H_2 \) from formate breakdown via the FHL complex. Microbial community pre-dominated with Clostridium spp. enriched from activated sludge fermented crude glycerol mainly to \( H_2 \), CO\(_2\), acetate, butyrate and ethanol. Optimal bioprocess conditions for the enriched inoculum were experimentally observed to be pH 6.5, 40 °C and 1g/L crude glycerol. The \( H_2 \) yield from raw glycerol at optimal cultivation conditions was 1.1 mol-\( H_2 \)/mol-glycerol consumed. At elevated crude glycerol concentrations, substrate utilization and \( H_2 \) production were limited due to the presence of impurities in the crude glycerol fraction. The bioconversion of crude glycerol to \( H_2 \) was further improved by statistical optimization of the growth medium composition. Initial screening with Plackett–Burman design identified NH\(_4\)Cl, K\(_2\)HPO\(_4\) and KH\(_2\)PO\(_4\) with individual and interactive effects on \( H_2 \) yield. Among the three identified media components, NH\(_4\)Cl and KH\(_2\)PO\(_4\) imparted the maximal significance and were optimized in scrutiny. A series of statistical models identified the optimal media composition for improved \( H_2 \) production from crude glycerol fermentations and were successful in improving the \( H_2 \) yield by 29% (1.42 mol-\( H_2 \)/mol-glycerol consumed) in comparison to previously reported value (1.1 mol-\( H_2 \)/mol-glycerol consumed).

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**Improved bioconversion of crude glycerol to hydrogen by statistical optimization of media components**

Bioconversion of crude glycerol to hydrogen has gained importance as it addresses both sustainable energy production and waste disposal issues. Until recently, statistical optimizations of crude glycerol bioconversion to hydrogen have been greatly focused on pure strains. In this study, biohydrogen production from crude glycerol by an enriched microbial culture (predominated with Clostridium species) was improved by statistical optimization of media components. Plackett-Burman
design identified MgCl$_2.6$H$_2$O and KCl with negative effect on hydrogen production and selected NH$_4$Cl, K$_2$HPO$_4$ and KH$_2$PO$_4$ as significant variables. Box-Behnken design indicated the optimal region beyond design area and studies were continued by ridge analysis. Central composite face centered design envisaged a maximal hydrogen yield of 1.41mol-H$_2$/mol-glycerol consumed at concentrations 4.40g/L and 2.27g/L for NH$_4$Cl and KH$_2$PO$_4$ respectively. Confirmation experiment with the optimized media (NH$_4$Cl, 4.40g/L; K$_2$HPO$_4$, 1.6g/L; KH$_2$PO$_4$, 2.27g/L; MgCl$_2.6$H$_2$O, 1.0g/L; KCl, 1.0g/L; Na-acetate,3H$_2$O, 1.0g/L and tryptone, 2.0g/L) revealed an excellent correlation between predicted and experimental hydrogen yield. Optimization of media components by design of experiments enhanced hydrogen yield by 29%.

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Organisations: Department of Chemistry and Bioengineering, Research group: Industrial Bioengineering and Applied Organic Chemistry, Tampere University of Technology, Department of Signal Processing, Urban circular bioeconomy (UrCirBio)
Authors: Mangayil, R., Aho, T., Karp, M., Santala, V.
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Scopus rating (2013): SJR 2.066 SNIP 2.767 CiteScore 4.63
Scopus rating (2012): SJR 1.852 SNIP 2.745 CiteScore 3.97
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Research output: Scientific - peer-review › Article
Integrated in vitro-in silico screening strategy for the discovery of antibacterial compounds

Multidrug-resistant bacterial infections are an increasing source of healthcare problems, and the research for new antibiotics is currently unable to respond to this challenge. In this work, we present a screening strategy that integrates cell-based high-throughput screening (HTS) with in silico analogue search for antimicrobial small-molecule drug discovery. We performed an HTS on a diverse chemical library by using an assay based on a bioluminescent Escherichia coli K-12 (pTetLux1) strain. The HTS yielded eight hit compounds with >50% inhibition. These hits were then used for structural similarity-based virtual screening, and of the 29 analogues selected for in vitro testing, four compounds displayed potential activity in the pTetLux1 assay. The 11 most active compounds from combined HTS and analogue search were further assessed for antimicrobial activity against clinically important strains of E. coli and Staphylococcus aureus and for in vitro cytotoxicity against human cells. Three of the compounds displayed antibacterial activity and low human cell cytotoxicity. Additionally, two compounds of the set fully inhibited S. aureus growth after 24 h, but also exhibited human cell cytotoxicity in vitro.

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Organisations: Department of Chemistry and Bioengineering, Research group: Industrial Bioengineering and Applied Organic Chemistry, Tampere University of Technology, Urban circular bioeconomy (UrCirBio), Centre for Drug Research, Division of Pharmaceutical Biosciences, Helsinki University, Division of Pharmaceutical Chemistry and Technology
Authors: Nybond, S., Ghemtio, L., Nawrot, D. A., Karp, M., Xhaard, H., Tammela, P.
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Scopus rating (2013): SJR 0.955 SNIP 0.642 CiteScore 1.04
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Scopus rating (2011): SJR 0.655 SNIP 0.517 CiteScore 0.83
Scopus rating (2010): SJR 0.951 SNIP 0.852
Scopus rating (2009): SJR 0.845 SNIP 0.728
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Research output: Scientific - peer-review › Article

Glycerol as an Efficient Medium for the Petasis Borono-Mannich Reaction

The multicomponent Petasis borono-Mannich (PBM) reaction is a useful tool for the preparation of complex molecules in a single step from boronic acids, aldehydes/ketones, and amines. Here, we describe the use of glycerol in the PBM reaction of salicylaldehydes or 2-pyridinecarbaldehyde with several boronic acids and secondary amines. From these readily available starting materials, alkylaminophenols, 2-substituted pyridines, and 2H-chromenes were prepared in reasonable to good yields. Glycerol was compared with other solvents, and in some cases, it provided the reaction product in higher yield. Crude glycerol, as generated by the biodiesel industry, was evaluated and found to be a suitable solvent for the PBM reaction, successfully expanding the potential use of this industry by-product. Based on density functional theory
(DFT) calculations and the obtained experimental results, the involvement of glycerol-derived boronic esters in the reaction mechanism is suggested to be competitive with the free boronic acid pathway. Similar Gibbs free energies for the aryl migration from the boronate species to the iminium were determined for both mechanisms.

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Organisations: Research group: Industrial Bioengineering and Applied Organic Chemistry, Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio), Univ Lisbon, Fac Farm, Inst Invest Medicamento iMed ULisboa

Authors: Rosholm, T., Gois, P. M. P., Franzen, R., R. Candeias, N.

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**Aryl end-capped quaterthiophenes applied as anode interfacial layers in inverted organic solar cells**

Four aryl end-capped quaterthiophene derivatives were synthesized and their material properties were studied by computational, spectroscopic, electrochemical, and thermoanalytical methods. Compounds were applied as interfacial layers between the bulk heterojunction active layer and Ag anode in inverted organic solar cells. Results show that p-cyanophenyl end-capped quaterthiophene with hexyl side chains increases both the short circuit current density and power conversion efficiency notably compared to reference interlayer material, tris-(8-hydroxyquinoline)aluminum. The improved cell performance was attributed to the optimal positions of the highest occupied molecular orbital and the lowest unoccupied molecular orbital (LUMO) of this material, relative to those of the photoactive electron donor poly(3-hexylthiophene) and Ag anode, and evenly distributed LUMO. In addition, the use of these materials as an anode interfacial layer increases the absorption of the solar cell, which could contribute to the formation of excitons and additional current production by the cell.

**General information**

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Organisations: Department of Chemistry and Bioengineering, Research group: Supramolecular photochemistry, Frontier Photonics, University of Oulu, Department of Chemistry and Mathematics, Faculty of Petroleum and Mining Engineering, Suez University


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Chemolithotrophic denitrification is an inexpensive and advantageous process for nitrate removal and represents a promising alternative to classical denitrification with organics. Chemolithotrophic denitrifiers are microorganisms able to reduce nitrate and nitrite using inorganic compounds as source of energy. Ferrous iron, sulfur-reduced compounds (e.g. hydrogen sulfide, elemental sulfur and thiosulfate), hydrogen gas, pyrite and arsenite have been used as inorganic electron donors resulting in diverse outcomes. In the last 40 years, a large number of engineered systems have been used to maintain chemolithotrophic denitrification and improve rate and efficiency of the process. Among them, biofilm reactors proved to be robust and high-performing technologies. Packed bed reactors are particularly suitable for the removal of low nitrate concentrations, since high retention times are required to complete denitrification. Fluidized bed and membrane biofilm reactors result in the highest denitrification rates (>20kg N-NO$_3^{-}$/m$^3$/d) when hydrogen gas and sulfur reduced compounds are used as electron donors. Hydrogen gas pressure and current intensity rule the performance of membrane biofilm and biofilm electrode reactors, respectively. Biofouling is the most common and detrimental issue in biofilm reactors. Bed fluidization and hydrogen supply limitation are convenient and effective solutions to mitigate biofouling.

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Organisations: Tampere University of Technology, Department of Chemistry and Bioengineering, Research group: Industrial Bioengineering and Applied Organic Chemistry, Urban circular bioeconomy (UrCirBio), Department of Civil and Mechanical Engineering, University of Cassino and Southern Lazio

Authors: Di Capua, F., Papirio, S., Lens, P. N. L., Esposito, G.

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Publication date: 2015

Peer-reviewed: Yes

Early online date: 15 Jun 2015
Combination of a novel electrode material and artificial mediators to enhance power generation in an MFC

This study focuses on two main aspects: developing a novel cost-effective electrode material and power production from domestic wastewater using three different mediators. Methylene blue (MB), neutral red (NR) and 2-hydroxy-1,4-naphthoquinone (HNQ) were selected as electrode mediators with different concentrations. A tin-coated copper mesh electrode was tested as anode electrode. Maximum power density of the microbial fuel cell (MFC) with 300 μM MB was 636 mW/m². Optimal mediator concentrations with respect to the achieved maximum power output for MB, NR and HNQ were 300 μM, 200 μM and 50 μM, respectively. The results demonstrate that tin-coated copper mesh showed a higher biocompatibility and electrical conductivity.
Metals removal and recovery in bioelectrochemical systems: A review

Metal laden wastes and contamination pose a threat to ecosystem well being and human health. Metal containing waste streams are also a valuable resource for recovery of precious and scarce elements. Although biological methods are inexpensive and effective for treating metal wastewaters and in situ bioremediation of metal(loid) contamination, little progress has been made towards metal(loid) recovery. Bioelectrochemical systems are emerging as a new technology platform for removal and recovery of metal ions from metallurgical wastes, process streams and wastewaters. Biodegradation of organic matter by electroactive biofilms at the anode has been successfully coupled to cathodic reduction of metal ions. Until now, leaching of Co(II) from LiCoO$_2$ particles, and removal of metal ions i.e. Co(III/II), Cr(VI), Hg(II), Ag(I), Se(IV), and Cd(II) from aqueous solutions has been demonstrated. This article reviews the state of art research of bioelectrochemical systems for removal and recovery of metal(loid) ions and pertaining removal mechanisms.

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Authors: Nancharaiah, Y. V., Venkata Mohan, S., Lens, P.
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Method with high-throughput screening potential for antioxidative substances using Escherichia coli biosensor katG'::lux

A new method is described for the rapid real-time screening of antioxidative properties using a recombinant Escherichia coli DPD2511 biosensor. This microplate technique, without time-consuming pre-incubations and handling, has potential for a high-throughput search of bioactive compounds. Special emphasis was given to obtaining highly reliable and repeatable results.

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Organisations: Research group: Industrial Bioengineering and Applied Organic Chemistry, Department of Chemistry and Bioengineering, Tampere University of Technology, Urban circular bioeconomy (UrCirBio), Natural Resources Institute Finland (Luke), Parkano Research Unit
Authors: Tienaho, J., Sarjala, T., Franzén, R., Karp, M.
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Scopus rating (2013): SJR 0.917 SNIP 1.019 CiteScore 2.5
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Pt-functionalized Fe2O3 photoanodes for solar water splitting: the role of hematite nano-organization and the platinum redox state

Pt-alpha-Fe2O3 nanocomposites were synthesized on fluorine-doped tin oxide (FTO) substrates by a sequential plasma enhanced-chemical vapor deposition (PE-CVD)/radio frequency (RF) sputtering approach, tailoring the overall Pt content as a function of sputtering time. The chemico-physical properties of the as-prepared systems were extensively investigated by means of complementary techniques, including X-ray diffraction (XRD), X-ray photoelectron spectroscopy (XPS), field emission-scanning electron microscopy (FE-SEM), energy dispersive X-ray spectroscopy (EDXS), secondary ion mass spectrometry (SIMS), and optical absorption spectroscopy, and compared to those of the homologous Pt-alpha-Fe2O3 systems annealed in air prior and/or after sputtering. The obtained results evidenced that the material compositional, structural and morphological features, with particular regard to the Pt oxidation state and hematite nano-organization, could be finely tailored as a function of the adopted processing conditions. Pt-alpha-Fe2O3 systems were finally tested as photoanodes in photoelectrochemical (PEC) water splitting experiments, evidencing a remarkable interplay between functional performances and the above-mentioned material properties, as also testified by transient absorption spectroscopy (TAS) results.

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Scopus rating (2013): SJR 1.715 SNIP 1.216 CiteScore 4.05
Scopus rating (2012): SJR 1.916 SNIP 1.184 CiteScore 3.67
Vapor phase processing of α-Fe2O3 photoelectrodes for water splitting: An insight into the structure/property interplay

Harvesting radiant energy to trigger water photolysis and produce clean hydrogen is receiving increasing attention in the search of alternative energy resources. In this regard, hematite (alpha-Fe2O3) nanostructures with controlled nano-organization have been fabricated and investigated for use as anodes in photoelectrochemical (PEC) cells. The target systems have been grown on conductive substrates by plasma enhanced-chemical vapor deposition (PE-CVD) and subjected to eventual ex situ annealing in air to further tailor their structure and properties. A detailed multitechnique approach has enabled to elucidate between system characteristics and the generated photocurrent. The present alpha-Fe2O3 systems are characterized by a high purity and hierarchical morphologies consisting of nanopyramids/organized dendrites, offering a high contact area with the electrolyte. PEC data reveal a dramatic response enhancement upon thermal treatment, related to a more efficient electron transfer. The reasons underlying such a phenomenon are elucidated and discussed by transient absorption spectroscopy (TAS) studies of photogenerated charge carrier kinetics, investigated on different time scales for the first time on PE-CVD Fe2O3 nanostructures.
Rationally engineered synthetic coculture for improved biomass and product formation

In microbial ecosystems, bacteria are dependent on dynamic interspecific interactions related to carbon and energy flow. Substrates and end-metabolites are rapidly converted to other compounds, which protects the community from high concentrations of inhibitory molecules. In biotechnological applications, pure cultures are preferred because of the more straight-forward metabolic engineering and bioprocess control. However, the accumulation of unwanted side products can limit the cell growth and process efficiency. In this study, a rationally engineered coculture with a carbon channeling system was constructed using two well-characterized model strains Escherichia coli K12 and Acinetobacter baylyi ADP1. The directed carbon flow resulted in efficient acetate removal, and the coculture showed symbiotic nature in terms of substrate utilization and growth. Recombinant protein production was used as a proof-of-principle example to demonstrate the coculture utility and the effects on product formation. As a result, the biomass and recombinant protein titers of E. coli were enhanced in both minimal and rich medium simple batch cocultures. Finally, harnessing both the strains to the production resulted in enhanced recombinant protein titers. The study demonstrates the potential of rationally engineered cocultures for synthetic biology applications.
Biohydrogen production in extreme conditions: A comprehensive study of the fermentative metabolism of a polyextremophilic bacterium

Dark fermentation is a potential carbon neutral process that exploits fermentative microorganisms to convert renewable organic substrates (e.g. lignocellulosic biomass and wastes) to H2, a non-fuel commodity and an ideal and clean energy carrier for replacing fossil fuels in the future. In the quest for developing a robust and efficient dark fermentative process for H2 production at industrial scale, the organism(s) selected to carry out the bioconversion is crucial. Thermophilic anaerobic bacteria have been drawing attention because they come close to meet the features that an ideal H2-producing organism should possess, including efficient breakdown and conversion of complex organic substrates to H2. In this study, a novel microorganism, Caloramator celer (former Thermobrachium celere), was evaluated for its potential to produce H2 from organic substrates. C. celer is a strict anaerobic, alkalitolerant, thermophilic bacterium capable of converting glucose to H2, CO2, acetate, ethanol and formate by mixed acid fermentation. In addition, C. celer shows remarkable features such as an extremely elevated growth rates (doubling time of 10 minutes) and the ability to grow in extreme conditions (Topt= 67 °C; pH67°Copt= 8.2). For these reasons C. celer may be of industrial interest for the conversion of organic waste material to H2 in an open (non-sterile) bioprocess system. However, for a biotechnological exploitation of this bacterium for H2 production it is crucial to understand the factors that regulate carbon and electron flux and therefore the final distribution of metabolites to channel the metabolic flux towards the desired product. The general goal of this study is to investigate the fermentative and energy metabolism of C. celer in order to understand how factors pertaining to the fermentation process can alter the metabolic fluxes. This is achieved by determining the relationship between fermentation conditions, physiological state, genome content, gene expression, metabolic fluxes and end-product yields through the combination of multiple methodologies such as conventional one-factor-at-a-time optimization, batch fermentations, comparative and functional genomics, transcription analysis and metabolic flux analysis. The final goal is to identify the optimal process conditions and metabolic state that maximize the H2 production from C. celer. In this study, glucose fermentation of C. celer was characterized in controlled and non-controlled cultivations and the effect of several parameters on growth and fermentation of C. celer was investigated to identify the optimal conditions for H2 production. In addition, the inhibitory effect of high concentrations of substrate and soluble end-products on growth and H2 production was studied to assess the robustness of C. celer. The whole-genome sequence provided valuable information for interpretation of experimental results and for directing experimental design. Genomic data were employed to design transcriptional analysis, construct a stoichiometric model employed in metabolic flux analysis (MFA), and infer the metabolic network and possible regulatory mechanisms that dictate metabolic fluxes. End-product synthesis profiles, and consequently H2 production, changed in response to several modifications of the culture conditions namely growth rate, iron content in the medium, substrate availability and nutrient content, presence of soluble metabolites, pH and H2 concentration. The distribution of the fluxes at key metabolic nodes was found to be a function of thermodynamics as well as several physiological factors including genome content, growth and glycolytic rate, need for maintaining intracellular redox and pH homeostasis and only to some extent control of gene expression. The synthesis of formate and ethanol, two products of the branched metabolism of C. celer, was found to compete with H2-evolving reactions for the disposal of reducing equivalents. Ethanol and formate production served as an alternative to H2 production for regulating the redox state when hydrogenases were inhibited. Moreover, formate synthesis was strictly linked to the growth rate suggesting its possible role in anaerobic metabolism. Low growth rates, low substrate availability and nutrient content, high iron availability, presence of subinhibitory concentration of acetate and ethanol, slightly acidic pH and low H2 concentrations minimized the redirection of carbon and electron flow to ethanol and formate synthesis and thus favored efficient H2 production. Kinetics of growth and H2 production were inhibited, albeit to different degrees, by high concentration of substrate and soluble end-products, whereas H2 yields remained marginally affected even in presence of considerable concentration of inhibitors. Acetate, the main soluble metabolite of the fermentation, inhibited H2 productivity due to the increasing ionic strength in the medium, rather than the uncoupling effect of the undissociated form. The critical substrate and salt concentration estimated for C. celer suggests that this organism is not particularly osmotolerant. In conclusion, this study provides valuable information on the capabilities of C. celer to efficiently produce H2 as well as on its limitations through a comprehensive investigation of its fermentative and energy metabolism. C. celer showed a great metabolic flexibility that allows redistribution of fluxes at key metabolic nodes to simultaneously control redox state and efficiently harvest energy from substrate even under unfavorable conditions. Understanding how fermentation conditions control the metabolic fluxes contributes to expand the knowledge of the thermophilic dark fermentative H2 production process.
Bioprocessing of enhanced cellulase production from a mutant of Trichoderma asperellum RCK2011 and its application in hydrolysis of cellulose

A mutant strain of Trichoderma asperellum RCK2011 was developed through UV-irradiation for enhanced cellulase production and lower catabolite repression. The production of FPase, CMCase and β-glucosidase was optimized under solid state fermentation; up to 20 mM of glucose did not inhibit cellulase production. The mutant strain T. asperellum SR1-7 produced FPase (2.2 IU/gds), CMCase (13.2 IU/gds), and β-glucosidase (9.2 IU/gds) under optimized conditions, which is, 1.4, 1.3, 1.5-fold higher than the wild type. The wild as well as mutant strain produced the cellulases at pH range, 4.0-10.0. Saccharification of pretreated corn cob, wheat straw, and sugarcane bagasse by cellulase from mutant strain SR1-7 resulted in release of reducing sugar at the rate of 530.0 mg/g, 290.0 mg/g, and 335.0 mg/g of substrate, respectively; this is 1.6-fold higher than the wild type strain. © 2014 Published by Elsevier Ltd.
Inhibitory effects of substrate and soluble end products on biohydrogen production of the alkalithermophile Caloramator celer: Kinetic, metabolic and transcription analyses

In this study the tolerance of the alkalithermophile Caloramator celer towards substrate (glucose) and soluble end product (acetate, formate and ethanol) inhibition was assessed employing nonlinear inhibition models. In addition, the effects of subinhibitory concentrations of end products on fermentative metabolism and regulation of 12 key genes involved in pyruvate catabolism were studied. Optimal growth and H2 production were found at 50 mM of glucose and the critical substrate concentration was observed at 290-360 mM. Two inhibition models revealed that ethanol had a higher inhibitory effect on growth rate, whereas H2 production kinetics was more sensitive towards increasing concentrations of acetate and formate. Acetate, the main soluble metabolite of the fermentation, inhibited the H2 production by increasing the ionic strength in the medium. Subinhibitory concentrations of soluble end products induced changes in the metabolite profile of C. celer, specifically exogenous acetate (80 mM) and ethanol (40 mM) slightly increased the H2 yield by 4 and 7%, respectively. However, despite the observed metabolic shifts, gene regulation was minimal and not always in agreement with the measured product yields. Overall, the results suggest that further optimization of the H2 production process from C. celer should focus on methods to evolve adapted osmotolerant strains and/or remove soluble metabolites, especially acetate, from the culture. Copyright © 2014, Hydrogen Energy Publications, LLC. Published by Elsevier Ltd. All rights reserved.

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Assessment of metabolic flux distribution in the thermophilic hydrogen producer Caloramator celer as affected by external pH and hydrogen partial pressure

Background: Caloramator celer is a strict anaerobic, alkali tolerant, thermophilic bacterium capable of converting glucose to hydrogen (H₂), carbon dioxide, acetate, ethanol and formate by a mixed acid fermentation. Depending on the growth conditions C. celer can produce H₂ at high yields. For a biotechnological exploitation of this bacterium for H₂ production it is crucial to understand the factors that regulate carbon and electron fluxes and therefore the final distribution of metabolites to channel the metabolic flux towards the desired product. Results: Combining experimental results from batch fermentations with genome analysis, reconstruction of central carbon metabolism and metabolic flux analysis (MFA), this study shed light on glucose catabolism of the thermophilic alkali tolerant bacterium C. celer. Two innate factors pertaining to culture conditions have been identified to significantly affect the metabolic flux distribution: culture pH and partial pressures of H₂ (P_{H₂}). Overall, at alkaline to neutral pH the rate of biomass synthesis was maximized, whereas at acidic pH the lower growth rate and the less efficient biomass formation are accompanied with more efficient energy recovery from the substrate indicating high cell maintenance possibly to sustain intracellular pH homeostasis. Higher H₂ yields were associated with fermentation at acidic pH as a consequence of the lower synthesis of other reduced by-products such as formate and ethanol. In contrast, P_{H₂} did not affect the growth of C. celer on glucose. At high P_{H₂} the cellular redox state was balanced by rerouting the flow of carbon and electrons to ethanol and formate production allowing unaltered glycolytic flux and growth rate, but resulting in a decreased H₂ synthesis. Conclusion: C. celer possesses a flexible fermentative metabolism that allows redistribution of fluxes at key metabolic nodes to simultaneously control redox state and efficiently harvest energy from substrate even under unfavorable conditions (i.e. low pH and high P_{H₂}). With the H₂ production in mind, acidic pH and low P_{H₂} should be preferred for a high yield-oriented process, while a high productivity-oriented process can be achieved at alkaline pH and high P_{H₂}. © 2014 Ciranna et al.; licensee BioMed Central Ltd.
Rewiring the wax ester production pathway of acinetobacter baylyi ADP1

Wax esters are industrially relevant high-value molecules. For sustainable production of wax esters, bacterial cell factories are suggested to replace the chemical processes exploiting expensive starting materials. However, it is well recognized that new sophisticated solutions employing synthetic biology toolbox are required to improve and tune the cellular production platform to meet the product requirements. For example, saturated wax esters with alkanol chain lengths C12 or C14 that are convenient for industrial uses are rare among bacteria. Acinetobacter baylyi ADP1, a natural producer of wax esters, is a convenient model organism for studying the potentiality and modifiability of wax esters in a natural host by means of synthetic biology. In order to establish a controllable production platform exploiting well-characterized biocomponents, and to modify the wax ester synthesis pathway of A. baylyi ADP1 in terms product quality, a fatty acid reductase complex LuxCDE with an inducible arabinose promoter was employed to replace the natural fatty acyl-CoA reductase acr1 in ADP1. The engineered strain was able to produce wax esters by the introduced synthetic pathway. Moreover, the fatty alkanol chain length profile of wax esters was found to shift toward shorter and more saturated carbon chains, C16:0 accounting for most of the alkanols. The study demonstrates the potentiality of recirculating a biosynthesis pathway in a natural producer, enabling a regulated production of a customized bioproduct. Furthermore, the LuxCDE complex can be potentially used as a well-characterized biopart in a variety of synthetic biology applications involving the production of long-chain hydrocarbons. © 2014 American Chemical Society.
Application of Computational Methods for Fermentative Hydrogen Production

Energy and environment are inseparable, since the production and use of energy always affects the environment. Current energy production relies on nonrenewable energy sources such as oil, coal and natural gas. However, the continuous production of energy from limited resources is not sustainable. This creates an urgent need to develop new methods for the production of energy from renewable sources. One possible solution is fermentative hydrogen (H₂) production. H₂ is seen as a future energy carrier. Fermentative H₂ production has many environmental advantages such as ability to use wastes as the source of energy and possibility to apply ambient temperature and pressure. Drawbacks are rather low yields and slow H₂ production rates. In order to overcome these issues vast amount of research has been conducted.

Under anaerobic conditions, various anaerobic and facultatively anaerobic bacteria utilize organic compounds by fermentation and excrete H₂ as a byproduct. In the nature, bacteria exist as mixed cultures. With appropriate pretreatments and culture conditions, H₂ producing bacteria can be enriched. Microscopy can be used for visual examination of bacterial communities, which can reveal their diversity and dominant bacterial species. Additionally wide range of fluorescent staining methods can be employed in the microscopic analysis of bacterial groups. The manual analysis of the microscopy images is user dependent and laborious. Moreover, the visual quantification of fluorescence intensities and morphological features is impossible. Therefore, automated image analysis methods were developed, e.g., for monitoring culture compositions in the H₂ producing bioreactors. The highest H₂ production rates have been achieved with undefined mixed cultures, where the role of each bacterium to H₂ production is not exactly known. In this work, the properties of Escherichia coli and Clostridium butyricum that often coexists in mixed bacterial cultures are described. Additionally the effect of coculture of E. coli and C. butyricum was investigated and found to enhance the utilization of the given substrate. Moreover, the effects of growth conditions and possibilities of genetic modification to H₂ production by E. coli and C. butyricum are presented. The biological approach to the design of experiments often relies on intuition. However, with computational methods higher understanding over fermentative H₂ production can be achieved.

Computational methods in this work mostly focus on the modeling of bacterial metabolism and some emphasis is also given to the systematic design of experiments. Metabolic models are interaction based presentations of reactions occurring within metabolic pathways, in which the knowledge of molecules and enzymes taking part to reactions is combined. The largest metabolic models are based on the complete genome of bacteria. Metabolic models can be used to help in designing mutations and cultivation conditions to enhance bioprocesses. Various approaches, such as flux balance analysis, can be used to simulate and analyze metabolic models. Here, the existing genome-scale metabolic model is utilized with flux balance analysis for analysis and enhancement of fermentative H₂ production. Increasing amount of knowledge and the need to make the processes as efficient as possible has made the utilization of computational tools inevitable. Therefore, cooperation between experts with biological and computational skills is encouraged. Commonly, the aid of a computational expert is requested when data mining from an overwhelming amount of existing measurements is needed. Actually, the cooperation should start from experimental design to gain most information over the system by
applying statistical design-of-experiment methods. This thesis gives an overview of computational methods applied to fermentative H₂ production and describes the use of genome-scale metabolic models to experimental design, analysis and modeling.

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Awarding institution: Tampere University of Technology
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Source-ID: 1478
Research output: Collection of articles › Doctoral Thesis

A geographical information system (GIS) based methodology for determination of potential biomasses and sites for biogas plants in southern Finland

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Höhn, J., Lehtonen, E., Rasi, S., Rintala, J.
Number of pages: 10
Pages: 1-10
Publication date: 2014
Peer-reviewed: Yes

Publication information
Journal: Applied Energy
Volume: 113
ISSN (Print): 0306-2619
Ratings:
Scopus rating (2016): SJR 3.058 SNIP 2.573 CiteScore 7.78
Scopus rating (2015): SJR 2.912 SNIP 2.61 CiteScore 6.4
Scopus rating (2014): SJR 3.254 SNIP 3.28 CiteScore 6.93
Scopus rating (2013): SJR 3.164 SNIP 3.377 CiteScore 6.59
Scopus rating (2012): SJR 2.854 SNIP 3.108 CiteScore 5.69
Scopus rating (2011): SJR 2.473 SNIP 2.84 CiteScore 5.5
Scopus rating (2010): SJR 1.516 SNIP 2.25
Scopus rating (2009): SJR 1.003 SNIP 1.781
Scopus rating (2008): SJR 0.974 SNIP 1.215
Scopus rating (2007): SJR 1.179 SNIP 1.709
Scopus rating (2006): SJR 0.979 SNIP 1.293
Bacterial and chemical leaching of chalcopyrite concentrates as affected by the redox potential and ferric/ferrous iron ratio at 22°C

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Bevilaqua, D., Lahti-Tommila, H., Garcia Jr., O., Puhakka, J. A., Tuovinen, O. H.
Number of pages: 7
Pages: 1-7
Publication date: 2014
Peer-reviewed: Yes

Publication information
Journal: International Journal of Mineral Processing
Volume: 132
ISSN (Print): 0301-7516
Ratings:
Scopus rating (2016): SJR 0.795 SNIP 1.518 CiteScore 2.03
Scopus rating (2015): SJR 0.811 SNIP 1.578 CiteScore 1.78
Scopus rating (2014): SJR 0.896 SNIP 1.847 CiteScore 1.8
Scopus rating (2013): SJR 1.145 SNIP 2.272 CiteScore 2.02
Scopus rating (2012): SJR 0.939 SNIP 2.104 CiteScore 1.8
Scopus rating (2011): SJR 0.888 SNIP 1.875 CiteScore 1.74
Scopus rating (2010): SJR 0.936 SNIP 1.348
Scopus rating (2009): SJR 1.066 SNIP 1.856
Scopus rating (2008): SJR 0.769 SNIP 1.395
Scopus rating (2007): SJR 0.822 SNIP 1.18
Scopus rating (2006): SJR 0.926 SNIP 1.384
Scopus rating (2005): SJR 1.14 SNIP 1.693
Scopus rating (2004): SJR 0.738 SNIP 1.736
Scopus rating (2003): SJR 1.203 SNIP 2.233
Scopus rating (2002): SJR 0.7 SNIP 1.418
Scopus rating (2001): SJR 0.545 SNIP 1.182
Scopus rating (2000): SJR 0.447 SNIP 1.175
Scopus rating (1999): SJR 0.831 SNIP 1.188
Original language: English
DOIs:
10.1016/j.minpro.2014.08.008

Bibliographical note
Contribution: organisation=keb,FACT1=1<br/>Portfolio EDEND: 2014-02-15
Source: researchoutputwizard
Source-ID: 488
Research output: Scientific › peer-review › Article
Biosensors, Antibiotics and Food

**General information**
State: Published
Ministry of Education publication type: A3 Part of a book or another research book
Organisations: Department of Chemistry and Bioengineering, Research group: Industrial Bioengineering and Applied Organic Chemistry, Urban circular bioeconomy (UrCirBio)
Authors: Virolainen, N., Karp, M.
Number of pages: 33
Pages: 153-185
Publication date: 2014

**Host publication information**
Title of host publication: Bioluminescence: Fundamentals and Applications in Biotechnology - Volume 2
Publisher: Springer
Editors: Thouand, G., Marks, R.
ISBN (Print): 978-3-662-43618-9
ISBN (Electronic): 978-3-662-43619-6

**Publication series**
Name: Advances in biochemical engineering : biotechnology
Publisher: Springer
Volume: 145
ISSN (Print): 0724-6145
ISSN (Electronic): 1616-8542
DOIs:
10.1007/978-3-662-43619-6_5

**Bibliographical note**
Contribution: organisation=keb,FACT1=1<br/>Portfolio EDEND: 2014-11-28
Source: researchoutputwizard
Source-ID: 1751
Research output: Scientific - peer-review › Chapter

Dark fermentative hydrogen production from lignocellulosic hydrolyzates - A review

**General information**
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Nissilä, M. E., Lay, C., Puhakka, J. A.
Number of pages: 15
Pages: 145-159
Publication date: 2014
Peer-reviewed: Yes

**Publication information**
Journal: Biomass & Bioenergy
Volume: 67
ISSN (Print): 0961-9534
Ratings:
Scopus rating (2016): SJR 1.188 SNIP 1.368 CiteScore 3.71
Scopus rating (2015): SJR 1.521 SNIP 1.615 CiteScore 4.03
Scopus rating (2014): SJR 1.888 SNIP 1.985 CiteScore 4.36
Scopus rating (2013): SJR 1.678 SNIP 1.823 CiteScore 4.42
Scopus rating (2012): SJR 1.545 SNIP 1.743 CiteScore 3.66
Scopus rating (2011): SJR 1.793 SNIP 2.283 CiteScore 4.74
Scopus rating (2010): SJR 1.931 SNIP 2.254
Scopus rating (2009): SJR 1.743 SNIP 2.187
Effect of arsenic on nitrification of simulated mining water

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Papirio, S., Zou, G., Ylinen, A., Di Capua, F., Pirozzi, F., Puhakka, J.
Number of pages: 6
Pages: 149-154
Publication date: 2014
Peer-reviewed: Yes

Publication information
Journal: Bioresource Technology
Volume: 164
ISSN (Print): 0960-8524
Ratings:
Scopus rating (2016): SJR 2.191 SNIP 1.91 CiteScore 5.94
Scopus rating (2015): SJR 2.255 SNIP 1.908 CiteScore 5.47
Scopus rating (2014): SJR 2.41 SNIP 2.104 CiteScore 5.3
Scopus rating (2013): SJR 2.412 SNIP 2.503 CiteScore 5.97
Scopus rating (2012): SJR 2.389 SNIP 2.465 CiteScore 5.25
Scopus rating (2011): SJR 2.314 SNIP 2.508 CiteScore 5.56
Scopus rating (2010): SJR 2.086 SNIP 2.355
Scopus rating (2009): SJR 1.912 SNIP 2.231
Scopus rating (2008): SJR 1.734 SNIP 2.732
Scopus rating (2007): SJR 1.529 SNIP 2.423
Scopus rating (2006): SJR 1.315 SNIP 1.98
Scopus rating (2005): SJR 1.269 SNIP 2.006
Scopus rating (2004): SJR 1.197 SNIP 1.659
Scopus rating (2003): SJR 0.948 SNIP 1.639
Scopus rating (2002): SJR 0.882 SNIP 1.3
Scopus rating (2001): SJR 0.541 SNIP 1.208
Scopus rating (2000): SJR 0.464 SNIP 1.049
Scopus rating (1999): SJR 0.669 SNIP 1.061
Original language: English
DOIs:
10.1016/j.biortech.2014.04.072
Fluidized-bed denitrification for mine waters. Part II: effects of Ni and Co

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Zou, G., Papirio, S., Ylinen, A., Di Capua, F., Lakaniemi, A., Puhakka, J.
Number of pages: 7
Pages: 417-423
Publication date: 2014
Peer-reviewed: Yes

Publication information
Journal: BIODEGRADATION
Volume: 25
ISSN (Print): 0923-9820
Ratings:
Scopus rating (2016): SJR 0.804 SNIP 1.069 CiteScore 2.41
Scopus rating (2015): SJR 0.888 SNIP 1.055 CiteScore 2.37
Scopus rating (2014): SJR 0.968 SNIP 1.195 CiteScore 2.42
Scopus rating (2013): SJR 1.103 SNIP 1.435 CiteScore 2.63
Scopus rating (2012): SJR 1.113 SNIP 1.213 CiteScore 2.22
Scopus rating (2011): SJR 1.052 SNIP 1.102 CiteScore 2.31
Scopus rating (2010): SJR 1.096 SNIP 0.991
Scopus rating (2009): SJR 1.009 SNIP 1.208
Scopus rating (2008): SJR 0.961 SNIP 1.193
Scopus rating (2007): SJR 0.874 SNIP 1.107
Scopus rating (2006): SJR 0.984 SNIP 1.105
Scopus rating (2005): SJR 0.805 SNIP 0.953
Scopus rating (2004): SJR 0.87 SNIP 0.765
Scopus rating (2003): SJR 0.738 SNIP 0.854
Scopus rating (2002): SJR 0.815 SNIP 0.686
Scopus rating (2001): SJR 0.651 SNIP 0.954
Scopus rating (2000): SJR 0.688 SNIP 0.81
Scopus rating (1999): SJR 0.87 SNIP 0.676
Original language: English
DOIs:
10.1007/s10532-013-9670-1

Fluorescent protein-based FRET sensor for intracellular monitoring of redox status in bacteria at single cell level
Monitoring of intracellular redox status in a bacterial cell provides vital information about the physiological status of the cell, which can be exploited in several applications such as metabolic engineering and computational modeling. Fluorescent protein-based genetically encoded sensors can be used to monitor intracellular oxidation/reduction status. This study reports the development of a redox sensor for intracellular measurements using fluorescent protein pairs and the phenomenon of Förster resonance energy transfer (FRET). For the development of the sensor, fluorescent proteins Citrine and Cerulean were genetically modified to carry reactive cysteine residues on the protein surface close to the chromophore and a constructed FRET pair was fused using a biotinylation domain as a linker. In oxidized state, the FRET pairs are in close proximity by labile disulfide bond formation resulting in higher FRET efficiency. In reducing environment,
the FRET is diminished due to the increased distance between FRET pairs providing large dynamic measurement range to the sensor. Intracellular studies in Escherichia coli mutants revealed the capability of the sensor in detecting real-time redox variations at single cell level. The results were validated by intensity based and time resolved measurements. The functional immobilization of the fluorescent protein-based FRET sensor at solid surfaces for in vitro applications was also demonstrated. [Figure not available: see fulltext.]

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Research group: Industrial Bioengineering and Applied Organic Chemistry, Tampere University of Technology, Research group: Supramolecular photochemistry, Frontier Photonics, Urban circular bioeconomy (UrCirBio)
Authors: Abraham, B. G., Santala, V., Tkachenko, N. V., Karp, M.
Number of pages: 10
Pages: 7195-7204
Publication date: 2014
Peer-reviewed: Yes

Publication information
Journal: Analytical and Bioanalytical Chemistry
Volume: 406
Issue number: 28
ISSN (Print): 1618-2642
Ratings:
Scopus rating (2016): CiteScore 3.03 SJR 0.943 SNIP 1.039
Scopus rating (2015): SJR 1.064 SNIP 1.083 CiteScore 3.07
Scopus rating (2014): SJR 1.126 SNIP 1.222 CiteScore 3.26
Scopus rating (2013): SJR 1.229 SNIP 1.282 CiteScore 3.55
Scopus rating (2012): SJR 1.347 SNIP 1.282 CiteScore 3.51
Scopus rating (2011): SJR 1.363 SNIP 1.275 CiteScore 3.47
Scopus rating (2010): SJR 1.354 SNIP 1.236
Scopus rating (2009): SJR 1.272 SNIP 1.237
Scopus rating (2008): SJR 1.144 SNIP 1.076
Scopus rating (2007): SJR 1.08 SNIP 1.096
Scopus rating (2006): SJR 0.981 SNIP 1.051
Scopus rating (2005): SJR 0.963 SNIP 1.134
Scopus rating (2004): SJR 0.88 SNIP 0.968
Scopus rating (2003): SJR 0.782 SNIP 1.155
Scopus rating (2002): SJR 0.699 SNIP 0.818
Scopus rating (1999): SJR 0.715 SNIP 1.007
Original language: English
DOIs: 10.1007/s00216-014-8165-1
Links: http://www.scopus.com/inward/record.url?scp=84919725200&partnerID=8YFLLogxK (Link to publication in Scopus)

Bibliographical note
Published online: 16 September 2014
Contribution: organisation=keb,FACT1=1
Portfolio EDEND: 2014-09-22
Publisher name: Springer; Fachgruppe Analytische Chemie
Source: researchoutputwizard
Source-ID: 336
Research output: Scientific · peer-review › Article

In vitro bioluminescence used as a method for real-time inhibition zone testing for antibiotic-releasing composites
Aims: This study describes the potential of real-time bioluminescence imaging in evaluating the antibiotic efficiency of two cylinder-shaped bioabsorbable antibiotic-releasing composites by in vitro inhibition zone tests. The bacterial infections of bone tissue can cause extensive hard and soft tissue damage and decrease the efficiency of oral antibiotic therapy due to the poor blood circulation in the infected area. To overcome this problem, new, locally antibiotic-releasing biodegradable composites have been developed. Study Design & Methodology: The two composites evaluated in this study were composed of poly(L-lactide-co-ε-caprolactone) matrix, β-tricalcium phosphate ceramic and either ciprofloxacin or rifampicin antibiotic. The composites were tested with genetically modified model pathogens of osteomyelitis (Pseudomonas aeruginosa and Staphylococcus epidermidis) in vitro in inhibition zone tests using a method of real-time
bioluminescence. Results: The first signs of the effect of the released ciprofloxacin or rifampicin became visible after four hours of incubation and were seen as changed bioluminescence around the composite pellet on a culture dish. Both of the composite types showed excellent effects against the sensor bacteria within the diffusion area. Bioluminescence measurements suggested that no survivor bacteria capable of evolving resistant strains were left inside the inhibition zones. The S. epidermidis bacterial strain was an inhibition sensor and P. aeruginosa was a stress sensor. Conclusion: These results highlight the potential of the composite materials against the pathogens of osteomyelitis. The approach allows continuous visual inspection of the efficacy of the antibiotics against the bacteria.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Electronics and Communications Engineering, Department of Chemistry and Bioengineering
Authors: Männistö, N. M., Ahola, N., Karp, M. T., Veiranto, M., Kellomäki, M.
Number of pages: 20
Pages: 235-254
Publication date: 2014
Peer-reviewed: Yes

Publication information
Journal: British Microbiology Research Journal
Volume: 4
Issue number: 2
ISSN (Print): 2231-0886
Original language: English
Electronic versions:
mannisto_in_vitro_bioluminescence_used_as_a_method.pdf
DOIs:
10.9734/BMRJ/2014/6661
Links:
http://urn.fi/URN:NBN:fi:tty-201401301069

Bibliographical note
Contribution: organisation=keb,FACT1=0.5<br/>
Contribution: organisation=elt,FACT2=0.5<br/>
Portfolio EDEND: 2014-02-15<br/>
Publisher name: Sciencedomain International
Source: researchoutputwizard
Source-ID: 1026
Research output: Scientific - peer-review › Article

Lamella dissolved air flotation treatment of fish farming effluents as a part of an integrated farming and effluent treatment concept

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Authors: Jokela, P., Lepistö, R.
Number of pages: 7
Pages: 2727-2733
Publication date: 2014
Peer-reviewed: Yes

Publication information
Journal: Environmental Technology
Volume: 35
Issue number: 21
ISSN (Print): 0959-3330
Ratings:
Scopus rating (2016): CiteScore 1.6 SJR 0.528 SNIP 0.747
Scopus rating (2015): SJR 0.633 SNIP 0.772 CiteScore 1.63
Scopus rating (2014): SJR 0.618 SNIP 0.781 CiteScore 1.39
Scopus rating (2013): SJR 0.488 SNIP 0.672 CiteScore 1.3
Scopus rating (2012): SJR 0.645 SNIP 0.877 CiteScore 1.47
Scopus rating (2011): SJR 0.597 SNIP 0.691 CiteScore 1.35
Mesophilic and thermophilic anaerobic laboratory-scale digestion of Nannochloropsis microalga residues

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Kinnunen, H., Koskinen, P., Rintala, J.
Number of pages: 9
Pages: 314-322
Publication date: 2014
Peer-reviewed: Yes

Publication information
Journal: Bioresource Technology
Volume: 155
ISSN (Print): 0960-8524
Ratings:
Scopus rating (2016): SJR 2.191 SNIP 1.91 CiteScore 5.94
Scopus rating (2015): SJR 2.255 SNIP 1.908 CiteScore 5.47
Scopus rating (2014): SJR 2.41 SNIP 2.104 CiteScore 5.3
Scopus rating (2013): SJR 2.412 SNIP 2.503 CiteScore 5.97
Scopus rating (2012): SJR 2.389 SNIP 2.465 CiteScore 5.25
Scopus rating (2011): SJR 2.314 SNIP 2.508 CiteScore 5.56
Scopus rating (2010): SJR 2.086 SNIP 2.355
Scopus rating (2009): SJR 1.912 SNIP 2.231
Scopus rating (2008): SJR 1.734 SNIP 2.732
Scopus rating (2007): SJR 1.529 SNIP 2.423
Scopus rating (2006): SJR 1.315 SNIP 1.98
Scopus rating (2005): SJR 1.269 SNIP 2.006
Scopus rating (2004): SJR 1.197 SNIP 1.659
Scopus rating (2003): SJR 0.948 SNIP 1.639
Scopus rating (2002): SJR 0.882 SNIP 1.3
Scopus rating (2001): SJR 0.541 SNIP 1.208
Scopus rating (2000): SJR 0.464 SNIP 1.049
Scopus rating (1999): SJR 0.669 SNIP 1.061
Original language: English
Metabolic engineering of Acinetobacter baylyi ADP1 for improved growth on gluconate and glucose

A high growth rate in bacterial cultures is usually achieved by optimizing growth conditions, but metabolism of the bacterium limits the maximal growth rate attainable on the carbon source used. This limitation can be circumvented by engineering the metabolism of the bacterium. Acinetobacter baylyi has become a model organism for studies of bacterial metabolism and metabolic engineering due to its wide substrate spectrum and easy-to-engineer genome. It produces naturally storage lipids, such as wax esters, and has a unique gluconate catabolism as it lacks a gene for pyruvate kinase.

We engineered the central metabolism of A. baylyi ADP1 more favorable for gluconate catabolism by expressing the pyruvate kinase gene (pykF) of Escherichia coli. This modification increased growth rate when cultivated on gluconate or glucose as a sole carbon source in a batch cultivation. The engineered cells reached stationary phase on these carbon sources approximately twice as fast as control cells carrying an empty plasmid and produced similar amount of biomass. Furthermore, when grown on either gluconate or glucose, pykF expression did not lead to significant accumulation of overflow metabolites and consumption of the substrate remained unaltered. Increased growth rate on glucose was not accompanied with decreased wax ester production, and the pykF-expressing cells accumulated significantly more of these storage lipids with respect to cultivation time.
Murein lytic enzyme TgaA of Bifidobacterium bifidum MIMBb75 modulates dendritic cell maturation through its cysteine- and histidine-dependent amidohydrolase/peptidase (CHAP) amidase domain

Bifidobacteria are Gram-positive inhabitants of the human gastrointestinal tract that have evolved close interaction with their host and especially with the host's immune system. The molecular mechanisms underlying such interactions, however, are largely unidentified. In this study, we investigated the immunomodulatory potential of Bifidobacterium bifidum MIMBb75, a bacterium of human intestinal origin commercially used as a probiotic. Particularly, we focused our attention on TgaA, a protein expressed on the outer surface of MIMBb75's cells and homologous to other known bacterial immunoreactive proteins. TgaA is a peptidoglycan lytic enzyme containing two active domains: lytic murein transglycosylase (LT) and cysteine- and histidine-dependent amidohydrolase/peptidase (CHAP). We ran immunological experiments stimulating dendritic cells (DCs) with the B. bifidum MIMBb75 and TgaA, with the result that both the bacterium and the protein activated DCs and triggered interleukin-2 (IL-2) production. In addition, we observed that the heterologous expression of TgaA in Bifidobacterium longum transferred to the bacterium the ability to induce IL-2. Subsequently, immunological experiments performed using two purified recombinant proteins corresponding to the single domains LT and CHAP demonstrated that the CHAP domain is the immune-reactive region of TgaA. Finally, we also showed that TgaA-dependent activation of DCs requires the protein CD14, marginally involves TRIF, and is independent of Toll-like receptor 4 (TLR4) and MyD88. In conclusion, our study suggests that the bacterial CHAP domain is a novel microbe-associated molecular pattern actively participating in the cross talk mechanisms between bifidobacteria and the host's immune system. © 2014, American Society for Microbiology.
Novel design of a multitube microbial fuel cell (UM2FC) for energy recovery and treatment of membrane concentrates

**General information**
- State: Published
- Ministry of Education publication type: A1 Journal article-refereed
- Organisations: Department of Chemistry and Bioengineering
- Authors: Köroglu, E. O., Yılmaz Baysoy, D., Cetinkaya, A. Y., Özkaya, B., Cakmakci, M.
- Number of pages: 8
- Pages: 58-65
- Publication date: 2014
- Peer-reviewed: Yes

**Publication information**
- Journal: Biomass & Bioenergy
- Volume: 69
- ISSN (Print): 0961-9534

**Ratings:**
- Scopus rating (2016): SJR 1.188 SNIP 1.368 CiteScore 3.71
- Scopus rating (2015): SJR 1.521 SNIP 1.615 CiteScore 4.03
- Scopus rating (2014): SJR 1.888 SNIP 1.985 CiteScore 4.36
- Scopus rating (2013): SJR 1.678 SNIP 1.823 CiteScore 4.42
- Scopus rating (2012): SJR 1.545 SNIP 1.743 CiteScore 3.66
- Scopus rating (2011): SJR 1.793 SNIP 2.283 CiteScore 4.74
- Scopus rating (2010): SJR 1.931 SNIP 2.254
- Scopus rating (2009): SJR 1.743 SNIP 2.187
- Scopus rating (2008): SJR 1.609 SNIP 2.073
- Scopus rating (2007): SJR 1.454 SNIP 1.77
- Scopus rating (2006): SJR 1.292 SNIP 1.954
- Scopus rating (2005): SJR 1.226 SNIP 1.398
- Scopus rating (2004): SJR 1.037 SNIP 1.637
- Scopus rating (2003): SJR 0.693 SNIP 1.312
- Scopus rating (2002): SJR 0.442 SNIP 0.764
- Scopus rating (2001): SJR 0.468 SNIP 0.994
- Scopus rating (2000): SJR 0.429 SNIP 0.903
- Scopus rating (1999): SJR 0.431 SNIP 1.105

**Original language:** English
**ASJC Scopus subject areas:** Applied Microbiology and Biotechnology, Food Science, Biotechnology, Ecology

**DOIs:**
- 10.1128/AEM.00761-14

**Bibliographical note**
- Contribution: organisation=keb, FACT1=1<br/>
- Portfolio EDEND: 2014-05-19<br/>
- Publisher name: American Society for Microbiology
- Source: researchoutputwizard
- Source-ID: 374
- Research output: Scientific - peer-review › Article

**Links:**
- http://www.scopus.com/inward/record.url?scp=84905922553&partnerID=8YFLLogxK (Link to publication in Scopus)
TgaA, a VirB1-like component belonging to a putative type IV secretion system of Bifidobacterium bifidum MIMBb75

Bifidobacterium bifidum MIMBb75 is a human intestinal isolate demonstrated to be interactive with the host and efficacious as a probiotic. However, the molecular biology of this microorganism is yet largely unknown. For this reason, we undertook whole-genome sequencing of B. bifidum MIMBb75 to identify potential genetic factors that would explain the metabolic and probiotic attributes of this bacterium. Comparative genomic analysis revealed a 45-kb chromosomal region that comprises 19 putative genes coding for a potential type IV secretion system (T4SS). Thus, we undertook the initial characterization of this genetic region by studying the putative virB1-like gene, named tgaA. Gene tgaA encodes a peptidoglycan lytic enzyme containing two active domains: lytic murein transglycosylase (LT, cd00254.3) and cysteine- and histidine-dependent amidohydrolase/peptidase (CHAP, pfam05257.4). By means of several in vitro assays, we experimentally confirmed that protein TgaA, consistent with its computationally assigned role, has peptidoglycan lytic activity, which is principally associated to the LT domain. Furthermore, immunofluorescence and immunogold labeling showed that the protein TgaA is abundantly expressed on the cell surface of B. bifidum MIMBb75. According to the literature, the T4SSs, which have not been characterized before in bifidobacteria, can have important implications for bacterial cell-to-cell communication as well as cross talk with host cells, justifying the interest for further studies aimed at the investigation of this genetic region. © 2014, American Society for Microbiology.
Upgrading landfill gas using a high pressure water absorption process

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Rasi, S., Läntelä, J., Rintala, J.
Number of pages: 5
Pages: 539-543
Publication date: 2014
Peer-reviewed: Yes

Publication information
Journal: Fuel
Non-sterile process for biohydrogen and 1,3-propanediol production from raw glycerol

Raw glycerol is a tempting substrate for fermentations, but contains impurities that can be inhibitory for organisms. In this study, raw glycerol tolerance and contamination risk of pure bacterial culture at hypersaline process conditions were evaluated. The inhibitory effect of raw glycerol was similar on a halophilic (Halanaerobium saccharolyticum) and a non-halophilic (Clostridium butyricum) bacterium implying the inhibition originating from methanol or other impurities rather than salt. The hypersaline process conditions decreased efficiently contaminations and no growth of contaminants was observed at and above 125 g/l NaCl. Halophilic H₂ and 1,3-PD production from raw glycerol were studied separately as 1-stage processes and jointly as 2-stage process in non-sterile conditions. Non-sterile conditions were successfully applied and the highest production yields obtained were 3.0 mol H₂/mol glycerol and 0.66 mol 1,3-PD/mol glycerol (1-stage processes), whereas the highest cumulative production was 74 mmol H₂/l culture and 31 mmol 1,3-PD/l culture (2-stage process). © 2013, Hydrogen Energy Publications, LLC. Published by Elsevier Ltd. All rights.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Research group: Industrial Bioengineering and Applied Organic Chemistry, Tampere University of Technology, Urban circular bioeconomy (UrCirBio)
Authors: Kivistö, A., Santala, V., Karp, M.
Number of pages: 7
Pages: 11749-11755
Publication date: 10 Sep 2013
Peer-reviewed: Yes

Publication information
Volume: 38
Issue number: 27
ISSN (Print): 0360-3199
Ratings:
Scopus rating (2016): CiteScore 3.74 SJR 1.142 SNIP 1.286
Prospecting hydrogen production of Escherichia coli by metabolic network modeling

Genome-scale model was applied to analyze the anaerobic metabolism of Escherichia coli. Three different methods were used to find deletions affecting fermentative hydrogen production: flux balance analysis (FBA), algorithm for blocking competing pathways (ABCP), and manual selection. Based on these methods, 81 E. coli mutants possessing one gene deletion were selected and cultivated in batch experiments. Experimental results of H₂ and biomass production were compared against the results of FBA. Several gene deletions enhancing H₂ production were found. Correctness of gene essentiality predictions of FBA for the selected genes was 78% and 77% in glucose and galactose media, respectively. 33% of the mutations that were predicted by FBA to increase H₂ production had a positive effect in experiments. Batch cultivation is a simple and straightforward experimental way to screen improvements in H₂ production. However, the ability of FBA to predict the H₂ production rate cannot be evaluated by batch experiments. Metabolic network models provide a method for gaining broader understanding of the complicated metabolic system of a cell and can aid in prospecting suitable gene deletions for enhancing H₂ production. © 2013, Hydrogen Energy Publications, LLC. Published by Elsevier Ltd. All rights.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Research group: Industrial Bioengineering and Applied Organic Chemistry, Tampere University of Technology, Department of Signal Processing, Prostate cancer research center (PCRC), Urban circular bioeconomy (UrCirBio), Aalto University
Authors: Seppälä, J. J., Larjo, A., Aho, T., Yli-Harja, O., Karp, M. T., Santala, V.
Number of pages: 10
Pages: 11780-11789
Publication date: 10 Sep 2013
Peer-reviewed: Yes

Publication information
Bioprocess data mining using regularized regression and random forests

Background: In bioprocess development, the needs of data analysis include (1) getting overview to existing data sets, (2) identifying primary control parameters, (3) determining a useful control direction, and (4) planning future experiments. In particular, the integration of multiple data sets causes that these needs cannot be properly addressed by regression models that assume linear input-output relationship or unimodality of the response function. Regularized regression and random forests, on the other hand, have several properties that may appear important in this context. They are capable, e.g., in handling small number of samples with respect to the number of variables, feature selection, and the visualization of response surfaces in order to present the prediction results in an illustrative way.

Results: In this work, the applicability of regularized regression (Lasso) and random forests (RF) in bioprocess data mining was examined, and their performance was benchmarked against multiple linear regression. As an example, we used data from a culture media optimization study for microbial hydrogen production. All the three methods were capable in providing a significant model when the five variables of the culture media optimization were linearly included in modeling. However, multiple linear regression failed when also the multiplications and squares of the variables were included in modeling. In this case, the modeling was still successful with Lasso (correlation between the observed and predicted yield was 0.69) and RF (0.91).

Conclusion: We found that both regularized regression and random forests were able to produce feasible models, and the latter was efficient in capturing the non-linearity in the data. In this kind of a data mining task of bioprocess data, both methods outperform multiple linear regression.
Screening pretreatment methods to enhance thermophilic anaerobic digestion of pulp and paper mill wastewater treatment secondary sludge

The effect of hydrothermal (150°C for 10min and 70°C for 40min), enzymatic (Accelerase 1500, 0.07g/g volatile solids (VS)), ultrasound (45kHz for 30min) and chemical pretreatments (HNO₃ at pH3 and NaOH at pH12) alone or in combination on the chemical composition and methane yield of the pulp and paper mill secondary sludge was studied in batch assays at 55°C. In total, 12 different pretreatment combinations were compared. Chemical analyses showed that all pretreatments except for HNO₃ and ultrasound pretreatments improved the organic matter solubilization. Among the studied pretreatments, hydrothermal (150°C, 10min) pretreatment alone or in combination with enzymes and/or ultrasound pretreatment had the highest impact on sludge solubilization and methane yield. The increase in methane yield was 31% (from 108ml/g VSoriginal to 141ml/gVSoriginal). In addition, enzymatic pretreatment also improved the methane yields but only when combined with hydrothermal pretreatment at 150°C or ultrasound+hydrothermal pretreatment at 150°C. On the other hand, ultrasound pretreatment did not improve the methane yields while acid and alkaline pretreatments resulted in lower methane yields than control. Improved hydrolysis and higher methane production rates noticed in assays subjected to hydrothermal pretreatment alone or in combination with enzymes and/or ultrasound could make these treatments more attractive in reducing the retention times required during full-scale anaerobic digestion of pulp and paper mill wastewater sludges. © 2013 Elsevier B.V.
Hydrogen and methane production in extreme thermophilic conditions in two-stage (upflow anaerobic sludge bed) UASB reactor system

Two-stage hydrogen and methane production in extreme thermophilic (70 °C) conditions was demonstrated for the first time in UASB-reactor system. Inoculum used in hydrogen and methane reactors was granular sludge from mesophilic internal circulation reactor and was first acclimated for extreme thermophilic conditions. In hydrogen reactor, operated with hydraulic retention time (HRT) of 5 h and organic loading rate (OLR) of 25.1 kg COD/m³/d, hydrogen yield was 0.73 mol/mol glucose added. Methane was produced in second stage from hydrogen reactor effluent. In methane reactor operated with HRT of 13 h and OLR of 7.8 kg COD/m³/d, methane yield was 117.5 ml/g COD added. These results prove that hydrogen and methane can be produced in extreme thermophilic temperatures, but as batch experiments confirmed, for methane production lower temperature would be more efficient. Copyright © 2013, Hydrogen Energy Publications, LLC. Published by Elsevier Ltd. All rights reserved.
Organic silicon compounds in biogases produced from grass silage, grass and maize in laboratory batch assays

In the present study the occurrence of volatile organic silicon compounds in biogas produced from grass silage, grass and maize in laboratory batch assays was analyzed and methane potentials were determined. Inoculum from a mesophilic farm digester was used, and its effects were subtracted. Methane yields from grass silage, grass and maize were 0.38, 0.42 and 0.34 m³ CH₄/kg volatile solids added (VS_add), respectively. Trimethyl silanol, hexamethylcyclotrisiloxane (D3), octamethylcyclotetrasiloxane (D4) and decamethylcyclopentasiloxane (D5) were detected from all the biogases. Higher yields of volatile organic silicon compounds in the grass (from 21.8 to 37.6 μg/kg VS_add) were detected than in grass silage or maize assays (from 14.7 to 20.4 and from 7.4 to 12.1 μg/kg VS_add, respectively). Overall, it is important to consider silicon-containing compounds also in biogases in energy crop digestion as the number of biogas plants using energy crops as feeding material increases and some biogas applications are sensitive to organic silicon compounds. © 2013 Elsevier Ltd.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio), Jyvaskyla Yliopisto, Tampere University of Technology
Authors: Rasi, S., Seppälä, M., Rintala, J.
Number of pages: 6
Pages: 137-142
Publication date: 1 Apr 2013
Peer-reviewed: Yes
Biogas upgrading and compression

General information
State: Published
Ministry of Education publication type: A3 Part of a book or another research book
Organisations: Department of Chemistry and Bioengineering, Tampere University of Technology, Urban circular bioeconomy (UrCirBio), Jyväskylä Yliopisto, MTT Agrifood Research Finland
Authors: Kaparaju, P., Rasi, S., Rintala, J.
Number of pages: 31
Pages: 152-182
Publication date: 1 Jan 2013

Host publication information
Title of host publication: Bioenergy Production by Anaerobic Digestion: Using Agricultural Biomass and Organic Wastes
Place of publication: London
Publisher: Routledge
Editors: Korres, N. E., O’Kiely, P., Benzie, J. A., West, J. S.
ASJC Scopus subject areas: Engineering(all), Agricultural and Biological Sciences(all)
DOIs:
10.4324/9780203137697
Links:
http://www.scopus.com/inward/record.url?scp=84899761424&partnerID=8YFLogxK (Link to publication in Scopus)

Bibliographical note
Contribution: organisation=keb,FACT1=1<br/>Portfolio EDEND: 2013-11-29
Anaerobic conversion of microalgal biomass to sustainable energy carriers - A review

General information
State: Published
Ministry of Education publication type: A2 Review article in a scientific journal
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Lakaniemi, A., Tuovinen, O. H., Puhakka, J. A.
Number of pages: 10
Pages: 222-231
Publication date: 2013
Peer-reviewed: Yes

Publication information
Journal: Bioresource Technology
Volume: 135
Issue number: May
ISSN (Print): 0960-8524
Ratings:
Scopus rating (2016): SJR 2.191 SNIP 1.91 CiteScore 5.94
Scopus rating (2015): SJR 2.255 SNIP 1.908 CiteScore 5.47
Scopus rating (2014): SJR 2.41 SNIP 2.104 CiteScore 5.3
Scopus rating (2013): SJR 2.412 SNIP 2.503 CiteScore 5.97
Scopus rating (2012): SJR 2.389 SNIP 2.465 CiteScore 5.25
Scopus rating (2011): SJR 2.314 SNIP 2.508 CiteScore 5.56
Scopus rating (2010): SJR 2.086 SNIP 2.355
Scopus rating (2009): SJR 1.912 SNIP 2.231
Scopus rating (2008): SJR 1.734 SNIP 2.732
Scopus rating (2007): SJR 1.529 SNIP 2.423
Scopus rating (2006): SJR 1.315 SNIP 1.98
Scopus rating (2005): SJR 1.269 SNIP 2.006
Scopus rating (2004): SJR 1.197 SNIP 1.659
Scopus rating (2003): SJR 0.948 SNIP 1.639
Scopus rating (2002): SJR 0.882 SNIP 1.3
Scopus rating (2001): SJR 0.541 SNIP 1.208
Scopus rating (2000): SJR 0.464 SNIP 1.049
Scopus rating (1999): SJR 0.669 SNIP 1.061
Original language: English
DOIs:
10.1016/j.biortech.2012.08.096

Bibliographical note
Contribution: organisation=keb,FACT1=1<br/>Portfolio EDEND: 2013-06-29<br/>Publisher name: Elsevier Ltd.
Source: researchoutputwizard
Source-ID: 2715
Research output: Scientific - peer-review › Review Article

An in vitro study of composites of poly(L-lactide-co-ε-caprolactone), β-tricalcium phosphate and ciprofloxacin intended for local treatment of osteomyelitis
Osteomyelitis is a bacterial disease that can become chronic, and treatment often includes a surgical operation to remove infected bone. The aim of this study was to develop and investigate in vitro bone filling composite materials that release ciprofloxacin to kill any remaining bacteria and contain bioceramic to help the bone to heal. Three composites of poly(L-lactide-co-ε-caprolactone), β-tricalcium phosphate and ciprofloxacin were compounded using twin-screw extrusion and sterilized by gamma irradiation. Drug release and degradation of the composites were investigated in vitro for 52 weeks. The composite with 50 wt% of β-TCP had the most promising ciprofloxacin release profile. The ceramic component accelerated the drug release that occurred in three phases obeying first-order kinetics. Inhibition zone testing using bioluminescence showed that the released ciprofloxacin had effect in eradicating a common osteomyelitis causing bacterium Pseudomonas aeruginosa. During the in vitro degradation test series, molar weight of the polymer matrix of the
composites decreased rapidly. Additionally, 1H-NMR analysis showed that the polymer had blocky structure and the comonomer ratio changed during hydrolysis. The tested composites showed great potential to be developed into bone filler materials for the treatment of osteomyelitis or other bone related infections.

**Antimicrobial assay optimization and validation for HTS in 384-well format using a bioluminescent E. coli K-12 strain**

This report describes the optimization and validation of an antimicrobial assay based on the genetically modified bacterial strain Escherichia coli K-12 (pTetLux1). The use of this particular strain enables an inducible cell-based bioluminescent assay for high-throughput screening (HTS) of antimicrobial agents, which shows a pronounced detection of compounds targeting transcriptional and translational events in protein synthesis. The optimizations in 96-well format led to several improvements in assay conditions, such as reduction of the pre-incubation time before luminescence induction by half. The threshold for DMSO tolerability was concluded to be up to 1%. Assay protocol was further miniaturized into 384-well format and the liquid handling was automated using a robotic workstation. The use of compound pre-plating into 384-well plates as a part of the process was evaluated, and the total assay volume was further downscaled from 50 μl to 30 μl. With this approach, the amount of test compound needed per well was reduced to nanoliter volumes. Using the miniaturized protocol a pilot screen of 2000 known drugs and bioactives was performed. The assay performance was evaluated by calculating known assay quality parameters, the Z’ factor having a mean value of 0.8 during the compound library screening indicated an excellent performance. Of the assay positives, 54 compounds showed high inhibitions (60-100%), of which the majority (89%) were known antibacterial agents. Of the actives showing >60% inhibition, 16 compounds were identified as known transcriptional and translational inhibitors. The screening results demonstrated that the miniaturized assay is well suited for identification of antimicrobial compounds in HT screening, and that the assay is specifically sensitive towards bacterial transcription and translation inhibitors. © 2013 Elsevier B.V.
Biomethane production from maize and liquid cow manure - Effect of share of maize, post-methanation potential and digestate characteristics

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Seppälä, M., Pyykkönen, V., Väisänen, A., Rintala, J.
Number of pages: 8
Pages: 209-216
Publication date: 2013
Peer-reviewed: Yes

Publication information
Journal: Fuel
Volume: 107
ISSN (Print): 0016-2361
Ratings:
Scopus rating (2016): SJR 1.744 SNIP 2.179 CiteScore 4.9
Scopus rating (2015): SJR 1.809 SNIP 2.125 CiteScore 4.46
Scopus rating (2014): SJR 1.667 SNIP 2.331 CiteScore 4.14
Scopus rating (2013): SJR 1.811 SNIP 2.595 CiteScore 4.31
Scopus rating (2012): SJR 1.852 SNIP 2.465 CiteScore 3.99
Scopus rating (2011): SJR 2.093 SNIP 2.427 CiteScore 4.1
Scopus rating (2010): SJR 1.984 SNIP 2.319
Scopus rating (2009): SJR 2.012 SNIP 2.277
Case study on sampling, processing and characterization of landfilled municipal solid waste in the view of landfill mining

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Kaartinen, T., Sormunen, K., Rintala, J.
Number of pages: 12
Pages: 56-66
Publication date: 2013
Peer-reviewed: Yes

Publication information
Journal: Journal of Cleaner Production
Volume: 55
ISSN (Print): 0959-6526
Ratings:
Scopus rating (2016): CiteScore 5.83 SJR 1.615 SNIP 2.382
Scopus rating (2015): SJR 1.609 SNIP 2.383 CiteScore 5.57
Scopus rating (2014): SJR 1.661 SNIP 2.477 CiteScore 4.6
Scopus rating (2013): SJR 1.644 SNIP 2.581 CiteScore 4.47
Scopus rating (2012): SJR 1.706 SNIP 2.328 CiteScore 4.07
Scopus rating (2011): SJR 1.461 SNIP 1.825 CiteScore 3.19
Scopus rating (2010): SJR 1.419 SNIP 1.742
Scopus rating (2009): SJR 0.942 SNIP 1.544
Scopus rating (2008): SJR 0.813 SNIP 1.354
Scopus rating (2007): SJR 0.942 SNIP 1.489
Scopus rating (2006): SJR 0.842 SNIP 1.543
Scopus rating (2005): SJR 0.544 SNIP 1.357
Scopus rating (2004): SJR 0.753 SNIP 1.818
Scopus rating (2003): SJR 0.501 SNIP 1.152
Scopus rating (2002): SJR 0.481 SNIP 1.103
Scopus rating (2001): SJR 0.419 SNIP 0.85
Scopus rating (2000): SJR 0.694 SNIP 0.888
Scopus rating (1999): SJR 0.276 SNIP 0.775
Original language: English
DOIs:
10.1016/j.jclepro.2013.02.036
CO2 capture from biogas: absorbent selection

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Privalova, E., Rasi, S., Mäki-Arvela, P., Eränen, K., Rintala, J., Murzin, D. Y., Mikkola, J.
Number of pages: 6
Pages: 2979-2994
Publication date: 2013
Peer-reviewed: Yes

Publication information
Journal: RSC Advances
Volume: 3
Issue number: 9
ISSN (Print): 2046-2069
Ratings:
Scopus rating (2016): CiteScore 3.06 SJR 0.875 SNIP 0.743
Scopus rating (2015): SJR 0.959 SNIP 0.837 CiteScore 3.42
Scopus rating (2014): SJR 1.114 SNIP 0.965 CiteScore 3.87
Scopus rating (2013): SJR 1.117 SNIP 0.903 CiteScore 3.74
Scopus rating (2012): SJR 0.863 SNIP 0.603 CiteScore 2.4
Original language: English
DOIs:
10.1039/C2RA23013E

Bibliographical note
Contribution: organisation=keb,FACT1=1<br/>Portfolio EDEND: 2013-11-29<br/>Publisher name: Elsevier BV
Source: researchoutputwizard
Source-ID: 2446
Research output: Scientific - peer-review › Article

Co-fermentation of water hyacinth and beverage wastewater in powder and pellet form for hydrogen production

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Authors: Lay, C., Sen, B., Chen, C., Wu, J., Lee, S., Lin, C.
Number of pages: 6
Pages: 610-615
Publication date: 2013
Peer-reviewed: Yes

Publication information
Journal: Bioresource Technology
Volume: 135
ISSN (Print): 0960-8524
Ratings:
Scopus rating (2016): SJR 2.191 SNIP 1.91 CiteScore 5.94
Scopus rating (2015): SJR 2.255 SNIP 1.908 CiteScore 5.47
Scopus rating (2014): SJR 2.41 SNIP 2.104 CiteScore 5.3
Scopus rating (2013): SJR 2.412 SNIP 2.503 CiteScore 5.97
Scopus rating (2012): SJR 2.389 SNIP 2.465 CiteScore 5.25
Scopus rating (2011): SJR 2.314 SNIP 2.508 CiteScore 5.56

Bibliographical note
Contribution: organisation=keb,FACT1=1<br/>Portfolio EDEND: 2013-06-29<br/>Publisher name: RSC Publishing
Source: researchoutputwizard
Source-ID: 3188
Research output: Scientific - peer-review › Article
Column bioleaching of low grade copper sulfide ore at extreme conditions for most mineral processing bacteria

**General information**

State: Published  
Ministry of Education publication type: A1 Journal article-refereed  
Organisations: Department of Chemistry and Bioengineering  
Authors: Zou, G., Zengling, W., Xiaokang, L., Laichang, Z., Renman, R., Papiro, S., Puhakka, J.  
Number of pages: 4  
Pages: 318-321  
Publication date: 2013  
Peer-reviewed: Yes

**Publication information**

Journal: Advanced Materials Research  
Volume: 825  
ISSN (Print): 1022-6680  
Ratings:  
Scopus rating (2016): SJR 0.12 SNIP 0.154  
Scopus rating (2015): SJR 0.115 SNIP 0.106 CiteScore 0.08  
Scopus rating (2014): SJR 0.141 SNIP 0.171 CiteScore 0.09  
Scopus rating (2013): SJR 0.143 SNIP 0.203 CiteScore 0.11  
Scopus rating (2012): SJR 0.136 SNIP 0.265 CiteScore 0.12  
Scopus rating (2011): SJR 0.15 SNIP 0.385 CiteScore 0.19  
Scopus rating (2010): SJR 0.155 SNIP 0.232  
Scopus rating (2009): SJR 0.168 SNIP 0.254  
Scopus rating (2008): SJR 0.169 SNIP 0.238  
Scopus rating (2007): SJR 0.186 SNIP 0.657  
Scopus rating (2006): SJR 0.251 SNIP 0.598  
Original language: English  
DOIs:  
10.4028/www.scientific.net/AMR.825.318

**Bibliographical note**

Contribution: organisation=keb,FACT1=1  
Portfolio EDEND: 2013-11-29  
Publisher name: Elsevier  
Source: researchoutputwizard  
Source-ID: 2740  
Research output: Scientific - peer-review › Article
Determination of waste decay rate for a large Finnish landfill by calibrating methane generation models on the basis of methane recovery and emissions

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Sormunen, K., Laurila, T., Rintala, J.
Number of pages: 7
Pages: 979-985
Publication date: 2013
Peer-reviewed: Yes

Publication information
Journal: Waste Management and Research
Volume: 31
Issue number: 10
ISSN (Print): 0734-242X
Ratings:
Scopus rating (2016): SJR 0.655 SNIP 1.036 CiteScore 1.76
Scopus rating (2015): SJR 0.617 SNIP 0.899 CiteScore 1.53
Scopus rating (2014): SJR 0.741 SNIP 1.085 CiteScore 1.28
Scopus rating (2013): SJR 0.588 SNIP 0.951 CiteScore 1.17
Scopus rating (2012): SJR 0.886 SNIP 1.046 CiteScore 1.4
Scopus rating (2011): SJR 1.027 SNIP 0.865 CiteScore 1.33
Scopus rating (2010): SJR 0.666 SNIP 0.975
Scopus rating (2009): SJR 0.877 SNIP 1.257
Scopus rating (2008): SJR 0.49 SNIP 0.933
Scopus rating (2007): SJR 0.352 SNIP 0.666
Scopus rating (2006): SJR 0.295 SNIP 0.755
Scopus rating (2005): SJR 0.449 SNIP 0.729
Scopus rating (2004): SJR 0.48 SNIP 0.787
Scopus rating (2003): SJR 0.626 SNIP 0.831
Scopus rating (2002): SJR 0.465 SNIP 0.707
Scopus rating (2001): SJR 0.691 SNIP 1.118
Scopus rating (2000): SJR 0.582 SNIP 0.879
Scopus rating (1999): SJR 0.579 SNIP 0.877
Original language: English
DOIs:
10.1177/0734242X13490980

Bibliographical note
Contribution: organisation=keb,FACT1=1<br/>Portfolio EDEND: 2013-07-29<br/>Publisher name: Sage Publications
Source: researchoutputwizard
Source-ID: 3442
Research output: Scientific - peer-review › Article

Distribution of dehalogenation activity in subseafloor sediments of the Nankai Trough subduction zone

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Authors: Futagami, T., Morono, Y., Terada, T., Kaksonen, A. H., Inagaki, F.
Number of pages: 15
Pages: 1-15
Publication date: 2013
Peer-reviewed: Yes
Draft genome sequence of the hydrogen- and ethanol-producing anaerobic alkalithermophilic bacterium Caloramator celer.
Effect of Na-chloride on the bioleaching of a chalcopyrite concentrate in shake flasks and stirred tank bioreactors

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Bevilaqua, D., Lahti, H., Suegama, P., Garcia Jr., O., Benedetti, A., Puhakka, J., Tuovinen, O.
Number of pages: 13
Pages: 1-13
Publication date: 2013
Peer-reviewed: Yes

Publication information
Journal: Hydrometallurgy
Volume: 138
ISSN (Print): 0304-386X
Ratings:
Scopus rating (2016): SJR 1.148 SNIP 1.737 CiteScore 2.8
Scopus rating (2015): SJR 1.173 SNIP 1.888 CiteScore 2.78
Scopus rating (2014): SJR 1.247 SNIP 2.25 CiteScore 2.7
Scopus rating (2013): SJR 1.626 SNIP 2.967 CiteScore 2.95
Scopus rating (2012): SJR 1.523 SNIP 2.4 CiteScore 2.6
Scopus rating (2011): SJR 1.521 SNIP 1.796 CiteScore 2.42
Scopus rating (2010): SJR 1.104 SNIP 1.672
Scopus rating (2009): SJR 1.185 SNIP 2.458
Scopus rating (2008): SJR 1.066 SNIP 1.56
Scopus rating (2007): SJR 1.027 SNIP 1.45
Scopus rating (2006): SJR 0.972 SNIP 1.482
Scopus rating (2005): SJR 1.076 SNIP 1.605
Scopus rating (2004): SJR 1.089 SNIP 1.869
Scopus rating (2003): SJR 0.843 SNIP 1.565
Scopus rating (2002): SJR 0.833 SNIP 1.308
Scopus rating (2001): SJR 0.481 SNIP 1.317
Scopus rating (2000): SJR 0.596 SNIP 1.44
Scopus rating (1999): SJR 0.717 SNIP 1.166
Original language: English
DOI:
10.1016/j.hydromet.2013.06.008

Bibliographical note
Ei UT-numeroa 7/13<br/>Contribution: organisation=keb,FACT1=1<br/>Portfolio EDEND: 2013-07-29<br/>Publisher name: Elsevier
Source: researchoutputwizard
Source-ID: 1994
Research output: Scientific - peer-review › Article

Electricity generation from young landfill leachate in a microbial fuel cell with a new electrode material

General information
State: Published
Enrichment of electrogens on xylose from anaerobic digester sample

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Department of Chemistry and Bioengineering
Authors: Nissilä, M., Sulonen, M., Puhakka, J.
Number of pages: 4
Publication date: 2013

Host publication information
Title of host publication: Proceedings of 13th World Congress on Anaerobic Digestion, 25th-28th June 2013, Santiago de Compostela, Spain
Publisher: IWA International Water Association

Publication series
Name: Anaerobic Digestion World Congress

Bibliographical note
SPB16 (IWA-10806) on page 124
Contribution: organisation=keb,FAC u1=1
Portfolio EDEND: 2013-07-29
Publisher name: IWA International Water Association
Fluidized-bed denitrification for mine waters. Part I: low pH and temperature operation

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Papirio, S., Ylinen, A., Zou, G., Peltola, M., Esposito, G., Puhakka, J.
Number of pages: 11
Pages: 1-11
Publication date: 2013
Peer-reviewed: Yes

Publication information
Journal: BIODEGRADATION
ISSN (Print): 0923-9820
Ratings:
Scopus rating (2016): SJR 0.804 SNIP 1.069 CiteScore 2.41
Scopus rating (2015): SJR 0.888 SNIP 1.055 CiteScore 2.37
Scopus rating (2014): SJR 0.968 SNIP 1.195 CiteScore 2.42
Scopus rating (2013): SJR 1.103 SNIP 1.435 CiteScore 2.63
Scopus rating (2012): SJR 1.113 SNIP 1.213 CiteScore 2.22
Scopus rating (2011): SJR 1.052 SNIP 1.102 CiteScore 2.31
Scopus rating (2010): SJR 1.096 SNIP 0.991
Scopus rating (2009): SJR 1.009 SNIP 1.208
Scopus rating (2008): SJR 0.961 SNIP 1.193
Scopus rating (2007): SJR 0.874 SNIP 1.107
Scopus rating (2006): SJR 0.984 SNIP 1.105
Scopus rating (2005): SJR 0.805 SNIP 0.953
Scopus rating (2004): SJR 0.87 SNIP 0.765
Scopus rating (2003): SJR 0.738 SNIP 0.854
Scopus rating (2002): SJR 0.815 SNIP 0.686
Scopus rating (2001): SJR 0.651 SNIP 0.954
Scopus rating (2000): SJR 0.688 SNIP 0.81
Scopus rating (1999): SJR 0.87 SNIP 0.676
Original language: English
DOIs:
10.1007/s10532-013-9671-0

Bibliographical note
Online first; Published online: 29 October 2013
Contribution: organisation=keb,FACT1=1
Publisher name: Springer Netherlands
Portofolio EDEND: 2013-11-29
Source: researchoutputwizard
Source-ID: 3096
Research output: Scientific - peer-review » Article

Generation of heat and power from biogas for stationary applications: boilers, gas engines and turbines, combined heat and power (CHP) plants and fuel cells

General information
State: Published
Ministry of Education publication type: A3 Part of a book or another research book
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Kaparaju, P., Rintala, J.
Number of pages: 24
Pages: 404-427
Publication date: 2013
Genome Sequence of Halanaerobium saccharolyticum subsp. saccharolyticum Strain DSM 6643T, a Halophilic Hydrogen-Producing Bacterium

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Signal Processing, Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Kivistö, A., Larjo, A., Ciranna, A., Santala, V., Roos, C., Karp, M.
Number of pages: 2
Pages: 1-2
Publication date: 2013
Peer-reviewed: Yes

Publication information
Journal: Genome Announcements
Volume: 1
Issue number: 2
ISSN (Print): 2169-8287
Ratings:
Scopus rating (2016): SJR 0.217 SNIP 0.233 CiteScore 0.41
Scopus rating (2015): SJR 0.199 SNIP 0.077
Scopus rating (2014): SJR 0.218 SNIP 0.089
Original language: English
DOIs:
10.1128/genomeA.00187-13

Bibliographical note
Contribution: organisation=keb,FACT1=1
Contribution: organisation=sgn,FACT2=0.2
Publisher name: American Society for Microbiology
Source: researchoutputwizard
Source-ID: 2575
Research output: Scientific - peer-review › Article

Heat stress adaptation induces cross-protection against lethal acid stress conditions in Arcobacter butzleri but not in Campylobacter jejuni

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Signal Processing, Department of Chemistry and Bioengineering
Authors: Isohanni, P., Huehn, S., Aho, T., Alter, T., Lyhs, U.
Number of pages: 5
Pages: 431-435
Publication date: 2013
Peer-reviewed: Yes

Publication information
Journal: Food Microbiology
Volume: 34
Issue number: 2
Impact of heavy metals on denitrification of simulated mining wastewaters

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Zou, G., Ylinen, A., Di Capua, F., Papirio, S., Lakaniemi, A., Puhakka, J.
Number of pages: 4
Pages: 500-503
Publication date: 2013
Peer-reviewed: Yes

Publication information
Journal: Advanced Materials Research
Volume: 825
ISSN (Print): 1022-6680
Ratings:
Scopus rating (2016): SJR 0.12 SNIP 0.154
Scopus rating (2015): SJR 0.115 SNIP 0.106 CiteScore 0.08
Scopus rating (2014): SJR 0.141 SNIP 0.171 CiteScore 0.09
Scopus rating (2013): SJR 0.143 SNIP 0.203 CiteScore 0.11
Scopus rating (2012): SJR 0.136 SNIP 0.265 CiteScore 0.12
Scopus rating (2011): SJR 0.15 SNIP 0.385 CiteScore 0.19
Scopus rating (2010): SJR 0.155 SNIP 0.232
Scopus rating (2009): SJR 0.168 SNIP 0.254
Scopus rating (2008): SJR 0.169 SNIP 0.238
Scopus rating (2007): SJR 0.186 SNIP 0.657
Lipid profile characterization of wastewaters from different origins

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Efimova, E., Marjakangas, J., Lakaniemi, A., Koskinen, P., Puhakka, J.
Number of pages: 10
Pages: 2505-2514
Publication date: 2013
Peer-reviewed: Yes

Publication information
Journal: Water Science and Technology
Volume: 68
Issue number: 11
ISSN (Print): 0273-1223
Ratings:
Scopus rating (2016): SJR 0.394 SNIP 0.621 CiteScore 1.3
Scopus rating (2015): SJR 0.466 SNIP 0.599 CiteScore 1.19
Scopus rating (2014): SJR 0.587 SNIP 0.685 CiteScore 1.14
Scopus rating (2013): SJR 0.568 SNIP 0.7 CiteScore 1.3
Scopus rating (2012): SJR 0.601 SNIP 0.669 CiteScore 1.13
Scopus rating (2011): SJR 0.591 SNIP 0.626 CiteScore 1.25
Scopus rating (2010): SJR 0.522 SNIP 0.602
Scopus rating (2009): SJR 0.589 SNIP 0.686
Scopus rating (2008): SJR 0.579 SNIP 0.697
Scopus rating (2007): SJR 0.749 SNIP 0.781
Scopus rating (2006): SJR 0.693 SNIP 0.796
Scopus rating (2005): SJR 0.763 SNIP 0.85
Scopus rating (2004): SJR 0.877 SNIP 0.904
Scopus rating (2003): SJR 0.882 SNIP 0.902
Scopus rating (2002): SJR 0.903 SNIP 0.888
Scopus rating (2001): SJR 0.759 SNIP 0.967
Scopus rating (2000): SJR 0.76 SNIP 0.885
Scopus rating (1999): SJR 0.889 SNIP 0.936
Original language: English
DOIs:
10.2166/wst.2013.538

Modification of the Escherichia coli metabolic model LAF1280 based on anaerobic experiments
Profiling of bacterial community in a full-scale aerobic composting plant

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Karadag, D., Özkaya, B., Ölmez, E., Nissilä, M. E., Cakmakçı, M., Yildiz, S., Puhakka, J. A.
Number of pages: 6
Pages: 85-90
Publication date: 2013
Peer-reviewed: Yes

Publication information
Journal: International Biodeterioration and Biodegradation
Volume: 77
ISSN (Print): 0964-8305
Ratings:
Scopus rating (2016): SJR 1.033 SNIP 1.555 CiteScore 3.38
Scopus rating (2015): SJR 0.899 SNIP 1.326 CiteScore 2.71
Scopus rating (2014): SJR 0.881 SNIP 1.389 CiteScore 2.53
Scopus rating (2013): SJR 0.873 SNIP 1.449 CiteScore 2.51
Scopus rating (2012): SJR 1.056 SNIP 1.289 CiteScore 2.31
Scopus rating (2011): SJR 0.919 SNIP 1.38 CiteScore 2.34
Scopus rating (2010): SJR 1.004 SNIP 1.27
Scopus rating (2009): SJR 1.114 SNIP 1.382
Scopus rating (2008): SJR 0.652 SNIP 1.118
Scopus rating (2007): SJR 0.657 SNIP 1.033
Scopus rating (2006): SJR 1.021 SNIP 1.431
Scopus rating (2005): SJR 0.56 SNIP 1.15
Scopus rating (2004): SJR 0.353 SNIP 0.752
Scopus rating (2003): SJR 0.408 SNIP 0.804
Scopus rating (2002): SJR 0.57 SNIP 0.661
Scopus rating (2001): SJR 0.557 SNIP 1.018
Screening of novel plants for biogas production in northern conditions

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Seppälä, M., Laine, A., Rintala, J.
Number of pages: 8
Pages: 355-362
Publication date: 2013
Peer-reviewed: Yes

Publication information
Journal: Bioresource Technology
Volume: 139
ISSN (Print): 0960-8524
Ratings:
Scopus rating (2016): SJR 2.191 SNIP 1.91 CiteScore 5.94
Scopus rating (2015): SJR 2.255 SNIP 1.908 CiteScore 5.47
Scopus rating (2014): SJR 2.41 SNIP 2.104 CiteScore 5.3
Scopus rating (2013): SJR 2.412 SNIP 2.503 CiteScore 5.97
Scopus rating (2012): SJR 2.389 SNIP 2.465 CiteScore 5.25
Scopus rating (2011): SJR 2.314 SNIP 2.508 CiteScore 5.56
Scopus rating (2010): SJR 2.086 SNIP 2.355
Scopus rating (2009): SJR 1.912 SNIP 2.231
Scopus rating (2008): SJR 1.734 SNIP 2.732
Scopus rating (2007): SJR 1.529 SNIP 2.423
Scopus rating (2006): SJR 1.315 SNIP 1.98
Scopus rating (2005): SJR 1.269 SNIP 2.006
Scopus rating (2004): SJR 1.197 SNIP 1.659
Scopus rating (2003): SJR 0.948 SNIP 1.639
Scopus rating (2002): SJR 0.882 SNIP 1.3
Scopus rating (2001): SJR 0.541 SNIP 1.208
Scopus rating (2000): SJR 0.464 SNIP 1.049
Scopus rating (1999): SJR 0.669 SNIP 1.061
Original language: English
DOIs:
10.1016/j.biortech.2013.04.014

Bibliographical note
Contribution: organisation=keb,FACT1=1<br/>Portfolio EDEND: 2013-11-29<br/>Publisher name: Elsevier
Source: researchoutputwizard
Source-ID: 3398
Research output: Scientific - peer-review › Article

S-Layer protein mediates the stimulatory effect of lactobacillus helveticus MIMLh5 on innate immunity

General information
Suppression of methanogenesis in cellulose-fed microbial fuel cells in relation to performance, metabolite formation, and microbial population

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Number of pages: 11
Pages: 1221-1231
Publication date: 2013
Peer-reviewed: Yes

Publication information
Journal: Applied and Environmental Microbiology
Volume: 79
Issue number: 4
ISSN (Print): 0099-2240
Ratings:
Scopus rating (2016): SJR 1.691 SNIP 1.243 CiteScore 4.08
Scopus rating (2015): SJR 1.896 SNIP 1.351 CiteScore 4.14
Scopus rating (2014): SJR 1.862 SNIP 1.402 CiteScore 4.02
Scopus rating (2013): SJR 1.909 SNIP 1.41 CiteScore 4.25
Scopus rating (2012): SJR 1.967 SNIP 1.427 CiteScore 4.29
Scopus rating (2011): SJR 1.91 SNIP 1.453 CiteScore 4.12
Scopus rating (2010): SJR 1.885 SNIP 1.431
Scopus rating (2009): SJR 1.975 SNIP 1.529
Scopus rating (2008): SJR 2.168 SNIP 1.574
Scopus rating (2007): SJR 2.045 SNIP 1.652
Scopus rating (2006): SJR 2.054 SNIP 1.594
Scopus rating (2005): SJR 2.078 SNIP 1.646
Scopus rating (2004): SJR 2.123 SNIP 1.641
Scopus rating (2003): SJR 2.108 SNIP 1.806
Scopus rating (2002): SJR 2.044 SNIP 1.739
Scopus rating (2001): SJR 2 SNIP 1.737
Scopus rating (2000): SJR 1.958 SNIP 1.75
Scopus rating (1999): SJR 2.316 SNIP 1.723
Original language: English
DOIs:
10.1128/AEM.03056-12

Bibliographical note
Contribution: organisation=keb,FACT1=1<br/>Portfolio EDEND: 2013-06-29<br/>Publisher name: American Society for Microbiology
Source: researchoutputwizard
Source-ID: 3518
Research output: Scientific - peer-review › Article

Suppression of methanogenesis in cellulose-fed microbial fuel cells in relation to performance, metabolite formation, and microbial population

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Authors: Rismani-Yazdi, H., Carver, S. M., Christy, A. D., Yu, Z., Bibby, K., Peccia, J., Tuovinen, O. H.
Number of pages: 8
Pages: 281-288
Publication date: 2013
Peer-reviewed: Yes

Publication information
Journal: Bioresource Technology
Volume: 129
Methane production from maize in Finland - Screening for different maize varieties and plant parts

The objective of the study was to determine how the harvest time and maize variety (12 varieties) affects the methane yield and dry matter yield per hectare in southern Finland (Piikkiö) and in Central Finland (Laukaa). The specific methane yields and methane yields per hectare were also determined for different plant parts (stem, leaves and cobs). The methane yield per hectare varied from 2130 to 9170 m³ ha⁻¹. The methane yields per hectare were ~50% lower in Laukaa than in Piikkiö due to a shorter growing season and lower total solid (TS) yields. TS yields were on average 16.7 and 15.5 Mg ha⁻¹ in Piikkiö and 8.7 and 6.8 Mg ha⁻¹ in Laukaa in 2007 and 2008, respectively. The specific methane yields varied from 366 to 491 dm³ kg⁻¹ volatile solid (VS) in 2007 and from 296 to 373 dm³ kg⁻¹ VS in 2008. The harvest time and sowing time did not affect the specific methane yields (p > 0.05). Whole maize crops produced more methane in batch assays than stem (372 dm³ kg⁻¹ VS), leaves (334 dm³ kg⁻¹ VS) and cobs (421 dm³ kg⁻¹ VS) alone, and also the specific methane yields per hectare were higher than the methane yield per hectare calculated for the various plant parts. Maize cultivation for biogas production appears to be feasible only in southern Finland. © 2012 Elsevier Ltd.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Tampere University of Technology, Urban circular bioeconomy (UrCirBio), Jyväskylä Yliopisto, MTT Agrifood Research Finland, Plant Production Research Horticulture, University of Jyväskylä, Department of Chemistry and Bioengineering
Authors: Seppälä, M., Pyykkönen, V., Laine, A., Rintala, J.
Number of pages: 9
Pages: 282-290
Publication date: Nov 2012
Peer-reviewed: Yes

Publication information
Journal: Biomass & Bioenergy
Volume: 46
Issue number: November
ISSN (Print): 0961-9534
Anaerobic digestion of pulp and paper mill primary sludge and co-digestion of primary and secondary sludge were studied for the first time in semi-continuously fed continuously stirred tank reactors (CSTR) in thermophilic conditions. Additionally, in batch experiments, methane potentials of 210 and 230 m$^3$CH$_4$/t volatile solids (VS) added were obtained for primary, and 50 and 100 m$^3$CH$_4$/tVS added for secondary sludge at 35 °C and 55 °C, respectively. Anaerobic digestion of primary sludge was shown to be feasible with organic loading rates (OLR) of 1-1.4 kgVS/m$^3$d and hydraulic retention times (HRT) of 16-32 d resulting in methane yields of 190-240 m$^3$CH$_4$/tVS fed. Also the highest tested OLR of 2 kgVS/m$^3$d and the shortest HRT of 14-16 d could be feasible, if pH stability is confirmed. Co-digestion of primary and secondary sludge with an OLR of 1 kgVS/m$^3$d and HRTs of 25-31 d resulted in methane yields of 150-170 m$^3$CH$_4$/tVS fed. In the digestion processes, cellulose and hemicellulose degraded while lignin did not. pH adjustment and nitrogen deficiency needs to be considered when planning anaerobic digestion of pulp and paper mill wastewater sludges. © 2012 Elsevier Ltd.

General information
State: Published
Organisations: Tampere University of Technology, Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio), Jyväskylän Yliopisto, University of Jyväskylä
Authors: Bayr, S., Rintala, J.
Number of pages: 8
Pages: 4713-4720
Publication date: 1 Oct 2012
Peer-reviewed: Yes

Publication information
Journal: Water Research
Volume: 46
Leachate formation and characteristics from gasification and grate incineration bottom ash under landfill conditions

Characteristics and formation of leachates from waste gasification and grate firing bottom ash were studied using continuous field measurements from 112 m³ lysimeters embedded into landfill body for three years. In addition, the total element concentrations of the fresh ash were analysed and laboratory batch tests were performed to study leachate composition. The three-year continuous flow measurement showed that about one fifth of the leachates were formed, when the flow rate was >200 l/d, covering <3.5% of the study time. After three years, the liquid/solid-ratio for the quenched grate ash was 1 (l/kg (d.m.)) and for the initially dry gasification ash 0.4 (l/kg (d.m.)). The low initial water and residual carbon content of the gasification ash kept the leachate pH at a high level (>13) major part of the study. In the grate ash leachate pH was lower (<8) due to the presence of organic carbon and biodegradation indicated by biological oxygen demand and redox potential measurements. In the gasification ash the high pH probably delayed leaching of major elements such as Ca, therefore, raising the need for a longer after-care period. The high pH also explains the higher leaching of As from the gasification ash compared to the grate ash both in the batch test and under landfill conditions. © 2011 Elsevier Ltd.
1,3-Propanediol production and tolerance of a halophilic fermentative bacterium, Halanaerobium saccharolyticum subsp saccharolyticum
Bioconversion of crude glycerol from biodiesel production to hydrogen

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Mangayil, R., Karp, M., Santala, V.
Pages: 12198-12204
Publication date: 2012
Peer-reviewed: Yes

Publication information
Volume: 37
Issue number: 17
ISSN (Print): 0360-3199
Ratings:
Scopus rating (2016): CiteScore 3.74 SJR 1.142 SNIP 1.286
Scopus rating (2015): SJR 1.294 SNIP 1.319 CiteScore 3.46
Scopus rating (2014): SJR 1.212 SNIP 1.494 CiteScore 3.54
Scopus rating (2013): SJR 1.278 SNIP 1.467 CiteScore 3.38
Scopus rating (2012): SJR 1.515 SNIP 1.729 CiteScore 3.96
Scopus rating (2011): SJR 1.456 SNIP 1.837 CiteScore 4.42
Scopus rating (2010): SJR 1.589 SNIP 1.871
Scopus rating (2009): SJR 1.333 SNIP 1.885
Scopus rating (2008): SJR 1.401 SNIP 2.096
Scopus rating (2007): SJR 1.279 SNIP 2.201
Scopus rating (2006): SJR 1.073 SNIP 2.161
Scopus rating (2005): SJR 1.107 SNIP 1.787
Scopus rating (2004): SJR 1.225 SNIP 1.626
Scopus rating (2003): SJR 1.003 SNIP 1.319
Scopus rating (2002): SJR 0.763 SNIP 1.157
Scopus rating (2001): SJR 0.487 SNIP 1.185
Scopus rating (2000): SJR 0.518 SNIP 0.866
Scopus rating (1999): SJR 0.382 SNIP 0.897
Original language: English
Bioelectricity production using a new electrode in a microbial fuel cell

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Authors: Özkaya, B., Akoglu, B., Karadag, D., Aci, G., Taskan, E., Hasar, H.
Pages: 1219-1227
Publication date: 2012
Peer-reviewed: Yes

Publication information
Journal: Bioprocess and Biosystems Engineering
Volume: 35
Issue number: 7
ISSN (Print): 1615-7591
Ratings:
Scopus rating (2016): SJR 0.628 SNIP 0.956 CiteScore 1.96
Scopus rating (2015): SJR 0.687 SNIP 0.887 CiteScore 1.97
Scopus rating (2014): SJR 0.699 SNIP 0.968 CiteScore 1.95
Scopus rating (2013): SJR 0.792 SNIP 1.085 CiteScore 2.16
Scopus rating (2012): SJR 0.767 SNIP 1.111 CiteScore 2.14
Scopus rating (2011): SJR 0.699 SNIP 0.888 CiteScore 1.92
Scopus rating (2010): SJR 0.805 SNIP 0.996
Scopus rating (2009): SJR 0.675 SNIP 0.94
Scopus rating (2008): SJR 0.587 SNIP 0.876
Scopus rating (2007): SJR 0.656 SNIP 0.822
Scopus rating (2006): SJR 0.54 SNIP 0.957
Scopus rating (2005): SJR 0.379 SNIP 0.719
Scopus rating (2004): SJR 0.457 SNIP 0.909
Scopus rating (2003): SJR 0.436 SNIP 0.878
Scopus rating (2002): SJR 0.445 SNIP 0.62
Scopus rating (2001): SJR 0.394 SNIP 0.604
Scopus rating (2000): SJR 0.429 SNIP 0.793
Scopus rating (1999): SJR 0.489 SNIP 0.629
Original language: English
DOIs:
10.1007/s00449-012-0709-1

Bioluminescence-based identification of nisin producers - A rapid and simple screening method for nisinogenic bacteria in food samples

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Dark fermentative hydrogen production from neutralized acid hydrolysates of conifer pulp

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Nissila, M. E., Li, Y., Wu, S., Puhakka, J. A.
Pages: 2160-2169
Publication date: 2012
Peer-reviewed: Yes

Publication information
Journal: Applied Biochemistry and Biotechnology
Volume: 168
Issue number: 8
ISSN (Print): 0273-2289
Ratings:
Scopus rating (2016): SJR 0.559 SNIP 0.738 CiteScore 1.81
Scopus rating (2015): SJR 0.57 SNIP 0.74 CiteScore 1.67
Scopus rating (2014): SJR 0.642 SNIP 0.939 CiteScore 1.92
Scopus rating (2013): SJR 0.744 SNIP 1.024 CiteScore 2.18
Scopus rating (2012): SJR 0.797 SNIP 1.034 CiteScore 2.04
Scopus rating (2011): SJR 0.8 SNIP 0.947 CiteScore 1.92
Scopus rating (2010): SJR 0.7 SNIP 0.905
Scopus rating (2009): SJR 0.644 SNIP 0.715
Scopus rating (2008): SJR 0.52 SNIP 0.629
Scopus rating (2007): SJR 0.505 SNIP 0.66
Scopus rating (2006): SJR 0.542 SNIP 0.819
Scopus rating (2005): SJR 0.435 SNIP 0.692
Scopus rating (2004): SJR 0.542 SNIP 0.772
Scopus rating (2003): SJR 0.434 SNIP 0.694
Scopus rating (2002): SJR 0.493 SNIP 0.735
Dark fermentative hydrogen production from xylose by a hot spring enrichment culture

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Mäkinen, A. E., Nissilä, M. E., Puhakka, J. A.
Pages: 12234-12240
Publication date: 2012
Peer-reviewed: Yes

Publication information
Volume: 37
Issue number: 17
ISSN (Print): 0360-3199
Ratings:
Scopus rating (2016): CiteScore 3.74 SJR 1.142 SNIP 1.286
Scopus rating (2015): SJR 1.294 SNIP 1.319 CiteScore 3.46
Scopus rating (2014): SJR 1.212 SNIP 1.494 CiteScore 3.54
Scopus rating (2013): SJR 1.278 SNIP 1.467 CiteScore 3.38
Scopus rating (2012): SJR 1.515 SNIP 1.729 CiteScore 3.96
Scopus rating (2011): SJR 1.456 SNIP 1.837 CiteScore 4.42
Scopus rating (2010): SJR 1.589 SNIP 1.871
Scopus rating (2009): SJR 1.333 SNIP 1.885
Scopus rating (2008): SJR 1.401 SNIP 2.096
Scopus rating (2007): SJR 1.279 SNIP 2.201
Scopus rating (2006): SJR 1.073 SNIP 2.161
Scopus rating (2005): SJR 1.107 SNIP 1.787
Scopus rating (2004): SJR 1.225 SNIP 1.626
Scopus rating (2003): SJR 1.003 SNIP 1.319
Scopus rating (2002): SJR 0.763 SNIP 1.157
Scopus rating (2001): SJR 0.487 SNIP 1.185
Scopus rating (2000): SJR 0.518 SNIP 0.866
Scopus rating (1999): SJR 0.382 SNIP 0.897
Original language: English
DOIs:
10.1016/j.ijhydene.2012.05.158

Bibliographical note
Contribution: organisation=keb bio,FACT1=1
Source: researchoutputwizard
Source-ID: 4786
Research output: Scientific - peer-review › Article
Direct fermentation of sweet potato to produce maximal hydrogen and ethanol

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Authors: Chu, C., Sen, B., Lay, C., Lin, Y., Lin, C.
Pages: 10-18
Publication date: 2012
Peer-reviewed: Yes

Publication information
Journal: Applied Energy
Volume: 100
ISSN (Print): 0306-2619

Effect of additives on process stability of mesophilic anaerobic monodigestion of pig slaughterhouse waste

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Bayr, S., Pakarinen, O., Korppoo, A., Liukis, S., Väisänen, A., Kaparaju, P., Rintala, J.
Number of pages: 8
Pages: 106-113
Publication date: 2012
Peer-reviewed: Yes

Publication information
Journal: Bioresource Technology
Volume: 120
Issue number: September
ISSN (Print): 0960-8524
Effect of effluent recycle ratio in a continuous anaerobic biohydrogen production system

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Authors: Chen, C., Sen, B., Chuang, Y., Tsai, C., Lay, C.
Pages: 236-243
Publication date: 2012
Peer-reviewed: Yes

Publication information
Journal: Journal of Cleaner Production
Volume: 32
ISSN (Print): 0959-6526
Ratings:
Scopus rating (2016): CiteScore 5.83 SJR 1.615 SNIP 2.382
Scopus rating (2015): SJR 1.609 SNIP 2.383 CiteScore 5.57
Scopus rating (2014): SJR 1.661 SNIP 2.477 CiteScore 4.6
Scopus rating (2013): SJR 1.644 SNIP 2.581 CiteScore 4.47
Scopus rating (2012): SJR 1.706 SNIP 2.328 CiteScore 4.07
Scopus rating (2011): SJR 1.461 SNIP 1.825 CiteScore 3.19
Scopus rating (2010): SJR 1.419 SNIP 1.742
Scopus rating (2009): SJR 0.942 SNIP 1.544
Scopus rating (2008): SJR 0.813 SNIP 1.354
Scopus rating (2007): SJR 0.942 SNIP 1.489
Scopus rating (2006): SJR 0.842 SNIP 1.543
Scopus rating (2005): SJR 0.544 SNIP 1.357
Scopus rating (2004): SJR 0.753 SNIP 1.818
Energy Demands of Nitrogen Supply in Mass Cultivation of Two Commercially Important Microalgal Species, Chlorella vulgaris and Dunaliella tertiolecta

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Hulatt, C. J., Lakaniemi, A., Puhakka, J. A., Thomas, D. N.
Pages: 669-684
Publication date: 2012
Peer-reviewed: Yes

Publication information
Journal: BioEnergy Research
Volume: 5
Issue number: 3
ISSN (Print): 1939-1234
Ratings:
Scopus rating (2016): SJR 0.943 SNIP 0.932 CiteScore 2.64
Scopus rating (2015): SJR 1.317 SNIP 1.285 CiteScore 3.35
Scopus rating (2014): SJR 1.453 SNIP 1.344 CiteScore 3.64
Scopus rating (2013): SJR 1.162 SNIP 1.384 CiteScore 3.66
Scopus rating (2012): SJR 1.362 SNIP 1.645 CiteScore 4.23
Scopus rating (2011): SJR 1 SNIP 1.435 CiteScore 3.16
Scopus rating (2010): SJR 0.458 SNIP 0.671
Original language: English
DOIs: 10.1007/s12155-011-9175-x

Bibliographical note
Contribution: organisation=keb bio,FACT1=1<br/>Publisher name: Springer-Verlag
Source-ID: 4239
Research output: Scientific - peer-review › Article

Enhancing biohydrogen production of the alkalithermophile Thermobrachium celere

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Ciranna, A., Santala, V., Karp, M.
Pages: 5550-5558
Publication date: 2012
Peer-reviewed: Yes

Publication information
Eukaryotic and prokaryotic microbial communities during microalgae biomass production

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Lakaniemi, A., Hulatt, C. J., Wakeman, K. D., Thomas, D. N., Puhakka, J. A.
Pages: 387-393
Publication date: 2012
Peer-reviewed: Yes

Publication information
Journal: Bioresource Technology
Volume: 124
Issue number: November
ISSN (Print): 0960-8524
Ratings:
Scopus rating (2016): SJR 2.191 SNIP 1.91 CiteScore 5.94
Scopus rating (2015): SJR 2.255 SNIP 1.908 CiteScore 5.47
Scopus rating (2014): SJR 2.41 SNIP 2.104 CiteScore 5.3
Scopus rating (2013): SJR 2.412 SNIP 2.503 CiteScore 5.97
Scopus rating (2012): SJR 2.389 SNIP 2.465 CiteScore 5.25
Scopus rating (2011): SJR 2.314 SNIP 2.508 CiteScore 5.56
Scopus rating (2010): SJR 2.086 SNIP 2.355
Scopus rating (2009): SJR 1.912 SNIP 2.231
Scopus rating (2008): SJR 1.734 SNIP 2.732
Fluidized-bed bioreactor applications for the treatment of metal-, sulfate- and nitrate-contaminated mine waters

General information
State: Published
Ministry of Education publication type: G4 Doctoral dissertation (monograph)
Organisations: Department of Chemistry and Bioengineering
Authors: Papirio, S.
Publication date: 2012

Publication information
Publisher: Università degli Studi di Cassino e del Lazio Meridionale
Original language: English

Publication series
Name: Università degli Studi di Cassino e del Lazio Meridionale
Publisher: Università degli Studi di Cassino e del Lazio Meridionale

Bibliographical note
Awarding institution: Università degli Studi di Cassino e del Lazio Meridionale
Source: researchoutputwizard
Source-ID: 5017
Research output: Monograph › Doctoral Thesis

Growth of Chlorella vulgaris and associated bacteria in photobioreactors

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Lakaniemi, A., Intihar, V. M., Tuovinen, O. H., Puhakka, J. A.
Pages: 69-78
Publication date: 2012
Peer-reviewed: Yes

Publication information
Journal: Microbial Biotechnology
Volume: 5
Issue number: 1
ISSN (Print): 0964-7562
Ratings:
Scopus rating (2016): SJR 1.207 SNIP 0.992 CiteScore 3.56
Scopus rating (2015): SJR 1.382 SNIP 1.124 CiteScore 3.59
Scopus rating (2014): SJR 1.37 SNIP 1.18 CiteScore 3.19
Growth of Dunaliella tertiolecta and associated bacteria in photobioreactors

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Lakaniemi, A., Intihar, V. M., Tuovinen, O. H., Puhakka, J. A.
Pages: 1357-1365
Publication date: 2012
Peer-reviewed: Yes

Publication information
Journal: Journal of Industrial Microbiology and Biotechnology
Volume: 39
Issue number: 9
ISSN (Print): 1367-5435
Ratings:
Scopus rating (2016): SJR 0.941 SNIP 0.944 CiteScore 2.87
Scopus rating (2015): SJR 0.967 SNIP 0.998 CiteScore 2.65
Scopus rating (2014): SJR 0.962 SNIP 1.339 CiteScore 2.66
Scopus rating (2013): SJR 1.047 SNIP 1.282 CiteScore 2.86
Scopus rating (2012): SJR 1.128 SNIP 1.509 CiteScore 2.78
Scopus rating (2011): SJR 1.171 SNIP 1.446 CiteScore 2.94
Scopus rating (2010): SJR 0.985 SNIP 1.27
Scopus rating (2009): SJR 0.83 SNIP 0.985
Scopus rating (2008): SJR 0.812 SNIP 0.927
Scopus rating (2007): SJR 0.683 SNIP 0.96
Scopus rating (2006): SJR 0.742 SNIP 0.989
Scopus rating (2005): SJR 0.713 SNIP 1.062
Scopus rating (2004): SJR 0.663 SNIP 0.78
Scopus rating (2003): SJR 0.551 SNIP 0.729
Scopus rating (2002): SJR 0.515 SNIP 0.522
Scopus rating (2001): SJR 0.523 SNIP 0.713
Scopus rating (2000): SJR 0.599 SNIP 0.746
Scopus rating (1999): SJR 0.769 SNIP 0.942
Original language: English
DOI:s: 10.1007/s10295-012-1133-x

Bibliographical note
Contribution: organisation=keb bio,FACT1=1
Publisher name: Springer-Verlag
Source: researchoutputwizard
Source-ID: 4644
Research output: Scientific - peer-review › Article
Hydrogen and volatile fatty acid production during fermentation of cellulosic substrates by a thermophilic consortium at 50 and 60 °C

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Authors: Carver, S. M., Nelson, M. C., Lepistö, R., Yu, Z., Tuovinen, O. H.
Pages: 424-431
Publication date: 2012
Peer-reviewed: Yes

Publication information
Journal: Bioresource Technology
Volume: 104
Issue number: January
ISSN (Print): 0960-8524
Ratings:
Scopus rating (2016): SJR 2.191 SNIP 1.91 CiteScore 5.94
Scopus rating (2015): SJR 2.255 SNIP 1.908 CiteScore 5.47
Scopus rating (2014): SJR 2.41 SNIP 2.104 CiteScore 5.3
Scopus rating (2013): SJR 2.412 SNIP 2.503 CiteScore 5.97
Scopus rating (2012): SJR 2.389 SNIP 2.465 CiteScore 5.25
Scopus rating (2011): SJR 2.314 SNIP 2.508 CiteScore 5.56
Scopus rating (2010): SJR 2.086 SNIP 2.355
Scopus rating (2009): SJR 1.912 SNIP 2.231
Scopus rating (2008): SJR 1.734 SNIP 2.732
Scopus rating (2007): SJR 1.529 SNIP 2.423
Scopus rating (2006): SJR 1.315 SNIP 1.98
Scopus rating (2005): SJR 1.269 SNIP 2.006
Scopus rating (2004): SJR 1.197 SNIP 1.659
Scopus rating (2003): SJR 0.948 SNIP 1.639
Scopus rating (2002): SJR 0.882 SNIP 1.3
Scopus rating (2001): SJR 0.541 SNIP 1.208
Scopus rating (2000): SJR 0.464 SNIP 1.049
Scopus rating (1999): SJR 0.669 SNIP 1.061
Original language: English
DOIs:
10.1016/j.biortech.2011.11.013

Bibliographical note
Contribution: organisation=keb bio,FACT1=1<br/>Publisher name: Elsevier BV
Source: researchoutputwizard
Source-ID: 3956
Research output: Scientific - peer-review › Article

Hydrogenic and methanogenic fermentation of birch and conifer pulps

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Nissilä, M. E., Li, Y., Wu, S., Lin, C., Puhakka, J. A.
Pages: 58-65
Publication date: 2012
Peer-reviewed: Yes

Publication information
In Vitro functional and immunomodulatory properties of the Lactobacillus helveticus MIMLh5-Streptococcus salivarius ST3 association that are relevant to the development of a Pharyngeal probiotic product
Landfill gas upgrading with pilot-scale water scrubber: Performance assessment with adsorption water recycling

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Urban circular bioeconomy (UrCirBio), Former organisation of the author
Authors: Läntelä, J., Rasi, S., Lehtinen, J., Rintala, J.
Pages: 307-314
Publication date: 2012
Peer-reviewed: Yes

Publication information
Journal: Applied Energy
Volume: 92
Issue number: April
ISSN (Print): 0306-2619
Ratings:
Scopus rating (2016): SJR 3.058 SNIP 2.573 CiteScore 7.78
Scopus rating (2015): SJR 2.912 SNIP 2.61 CiteScore 6.4
Scopus rating (2014): SJR 3.254 SNIP 3.28 CiteScore 6.93
Scopus rating (2013): SJR 3.164 SNIP 3.377 CiteScore 6.59
Scopus rating (2012): SJR 2.854 SNIP 3.108 CiteScore 5.69
Scopus rating (2011): SJR 2.473 SNIP 2.84 CiteScore 5.5
Scopus rating (2010): SJR 1.516 SNIP 2.25
Scopus rating (2009): SJR 1.003 SNIP 1.781
Scopus rating (2008): SJR 0.974 SNIP 1.215
Scopus rating (2007): SJR 1.179 SNIP 1.709
Scopus rating (2006): SJR 0.979 SNIP 1.293
Scopus rating (2005): SJR 1.043 SNIP 0.996
Scopus rating (2004): SJR 0.643 SNIP 0.839
Scopus rating (2003): SJR 0.778 SNIP 0.797
Scopus rating (2002): SJR 0.577 SNIP 0.775
Scopus rating (2001): SJR 0.376 SNIP 0.578
Scopus rating (2000): SJR 0.352 SNIP 0.515
Scopus rating (1999): SJR 0.182 SNIP 0.45
Original language: English
DOIs:
Ligninolytic enzymes improve soil DNA purity: Solution to methodological challenges of soil metagenomics

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Sharma, K. K., Sharma, S., Karp, M., Kuhad, R. C.
Pages: 73-79
Publication date: 2012
Peer-reviewed: Yes

Publication information
Journal: Journal of Molecular Catalysis B: Enzymatic
Volume: 83
Issue number: November
ISSN (Print): 1381-1177
Ratings:
Scopus rating (2016): SJR 0.63 SNIP 0.855 CiteScore 2.39
Scopus rating (2015): SJR 0.66 SNIP 0.802 CiteScore 2.12
Scopus rating (2014): SJR 0.744 SNIP 1.044 CiteScore 2.5
Scopus rating (2013): SJR 1.038 SNIP 1.38 CiteScore 3.09
Scopus rating (2012): SJR 1.12 SNIP 1.347 CiteScore 2.98
Scopus rating (2011): SJR 1.026 SNIP 1.126 CiteScore 2.74
Scopus rating (2010): SJR 0.797 SNIP 1.032
Scopus rating (2009): SJR 0.898 SNIP 1.136
Scopus rating (2008): SJR 0.975 SNIP 1.021
Scopus rating (2007): SJR 0.835 SNIP 1.007
Scopus rating (2006): SJR 0.723 SNIP 1.069
Scopus rating (2005): SJR 0.742 SNIP 0.955
Scopus rating (2004): SJR 0.574 SNIP 0.782
Scopus rating (2003): SJR 0.585 SNIP 0.856
Scopus rating (2002): SJR 0.599 SNIP 0.788
Scopus rating (2001): SJR 0.562 SNIP 0.821
Scopus rating (2000): SJR 0.538 SNIP 0.745
Scopus rating (1999): SJR 0.53 SNIP 0.736
Original language: English
DOIs:
10.1016/j.molcatb.2012.07.010

Mesophilic and thermophilic anaerobic co-digestion of rendering plant and slaughterhouse wastes

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Bayr, S., Rantanen, M., Kaparaju, P., Rintala, J.
Microbial community dynamics during a demonstration-scale bioheap leaching operation

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Pages: 34-41
Publication date: 2012
Peer-reviewed: Yes

Publication information
Journal: Hydrometallurgy
Volume: 125-126
ISSN (Print): 0304-386X
Ratings:
Scopus rating (2016): SJR 1.148 SNIP 1.737 CiteScore 2.8
Scopus rating (2015): SJR 1.173 SNIP 1.888 CiteScore 2.78
Scopus rating (2014): SJR 1.247 SNIP 2.25 CiteScore 2.7
Scopus rating (2013): SJR 1.626 SNIP 2.967 CiteScore 2.95
Scopus rating (2012): SJR 1.523 SNIP 2.4 CiteScore 2.6
Monitoring alkane degradation by single biobrick integration to an optimal cellular framework

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Santala, S., Karp, M., Santala, V.
Pages: 60-64
Publication date: 2012
Peer-reviewed: Yes

Publication information
Journal: ACS Synthetic Biology
Volume: 1
Issue number: 2
ISSN (Print): 2161-5063
Ratings:
Scopus rating (2016): SJR 2.736 SNIP 1.024 CiteScore 4.7
Scopus rating (2015): SJR 2.269 SNIP 1.049 CiteScore 4.41
Scopus rating (2014): SJR 3.783 SNIP 1.219 CiteScore 3.84
Scopus rating (2013): SJR 1.796 SNIP 0.859 CiteScore 3.42
Original language: English
DOIs:
10.1021/sb2000066

Bibliographical note
Contribution: organisation=keb bio,FACT1=1<br/>Publisher name: American Chemical Society ACS
Source: researchoutputwizard
Source-ID: 5275
Research output: Scientific - peer-review › Article

Processing and sustained in vitro release of rifampicin containing composites to enhance the treatment of osteomyelitis

The objective in this study was to develop an osteoconductive, biodegradable and rifampicin releasing bone filling composite material for the treatment of osteomyelitis, a bacterial infection of bone that is very difficult and expensive to treat. The composite material will be used together with a ciprofloxacin releasing composite, because of the rapid development of resistant bacteria when rifampicin is used alone. Three composites were manufactured by twin-screw extrusion. The polymer matrix for the composites was poly(L-lactide-co-ε-caprolactone) 70/30 and all the composites contained 8 wt% (weight percent) of rifampicin antibiotic. The b-TCP contents of the composites were 0 wt%, 50 wt% and
60 wt%. The composites were sterilized by gamma irradiation before in vitro degradation and drug release tests. The hydrolytical degradation of the studied composites proceeded quickly and the molecular weight of the polymer component of the composites decreased rapidly. Rifampicin release occurred in four phases in which the high b-TCP content of the samples, polymer degradation and mass loss all played a role in determining the phases. The ceramic component was seen to have a positive effect on the drug release. The composite with 50 wt% of b-TCP showed the most promising rifampicin release profile and it also showed activity against a common osteomyelitis causing bacteria Pseudomonas aeruginosa. A clear inhibition zone was formed in 16 h incubation. Overall, the tested materials showed great potential to be developed into a bone filler material for the treatment of osteomyelitis or other bone related infections in combination with the ciprofloxacin releasing materials.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Biomedical Engineering, Department of Chemistry and Bioengineering, Frontier Photonics, Integrated Technologies for Tissue Engineering Research (ITTE), Urban circular bioeconomy (UrCirBio)
Authors: Ahola, N., Veiranto, M., Männistö, N., Karp, M., Rich, J., Efimov, A., Seppälä, J., Kellomäki, M.
Number of pages: 13
Pages: 1-13
Publication date: 2012
Peer-reviewed: Yes

Publication information
Journal: Biomatter
Volume: 2
Issue number: 4
ISSN (Print): 2159-2527
Ratings:
Scopus rating (2016): SJR 0.579 SNIP 3.262 CiteScore 1.92
Scopus rating (2015): SJR 0.627 SNIP 1.402 CiteScore 2.67
Scopus rating (2014): SJR 0.632 SNIP 0.47 CiteScore 2.39
Scopus rating (2013): SJR 0.329 CiteScore 1.2
Scopus rating (2012): SJR 0.143
Original language: English
Electronic versions:
ahola_processing_and_sustained_in_vitro_release.pdf
DOIs: 10.4161/biom.22793
Links:
http://www.landesbioscience.com/journals/biomatter/
http://urn.fi/URN:NBN:fi:tty-201401301068

Bibliographical note
ei ut-numeroa 9.8.2013<br/>Contribution: organisation=bme,FACT1=0.8<br/>Contribution: organisation=keb bio,FACT2=0.1<br/>Publisher name: Landes Bioscience
Source: researchoutputwizard
Source-ID: 3813
Research output: Scientific - peer-review › Article

Production of Electricity and Butanol from Microalgal Biomass in Microbial Fuel Cells

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Lakaniemi, A., Tuovinen, O. H., Puhakka, J. A.
Pages: 481-491
Publication date: 2012
Peer-reviewed: Yes

Publication information
Journal: BioEnergy Research
Volume: 5
Issue number: 2
ISSN (Print): 1939-1234
Seed inocula for biohydrogen production from biodiesel solid residues

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Authors: Kumar, G., Lay, C., Chu, C., Wu, J., Lee, S., Lin, C.
Pages: 15489-15495
Publication date: 2012
Peer-reviewed: Yes

Publication information
Volume: 37
Issue number: 29
ISSN (Print): 0360-3199
Ratings:
Scopus rating (2016): CiteScore 3.74 SJR 1.142 SNIP 1.286
Scopus rating (2015): SJR 1.294 SNIP 1.319 CiteScore 3.46
Scopus rating (2014): SJR 1.212 SNIP 1.494 CiteScore 3.54
Scopus rating (2013): SJR 1.278 SNIP 1.467 CiteScore 3.38
Scopus rating (2012): SJR 1.515 SNIP 1.729 CiteScore 3.96
Scopus rating (2011): SJR 1.456 SNIP 1.837 CiteScore 4.42
Scopus rating (2010): SJR 1.589 SNIP 1.871
Scopus rating (2009): SJR 1.333 SNIP 1.885
Scopus rating (2008): SJR 1.401 SNIP 2.096
Scopus rating (2007): SJR 1.279 SNIP 2.201
Scopus rating (2006): SJR 1.073 SNIP 2.161
Scopus rating (2005): SJR 1.107 SNIP 1.787
Scopus rating (2004): SJR 1.225 SNIP 1.626
Scopus rating (2003): SJR 1.003 SNIP 1.319
Scopus rating (2002): SJR 0.763 SNIP 1.157
Scopus rating (2001): SJR 0.487 SNIP 1.185
Scopus rating (2000): SJR 0.518 SNIP 0.866
Scopus rating (1999): SJR 0.382 SNIP 0.897
Original language: English
DOIs:
10.1016/j.ijhydene.2012.04.016

Bibliographical note
Contribution: organisation=keb bio,FACT1=1
Publisher name: Elsevier
Silage as source of bacteria and electrons for dark fermentative hydrogen production

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Li, Y., Nissilä, M. E., Wu, S., Lin, C., Puhakka, J. A.
Pages: 15518-15524
Publication date: 2012
Peer-reviewed: Yes

Publication information
Volume: 37
Issue number: 20
ISSN (Print): 0360-3199
Ratings:
Scopus rating (2016): CiteScore 3.74 SJR 1.142 SNIP 1.286
Scopus rating (2015): SJR 1.294 SNIP 1.319 CiteScore 3.46
Scopus rating (2014): SJR 1.212 SNIP 1.494 CiteScore 3.54
Scopus rating (2013): SJR 1.278 SNIP 1.467 CiteScore 3.38
Scopus rating (2012): SJR 1.515 SNIP 1.729 CiteScore 3.96
Scopus rating (2011): SJR 1.456 SNIP 1.837 CiteScore 4.42
Scopus rating (2010): SJR 1.589 SNIP 1.871
Scopus rating (2009): SJR 1.333 SNIP 1.885
Scopus rating (2008): SJR 1.401 SNIP 2.096
Scopus rating (2007): SJR 1.279 SNIP 2.201
Scopus rating (2006): SJR 1.073 SNIP 2.161
Scopus rating (2005): SJR 1.107 SNIP 1.787
Scopus rating (2004): SJR 1.225 SNIP 1.626
Scopus rating (2003): SJR 1.003 SNIP 1.319
Scopus rating (2002): SJR 0.763 SNIP 1.157
Scopus rating (2001): SJR 0.487 SNIP 1.185
Scopus rating (2000): SJR 0.518 SNIP 0.866
Scopus rating (1999): SJR 0.382 SNIP 0.897
Original language: English
DOIs:
10.1016/j.ijhydene.2012.04.060

Bibliographical note
Contribution: organisation=keb bio,FACT1=1<br/>Publisher name: Elsevier Ltd
Source: researchoutputwizard
Source-ID: 4704
Research output: Scientific - peer-review › Article

Synthesis, characterization and antimicrobial activity of arylhydrazones of methylene active compounds

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Signal Processing, Department of Chemistry and Bioengineering, Research group: Computational Systems Biology, Multi-scaled biodata analysis and modelling (MultiBAM), Prostate cancer research center (PCRC), Urban circular bioeconomy (UrCirBio)
Authors: Kandhavelu, M., Paturu, L., Mizar, A., Mahmudov, K., Kopylovich, M., Karp, M., Yli-Harja, O., Pombeiro, A., Ribeiro, A. S.
Toxicity of waste gasification bottom ash leachate

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Urban circular bioeconomy (UrCirBio), Former organisation of the author
Authors: Sivula, L., Oikari, A., Rintala, J.
Pages: 1171-1178
Publication date: 2012
Peer-reviewed: Yes

Publication information
Journal: Waste Management
Volume: 32
Issue number: 6
ISSN (Print): 0956-053X
Ratings:
Scopus rating (2016): CiteScore 4 SJR 1.354 SNIP 2.044
Scopus rating (2015): SJR 1.739 SNIP 2.256 CiteScore 4.33
Scopus rating (2014): SJR 1.777 SNIP 2.482 CiteScore 3.43
Scopus rating (2013): SJR 1.822 SNIP 2.435 CiteScore 3.39
Archaeal communities in boreal forest tree rhizospheres respond to changing soil temperatures

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Authors: Bomberg, M., Munster, U., Pumpanen, J., Ilvesniemi, H., Heinonsalo, J.
Pages: 205-217
Publication date: 2011
Peer-reviewed: Yes

Publication information
Journal: Microbial Ecology
Volume: 62
Issue number: 1
ISSN (Print): 0095-3628
Ratings:

Scopus rating (2016): SJR 1.295 SNIP 1.116 CiteScore 3.55
Scopus rating (2015): SJR 1.334 SNIP 1.021 CiteScore 3.13
Scopus rating (2014): SJR 1.316 SNIP 1.136 CiteScore 3.08
Scopus rating (2013): SJR 1.408 SNIP 1.245 CiteScore 3.7
Scopus rating (2012): SJR 1.417 SNIP 1.279 CiteScore 3.36
Scopus rating (2011): SJR 1.299 SNIP 1.186 CiteScore 3.04
Scopus rating (2010): SJR 1.299 SNIP 1.158
Scopus rating (2009): SJR 1.464 SNIP 1.168
Scopus rating (2008): SJR 1.253 SNIP 1.058
Scopus rating (2007): SJR 1.283 SNIP 1.157
Scopus rating (2006): SJR 1.266 SNIP 1.12
Scopus rating (2005): SJR 1.42 SNIP 1.386
Scopus rating (2004): SJR 1.413 SNIP 1.2
Scopus rating (2003): SJR 1.273 SNIP 1.106
Scopus rating (2002): SJR 1.132 SNIP 0.927
Scopus rating (2001): SJR 1.536 SNIP 1.395
Scopus rating (2000): SJR 1.506 SNIP 1.207
A thermophilic microbial fuel cell design

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Authors: Carver, S. M., Vuoriranta, P., Tuovinen, O. H.
Pages: 3757-3760
Publication date: 2011
Peer-reviewed: Yes

Publication Information
Journal: Journal of Power Sources
Volume: 196
Issue number: 8
ISSN (Print): 0378-7753
Ratings:
Scopus rating (2016): CiteScore 6.22 SJR 1.945 SNIP 1.483
Scopus rating (2015): SJR 1.945 SNIP 1.686 CiteScore 6.34
Scopus rating (2014): SJR 1.983 SNIP 2.071 CiteScore 6.3
Scopus rating (2013): SJR 1.985 SNIP 2.138 CiteScore 5.63
Scopus rating (2012): SJR 2.293 SNIP 2.016 CiteScore 5.04
Scopus rating (2011): SJR 2.247 SNIP 2.181 CiteScore 5.13
Scopus rating (2010): SJR 2.297 SNIP 1.981
Scopus rating (2009): SJR 2.117 SNIP 1.793
Scopus rating (2008): SJR 1.968 SNIP 1.726
Scopus rating (2007): SJR 1.597 SNIP 1.489
Scopus rating (2006): SJR 1.8 SNIP 2.224
Scopus rating (2005): SJR 1.65 SNIP 1.825
Scopus rating (2004): SJR 1.852 SNIP 1.818
Scopus rating (2003): SJR 1.66 SNIP 1.583
Scopus rating (2002): SJR 1.959 SNIP 1.4
Scopus rating (2001): SJR 1.115 SNIP 1.492
Scopus rating (2000): SJR 1.106 SNIP 0.914
Scopus rating (1999): SJR 0.854 SNIP 0.998
Original language: English
DOIs:
10.1016/j.jpowsour.2010.12.088

Bibliographical note
Contribution: organisation=keb bio,FACT1=1
Source: researchoutputwizard
Source-ID: 5791
Research output: Scientific - peer-review › Article
Bidirectional fluorescence resonance energy transfer (FRET) in mutated and chemically modified yellow fluorescent protein (YFP)

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Research group: Supramolecular photochemistry, Frontier Photonics, Urban circular bioeconomy (UrCirBio)
Authors: George Abraham, B., Tkachenko, N. V., Santala, V., Lemmetyinen, H., Karp, M.
Pages: 227-234
Publication date: 2011
Peer-reviewed: Yes

Publication information
Journal: Bioconjugate Chemistry
Volume: 22
Issue number: 2
ISSN (Print): 1043-1802
Ratings:
Scopus rating (2016): SJR 1.781 SNIP 1.071 CiteScore 4.63
Scopus rating (2015): SJR 1.686 SNIP 1.073 CiteScore 4.64
Scopus rating (2014): SJR 1.704 SNIP 1.177 CiteScore 4.85
Scopus rating (2013): SJR 2.012 SNIP 1.208 CiteScore 5.12
Scopus rating (2012): SJR 2.069 SNIP 1.267 CiteScore 4.8
Scopus rating (2011): SJR 2.28 SNIP 1.292 CiteScore 5.26
Scopus rating (2010): SJR 2.252 SNIP 1.203
Scopus rating (2009): SJR 2.03 SNIP 1.111
Scopus rating (2008): SJR 2.154 SNIP 1.154
Scopus rating (2007): SJR 2.029 SNIP 1.284
Scopus rating (2006): SJR 1.693 SNIP 1.145
Scopus rating (2005): SJR 1.661 SNIP 1.159
Scopus rating (2004): SJR 1.346 SNIP 1.154
Scopus rating (2003): SJR 1.343 SNIP 1.251
Scopus rating (2002): SJR 1.087 SNIP 1.197
Scopus rating (2001): SJR 1.091 SNIP 1.059
Scopus rating (2000): SJR 1.022 SNIP 1.08
Scopus rating (1999): SJR 1.502 SNIP 1.406
Original language: English
Bioleaching and recovery of metals from final slag waste of the copper smelting industry

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Pages: 1113-1121
Publication date: 2011
Peer-reviewed: Yes

Publication information
Journal: Minerals Engineering
Volume: 24
Issue number: 11
ISSN (Print): 0892-6875
Ratings:
Scopus rating (2016): SJR 1.133 SNIP 1.766 CiteScore 2.48
Scopus rating (2015): SJR 1.114 SNIP 1.865 CiteScore 2.31
Scopus rating (2014): SJR 1.063 SNIP 1.876 CiteScore 1.92
Scopus rating (2013): SJR 1.342 SNIP 2.267 CiteScore 2.09
Scopus rating (2012): SJR 1.109 SNIP 1.864 CiteScore 1.66
Scopus rating (2011): SJR 0.909 SNIP 1.826 CiteScore 1.64
Scopus rating (2010): SJR 0.945 SNIP 1.644
Scopus rating (2009): SJR 0.966 SNIP 1.655
Scopus rating (2008): SJR 0.805 SNIP 1.222
Scopus rating (2007): SJR 1.009 SNIP 1.401
Scopus rating (2006): SJR 0.882 SNIP 1.372
Scopus rating (2005): SJR 0.843 SNIP 1.198
Scopus rating (2004): SJR 0.564 SNIP 0.969
Bioleaching of flotation by-products of talc production permits the separation of nickel and cobalt from iron and arsenic.
Cell-to-cell diversity in protein levels of a gene driven by a tetracycline inducible promoter

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Signal Processing, Research group: Laboratory of Biosystem Dynamics-LBD, Department of Chemistry and Bioengineering, Research group: Algebraic and Algorithmic Methods in Signal Processing AAMSP, Research group: Computational Systems Biology, Multi-scaled biodata analysis and modelling (MultiBAM), Prostate cancer research center (PCRC), Urban circular bioeconomy (UrCirBio)
Authors: Smolander, O., Kandhavelu, M., Mannerström, H., Lihavainen, E., Kalaichelvan, S., Healy, S., Yli-Harja, O., Karp, M., Ribeiro, A. S.
Number of pages: 27
Pages: 1-27
Publication date: 2011
Peer-reviewed: Yes

Publication information
Journal: BMC Molecular Biology
Volume: 12
Article number: 21
ISSN (Print): 1471-2199
Ratings:
Scopus rating (2016): SJR 1.031 SNIP 0.628 CiteScore 2.14
Scopus rating (2015): SJR 1.275 SNIP 0.727 CiteScore 2.16
Scopus rating (2014): SJR 1.236 SNIP 0.82 CiteScore 2.12
Scopus rating (2013): SJR 1.594 SNIP 0.914 CiteScore 2.91
Scopus rating (2012): SJR 1.425 SNIP 0.923 CiteScore 3.29
Scopus rating (2011): SJR 1.663 SNIP 1.041 CiteScore 3.39
Scopus rating (2010): SJR 1.829 SNIP 1.015
Scopus rating (2009): SJR 1.783 SNIP 0.894
Scopus rating (2008): SJR 1.561 SNIP 0.788
Scopus rating (2007): SJR 1.893 SNIP 0.936
Scopus rating (2006): SJR 2.198 SNIP 0.841
Scopus rating (2005): SJR 1.794 SNIP 0.584
Scopus rating (2004): SJR 1.438 SNIP 0.703
Scopus rating (2003): SJR 1.177 SNIP 0.273
Scopus rating (2002): SJR 1.178 SNIP 0.396
Scopus rating (2001): SJR 0.111 SNIP 0
Original language: English
DOIs: 10.1186/1471-2199-12-21
Links: http://www.biomedcentral.com/1471-2199/12/21

Bibliographical note
poistettu tupla r=2222<br/>Contribution: organisation=sgn,FACT1=0.5<br/>Contribution: organisation=keb bio,FACT2=0.5
Source: researchoutputwizard
Source-ID: 7285
Research output: Scientific - peer-review › Article

Closing the 1,3-propanediol route enhances hydrogen production from glycerol by Halanaerobium saccharolyticum subsp. saccharolyticum

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Kivistö, A., Santala, V., Karp, M.
Pages: 7074-7080
Construction and Modelling of an Artificial Microecosystem

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Research group: MMDM, Department of Signal Processing, Department of Chemistry and Bioengineering, Research group: Algebraic and Algorithmic Methods in Signal Processing AAMSP
Authors: Santala, S., Larjo, A., Aho, T., Karp, M., Santala, V.
Pages: 225-225
Publication date: 2011

Host publication information
Title of host publication: Eight International Workshop on Computational Systems Biology, WCSB 2011, June 6-8, Zurich, Switzerland. TICSP series
Place of publication: Zurich
Publisher: WCSB 2011

Publication series
Name: International Workshop on Computational Systems Biology WCSB
Publisher: WCSB 2011
No.: 57
ISSN (Print): 1456-2774
Dynamics of Gene Expression under Tetracycline Inducible Promoters

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Department of Signal Processing, Research group: Laboratory of Biosystem Dynamics-LBD, Department of Chemistry and Bioengineering, Research group: Algebraic and Algorithmic Methods in Signal Processing AAMSP, Research group: Computational Systems Biology
Authors: Smolander, O., Kandhavelu, M., Mannerström, H., Lihavainen, E., Kalaichelvan, S., Healy, S., Yli-Harja, O., Karp, M., Ribeiro, A. S.
Pages: 227-227
Publication date: 2011

Host publication information
Title of host publication: Eight International Workshop on Computational Systems Biology, WCSB 2011, June 6-8, Zurich, Switzerland. TICSP series
Place of publication: Zurich
Publisher: WCSB 2011

Publication series
Name: International Workshop on Computational Systems Biology WCSB
Publisher: WCSB 2011
No.: 57
ISSN (Print): 1456-2774

Effects of heat treatment on hydrogen production potential and microbial community of thermophilic compost enrichment cultures

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Nissilä, M. E., Tähti, H. P., Rintala, J. A., Puhakka, J. A.
Pages: 4501-4506
Publication date: 2011
Peer-reviewed: Yes

Publication information
Journal: Bioresource Technology
Volume: 102
Issue number: 6
ISSN (Print): 0960-8524
Ratings:
Scopus rating (2016): SJR 2.191 SNIP 1.91 CiteScore 5.94
Scopus rating (2015): SJR 2.255 SNIP 1.908 CiteScore 5.47
Scopus rating (2014): SJR 2.41 SNIP 2.104 CiteScore 5.3
Scopus rating (2013): SJR 2.412 SNIP 2.503 CiteScore 5.97
Fermentative hydrogen production by Clostridium butyricum and Escherichia coli in pure and cocultures

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Signal Processing, Department of Chemistry and Bioengineering, Research group: M2oBSI, Prostate cancer research center (PCRC), Urban circular bioeconomy (UrCirBio)
Authors: Seppälä, J. J., Puhakka, J. A., Yli-Harja, O., Karp, M. T., Santala, V.
Pages: 10701-10708
Publication date: 2011
Peer-reviewed: Yes

Publication information
Volume: 36
Issue number: 17
ISSN (Print): 0360-3199
Ratings:
Scopus rating (2016): CiteScore 3.74 SJR 1.142 SNIP 1.286
Scopus rating (2015): SJR 1.294 SNIP 1.319 CiteScore 3.46
Scopus rating (2014): SJR 1.212 SNIP 1.494 CiteScore 3.54
Scopus rating (2013): SJR 1.278 SNIP 1.467 CiteScore 3.38
Scopus rating (2012): SJR 1.515 SNIP 1.729 CiteScore 3.96
Scopus rating (2011): SJR 1.456 SNIP 1.837 CiteScore 4.42
Scopus rating (2010): SJR 1.589 SNIP 1.871
Scopus rating (2009): SJR 1.333 SNIP 1.885
Scopus rating (2008): SJR 1.401 SNIP 2.096
Scopus rating (2007): SJR 1.279 SNIP 2.201
Scopus rating (2006): SJR 1.073 SNIP 2.161
Scopus rating (2005): SJR 1.107 SNIP 1.787
Scopus rating (2004): SJR 1.225 SNIP 1.626
Scopus rating (2003): SJR 1.003 SNIP 1.319
Scopus rating (2002): SJR 0.763 SNIP 1.157
Scopus rating (2001): SJR 0.487 SNIP 1.185
Fermentative hydrogen production from different sugars by Citrobacter sp. CMC-1 in batch culture

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Mangayil, R., Santala, V., Karp, M.
Pages: 15187-15194
Publication date: 2011
Peer-reviewed: Yes

Publication information
Volume: 36
ISSN (Print): 0360-3199
Ratings:
Scopus rating (2016): CiteScore 3.74 SJR 1.142 SNIP 1.286
Scopus rating (2015): SJR 1.294 SNIP 1.319 CiteScore 3.46
Scopus rating (2014): SJR 1.212 SNIP 1.494 CiteScore 3.54
Scopus rating (2013): SJR 1.278 SNIP 1.467 CiteScore 3.38
Scopus rating (2012): SJR 1.515 SNIP 1.729 CiteScore 3.96
Scopus rating (2011): SJR 1.456 SNIP 1.837 CiteScore 4.42
Scopus rating (2010): SJR 1.589 SNIP 1.871
Scopus rating (2009): SJR 1.333 SNIP 1.885
Scopus rating (2008): SJR 1.401 SNIP 2.096
Scopus rating (2007): SJR 1.279 SNIP 2.201
Scopus rating (2006): SJR 1.073 SNIP 2.161
Scopus rating (2005): SJR 1.107 SNIP 1.787
Scopus rating (2004): SJR 1.225 SNIP 1.626
Scopus rating (2003): SJR 1.003 SNIP 1.319
Scopus rating (2002): SJR 0.763 SNIP 1.157
Scopus rating (2001): SJR 0.487 SNIP 1.185
Scopus rating (2000): SJR 0.518 SNIP 0.866
Scopus rating (1999): SJR 0.382 SNIP 0.897
Original language: English
DOIs:
10.1016/j.ijhydene.2011.05.189

Bibliographical note
Contribution: organisation=sgn,FACT1=0.5
Contribution: organisation=keb bio,FACT2=0.5
Source: researchoutputwizard
Source-ID: 7235
Research output: Scientific - peer-review › Article

Halophilic anaerobic fermentative bacteria: Review

General information
State: Published
Improved triacylglycerol production in Acinetobacter baylyi ADP1 by metabolic engineering

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Research group: MMDM, Department of Signal Processing, Department of Chemistry and Bioengineering, Research group: Computational Systems Biology, Urban circular bioeconomy (UrCirBio)
Authors: Santala, S., Efimova, E., Kivinen, V., Larjo, A., Aho, T., Karp, M., Santala, V.
Number of pages: 10
Pages: 1-10
Publication date: 2011
Peer-reviewed: Yes

Publication information
Journal: Microbial Cell Factories
Volume: 10
Issue number: 36
ISSN (Print): 1475-2859
Ratings:
Scopus rating (2016): SJR 1.446 SNIP 1.228 CiteScore 3.92
Scopus rating (2015): SJR 1.501 SNIP 1.24 CiteScore 4.08
Scopus rating (2014): SJR 1.672 SNIP 1.471 CiteScore 4.25
Scopus rating (2013): SJR 1.686 SNIP 1.43 CiteScore 4.22
Scopus rating (2012): SJR 1.392 SNIP 1.312 CiteScore 3.69
Scopus rating (2011): SJR 1.417 SNIP 1.38 CiteScore 3.91
Scopus rating (2010): SJR 1.609 SNIP 1.463
Scopus rating (2009): SJR 1.276 SNIP 1.206
Scopus rating (2008): SJR 1.325 SNIP 1.335
Scopus rating (2007): SJR 1.13 SNIP 1.293
Scopus rating (2006): SJR 0.973 SNIP 0.906
Scopus rating (2005): SJR 0.99 SNIP 1.056
Scopus rating (2004): SJR 0.615 SNIP 0.478
Scopus rating (2003): SJR 0.528 SNIP 0.229
Original language: English
DOIs:
10.1186/1475-2859-10-36
Links:
http://www.microbialcellfactories.com/content/pdf/1475-2859-10-36.pdf

Microbiology and geochemistry of mine tailings amended with organic carbon for passive treatment of pore water

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Authors: Lindsasy, M. B., Wakeman, K. D., Rowe, O. F., Grail, B. M., Ptacek, C. J., Blowes, D. W., Johnson, D. B.
Pages: 229-241
Publication date: 2011
Peer-reviewed: Yes

Publication information
Journal: Geomicrobiology Journal
Volume: 28
Molecular methods for characterizing mixed microbial communities in hydrogen-fermenting systems

**General information**
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Tolvanen, K. E., Karp, M. T.
Pages: 5280-5288
Publication date: 2011
Peer-reviewed: Yes

**Publication information**
Volume: 36
Issue number: 9
ISSN (Print): 0360-3199
Ratings:
Scopus rating (2016): CiteScore 3.74 SJR 1.142 SNIP 1.286
Scopus rating (2015): SJR 1.294 SNIP 1.319 CiteScore 3.46
Scopus rating (2014): SJR 1.212 SNIP 1.494 CiteScore 3.54
Scopus rating (2013): SJR 1.278 SNIP 1.467 CiteScore 3.38
Scopus rating (2012): SJR 1.515 SNIP 1.729 CiteScore 3.96
Scopus rating (2011): SJR 1.456 SNIP 1.837 CiteScore 4.42
Scopus rating (2010): SJR 1.589 SNIP 1.871
Scopus rating (2009): SJR 1.333 SNIP 1.885
Scopus rating (2008): SJR 1.401 SNIP 2.096
Scopus rating (2007): SJR 1.279 SNIP 2.201
Real-Time monitoring of intracellular wax ester metabolism

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Santala, S., Efimova, E., Karp, M., Santala, V.
Number of pages: 8
Pages: 1-8
Publication date: 2011
Peer-reviewed: Yes

Publication information
Journal: Microbial Cell Factories
Volume: 10
Issue number: 1
Article number: 75
ISSN (Print): 1475-2859
Ratings:
Scopus rating (2016): SJR 1.446 SNIP 1.228 CiteScore 3.92
Scopus rating (2015): SJR 1.501 SNIP 1.24 CiteScore 4.08
Scopus rating (2014): SJR 1.672 SNIP 1.471 CiteScore 4.25
Scopus rating (2013): SJR 1.686 SNIP 1.43 CiteScore 4.22
Scopus rating (2012): SJR 1.392 SNIP 1.312 CiteScore 3.69
Scopus rating (2011): SJR 1.417 SNIP 1.38 CiteScore 3.91
Scopus rating (2010): SJR 1.609 SNIP 1.463
Scopus rating (2009): SJR 1.276 SNIP 1.206
Scopus rating (2008): SJR 1.325 SNIP 1.335
Scopus rating (2007): SJR 1.13 SNIP 1.293
Scopus rating (2006): SJR 0.973 SNIP 0.906
Scopus rating (2005): SJR 0.99 SNIP 1.056
Scopus rating (2004): SJR 0.615 SNIP 0.478
Scopus rating (2003): SJR 0.528 SNIP 0.229
Original language: English
DOI's: 10.1186/1475-2859-10-75

Bibliographical note
Contribution: organisation=keb bio,FACT1=1
Source: researchoutputwizard
Source-ID: 7396
Research output: Scientific - peer-review › Article
Simple enrichment system for hydrogen producers

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Tolvanen, K. E. S., Mangayil, R. K., Karp, M. T., Santala, V. P.
Pages: 4246-4248
Publication date: 2011
Peer-reviewed: Yes

Publication information
Journal: Applied and Environmental Microbiology
Volume: 77
Issue number: 12
ISSN (Print): 0099-2240
Ratings:
Scopus rating (2016): SJR 1.691 SNIP 1.243 CiteScore 4.08
Scopus rating (2015): SJR 1.896 SNIP 1.351 CiteScore 4.14
Scopus rating (2014): SJR 1.862 SNIP 1.402 CiteScore 4.02
Scopus rating (2013): SJR 1.909 SNIP 1.41 CiteScore 4.25
Scopus rating (2012): SJR 1.967 SNIP 1.427 CiteScore 4.29
Scopus rating (2011): SJR 1.91 SNIP 1.453 CiteScore 4.12
Scopus rating (2010): SJR 1.885 SNIP 1.431
Scopus rating (2009): SJR 1.975 SNIP 1.529
Scopus rating (2008): SJR 2.168 SNIP 1.574
Scopus rating (2007): SJR 2.045 SNIP 1.652
Scopus rating (2006): SJR 2.054 SNIP 1.594
Scopus rating (2005): SJR 2.078 SNIP 1.646
Scopus rating (2004): SJR 2.123 SNIP 1.641
Scopus rating (2003): SJR 2.108 SNIP 1.806
Scopus rating (2002): SJR 2.044 SNIP 1.739
Scopus rating (2001): SJR 2 SNIP 1.737
Scopus rating (2000): SJR 1.958 SNIP 1.75
Scopus rating (1999): SJR 2.316 SNIP 1.723
Original language: English
DOIs:
10.1128/AEM.05150-11

Bibliographical note
Contribution: organisation=keb bio,FACT1=1
Source: researchoutputwizard
Source-ID: 7397
Research output: Scientific - peer-review › Article

Thermophilic, anaerobic co-digestion of microalgal biomass and cellulose for H2 production

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Authors: Carver, S. M., Hulatt, C. J., Thomas, D. N., Tuovinen, O. H.
Pages: 805-814
Publication date: 2011
Peer-reviewed: Yes

Publication information
Journal: BIODEGRADATION
Volume: 22
Thermophilic hydrogen production from cellulose with rumen fluid enrichment cultures: Effects of different heat treatments

Elevated temperatures (52, 60 and 65 °C) were used to enrich hydrogen producers on cellulose from cow rumen fluid. Methanogens were inhibited with two different heat treatments. Hydrogen production was considerable at 60 °C with the highest H₂ yield of 0.44 mol-H₂ mol-hexose⁻¹ (1.93 mol-H₂ mol-hexose-degraded⁻¹) as obtained without heat treatment and with acetate and ethanol as the main fermentation products. H₂ production rates and yields were controlled by cellulose degradation that was at the highest 21%. The optimum temperature and pH for H₂ production of the rumen fluid enrichment culture were 62 °C and 7.3, respectively. The enrichments at 52 and 60 °C contained mainly bacteria from Clostridia family. At 52 °C, the bacterial diversity was larger and was not affected by heat treatments. Bacterial diversity at 60 °C remained similar between heat treatments, but decreased during enrichment. At 60 °C, the dominant microorganism was Clostridium stercorarium subsp. leptospartum.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Urban circular bioeconomy (UrCirBio)
Authors: Nissilä, M. E., Tähti, H. P., Rintala, J. A., Puhakka, J. A.
Number of pages: 9
Pages: 1482-1490
Publication date: 2011
Peer-reviewed: Yes

Publication information
Volume: 36
Issue number: 2
ISSN (Print): 0360-3199
Ratings:
Scopus rating (2016): CiteScore 3.74 SJR 1.142 SNIP 1.286
Scopus rating (2015): SJR 1.294 SNIP 1.319 CiteScore 3.46

Bibliographical note
Contribution: organisation=keb bio,FACT1=1
Source: researchoutputwizard
Source-ID: 5823
Research output: Scientific - peer-review › Article
Weathering of biotite in Acidithiobacillus ferrooxidans cultures

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Authors: Bhatti, T. M., Bigham, J. M., Vuorinen, A., Tuovinen, O. H.
Pages: 130-134
Publication date: 2011
Peer-reviewed: Yes

Publication information
Journal: Geomicrobiology Journal
Volume: 28
Issue number: 2
ISSN (Print): 0149-0451
Ratings:
Scopus rating (2016): SJR 0.574 SNIP 0.553 CiteScore 1.36
Scopus rating (2015): SJR 0.603 SNIP 0.679 CiteScore 1.49
Scopus rating (2014): SJR 0.686 SNIP 0.712 CiteScore 1.6
Scopus rating (2013): SJR 0.84 SNIP 0.82 CiteScore 1.93
Scopus rating (2012): SJR 0.828 SNIP 0.697 CiteScore 2
Scopus rating (2011): SJR 0.957 SNIP 0.79 CiteScore 1.88
Scopus rating (2010): SJR 0.886 SNIP 0.732
Scopus rating (2009): SJR 0.73 SNIP 0.704
Scopus rating (2008): SJR 0.717 SNIP 0.768
Scopus rating (2007): SJR 0.775 SNIP 0.803
Scopus rating (2006): SJR 1.19 SNIP 1.04
Scopus rating (2005): SJR 1.172 SNIP 0.794
Scopus rating (2004): SJR 1.528 SNIP 1.244
Scopus rating (2003): SJR 1.007 SNIP 1.279
Scopus rating (2002): SJR 0.857 SNIP 1.129
Weathering of phlogopite in simulated bioleaching solutions

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Authors: Bhatti, T. M., Bigham, J. M., Vuorinen, A., Tuovinen, O. H.
Pages: 30-34
Publication date: 2011
Peer-reviewed: Yes

Publication information
Journal: International Journal of Mineral Processing
Volume: 98
Issue number: 1-2
ISSN (Print): 0301-7516
Ratings:
Scopus rating (2016): SJR 0.795 SNIP 1.518 CiteScore 2.03
Scopus rating (2015): SJR 0.811 SNIP 1.578 CiteScore 1.78
Scopus rating (2014): SJR 0.896 SNIP 1.847 CiteScore 1.8
Scopus rating (2013): SJR 1.145 SNIP 2.272 CiteScore 2.02
Scopus rating (2012): SJR 0.939 SNIP 2.104 CiteScore 1.8
Scopus rating (2011): SJR 0.888 SNIP 1.875 CiteScore 1.74
Scopus rating (2010): SJR 0.936 SNIP 1.348
Scopus rating (2009): SJR 1.066 SNIP 1.856
Scopus rating (2008): SJR 0.769 SNIP 1.395
Scopus rating (2007): SJR 0.822 SNIP 1.18
Scopus rating (2006): SJR 0.926 SNIP 1.384
Scopus rating (2005): SJR 1.14 SNIP 1.693
Scopus rating (2004): SJR 0.738 SNIP 1.736
Scopus rating (2003): SJR 1.203 SNIP 2.233
Scopus rating (2002): SJR 0.7 SNIP 1.418
Scopus rating (2001): SJR 0.545 SNIP 1.182
Scopus rating (2000): SJR 0.447 SNIP 1.175
Scopus rating (1999): SJR 0.831 SNIP 1.188
Original language: English
DOIs:
10.1016/j.minpro.2010.10.004

Bibliographical note
Contribution: organisation=keb bio,FACT1=1
Source: researchoutputwizard
Source-ID: 5763
Research output: Scientific - peer-review › Article
Bioreactor applications utilizing mesophilic sulfate-reducing bacteria for treatment of mine wastewaters at 9-35 °C

The exploitation of low-grade ores, treatment of wastewaters of mining activities, hydrometallurgical recovery processes and bioremediation of metal contaminated environment require novel and economical bioprocesses. Biotechnology has recently been introduced to mining technology, including for example bioleaching and biological metal recovery processes. The biological processes are a low cost option to traditional mining and metallurgical processes. The exploitation of metals is being focused to low-grade ores and to deposits located at high altitudes and northern regions having demanding environmental conditions. The mining operations are expensive, and introduction of bioprocess technology to mining processes may increase the profits of the operation. On the other hand, the mine wastewaters and metallurgical effluents produced in active mines also at low ambient temperatures have to be treated, and there is limited information on the bioprocess operation at sub-optimal temperatures. Acid mine drainage (AMD) is continuously being produced in old mines located in those located at cold regions. The quantity of AMD production may be large, although the temperature may affect on the rate of the AMD formation. Heating of a bioreactor and wastewater stream to AMD to the optimal temperature of the biological treatment process may not be feasible, thus the low temperature biological mine wastewater treatment is a compromise between the microbial activity, temperature and reactor size. Biological sulfate reduction provides simultaneous treatment of the major pollutants of acid mine drainage and mine wastewater: sulfate and metal concentrations are decreased, metals are precipitated as low soluble sulfides and the acidity of the solution is neutralized by biologically generated alkalinity. In a chemical process all these steps would require several unit processes and careful control of pH. The biological mine wastewater treatment with sulfate reduction has several benefits when compared to chemical precipitation with lime: the metal and sulfate concentrations in the biologically treated effluent are lower, and the produced sludge is more stable, dense and has high re-use potential. The objective of the present study was to develop sulfate reducing bioprocess technology for mine wastewater and AMD treatment. The limiting factors in the use of sulfate reducing bioreactors for mine wastewater treatment can be divided to two categories: 1) the costs of the bioreactor operation due to electron donor and heating and 2) the limitations of the sulfate reducing bacteria (SRB), which do not tolerate high metal concentrations and acidity. Because the tolerance of SRB for mine wastewater treatment can be resolved with reactor technological solutions, e.g. dilution and solution recycling in the process, the aim was to focus on studying the electron donors and activity of SRB at sub-optimal temperatures. There is limited number of publications describing low temperature sulfate reducing bioprocesses. In present study, a low temperature formate-fed sulfate reducing fluidized-bed bioreactor (FBR) treated synthetic and real mine wastewater at 9 °C with stable sulfate reduction rate of 6-14 mmol SO42- L-1 d-1, and high metal precipitation, 5.4 mmol Fe L-1 d-1 (99% precipitation), was achieved. The microbial community and the active species of the low temperature sulfidogenic FBR were analyzed with denaturing gel gradient electrophoresis (DGGE). The results showed that this reactor was dominated by a mesophilic SRB Desulfomicrobium sp., which was also the active species in the reactor. Therefore, the long-time operation at low temperature resulted in enrichment of psychrotolerant mesophilic SRB. Since formate is not a commercially feasible electron donor, further experiments were made with hydrogen-fed membrane bioreactors (MBR) and gas-lift bioreactors (GLB) at 9 °C, resulting in sulfate reduction rates of 6.9 and 6.2 mmol SO42- L-1 d-1 in these reactors, respectively. The specific sulfidogenic activities in these bioreactors were 1.6-33 mmol SO42- g VSS-1 d-1, demonstrating that high biomass activity can be achieved in low temperature. Sulfate reduction consumed majority of the electrons in these reactors, while acetate production from homoacetogenesis consumed a minor part of the electrons when the temperature was low and the reactor retention time was long. The temperature dependency of the sulfate reduction of the enrichment culture used in the low temperature bioreactor was analyzed, and the optimal temperature was 31 °C, demonstrating that this was a psychrotolerant mesophilic enrichment culture. Therefore, the following membrane bioreactor experiments included also operation at 15 and 30-35 °C with a reference mesophilic enrichment culture. The operation at these temperatures showed that mesophilic SRB processes can be operated at sub-optimal temperatures, but the activity is decreased by 10-40 % at 15 °C when compared to optimal temperature. The activity of SRB at sub-optimal temperature is limited by transport and oxidation rate of the electron donor, because the electron flow to sulfate reduction and specific sulfidogenic activity decrease with the temperature. Mine wastewater treatment at 35 °C was studied using fluidized-bed bioreactor fed with ethanol-lactate mixture. The sulfate reduction rate was high and stable, being 62-100 mmol SO42- L-1 d-1, and the metal precipitation rates were 11 mmol Fe L-1 d-1 (99% precipitation) and 1 mmol Zn L-1 d-1 (99% precipitation). This experiment included also biological hydrogen sulfide production experiment, where sulfide production rate of 73 mmol H2S L-1 d-1 was obtained. The sulfate reduction rate in this FBR was limited by the acetate oxidation rate, which was at maximum 50 mmol acetate L-1 d-1. Therefore, the acetate oxidation kinetics of this reactor process was studied, and kinetic constants for acetate oxidation were defined. The Km, affinity for acetate was 63 µmol, indicating high affinity for acetate. The maximum acetate oxidation rate, Vmax, was 0.76 µmol g VSS-1 min-1. These results demonstrate that although the enrichment of acetate oxidizing SRB is slow. The acetate oxidation rate controls the treatment capacity of the bioreactor fed with an organic electron donor. Pure electron donors, such as ethanol and hydrogen are expensive. Therefore, low-cost options as electron donors are needed. Therefore, the amenability of reed Canary grass (Phalaris arundinacea) plant material hydrolyzate as electron donor for mine wastewater treatment was studied. The experiments were performed with a fluidized-bed bioreactor, and sulfate reduction rate of 21-34 mmol SO42- L-1 d-1 and metal precipitation of 15 mmol Fe L-1 d-1 (99% precipitation) were achieved, although the acetate oxidation rate limited the process. Also the suitability of the dry reed Canary grass plant material as substrate for sulfate reduction was demonstrated in batch assays with H2S yield of 0.8 mmol H2S g-1 plant material. For comparison, the H2S yield with the hydrolyzate was 6.2 mmol H2S g-1 plant material. In summary, the experiments conducted for this thesis increased the knowledge on the achievable sulfate reduction rates and treatment capacity of mesophilic SRB at sub-optimal temperatures with several bioreactor types. It was demonstrated that mesophilic SRB could be enriched and long-time maintained in active state at low temperature sulfidogenic bioreactors. The microbiology and metabolic capacities of mesophilic SRB at decreased temperatures were studied. The suitability of sulfidogenic fluidized-bed bioreactors for mine wastewater treatment and biological hydrogen sulfide production was demonstrated with a number of electron donors,
including also a potential low-cost electron donor, the plant material hydrolyzate.

**General information**
State: Published
Ministry of Education publication type: G5 Doctoral dissertation (article)
Organisations: Department of Chemistry and Bioengineering
Authors: Nevatalo, L.
Number of pages: 92
Publication date: 10 Sep 2010

**Publication information**
Place of publication: Tampere
Publisher: Tampere University of Technology
Original language: English

**Publication series**
Name: Tampere University of Technology. Publication
Publisher: Tampere University of Technology
Volume: 910
ISSN (Print): 1459-2045
Electronic versions:
nevatalo.pdf
Links:
http://urn.fi/URN:NBN:fi:tty-201009211327

**Bibliographical note**
Awarding institution:Tampere University of Technology
Source: researchoutputwizard
Source-ID: 8833
Research output: Collection of articles › Doctoral Thesis

**Acid bioleaching of solid waste materials from copper, steel and recycling industries**

**General information**
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Pages: 74-79
Publication date: 2010
Peer-reviewed: Yes

**Publication information**
Journal: Hydrometallurgy
Volume: 103
Issue number: 1-4
ISSN (Print): 0304-386X
Ratings:
Scopus rating (2016): SJR 1.148 SNIP 1.737 CiteScore 2.8
Scopus rating (2015): SJR 1.173 SNIP 1.888 CiteScore 2.78
Scopus rating (2014): SJR 1.247 SNIP 2.25 CiteScore 2.7
Scopus rating (2013): SJR 1.626 SNIP 2.967 CiteScore 2.95
Scopus rating (2012): SJR 1.523 SNIP 2.4 CiteScore 2.6
Scopus rating (2011): SJR 1.521 SNIP 1.796 CiteScore 2.42
Scopus rating (2010): SJR 1.104 SNIP 1.672
Scopus rating (2009): SJR 1.185 SNIP 2.458
Scopus rating (2008): SJR 1.066 SNIP 1.56
Scopus rating (2007): SJR 1.027 SNIP 1.45
Scopus rating (2006): SJR 0.972 SNIP 1.482
Scopus rating (2005): SJR 1.076 SNIP 1.605
A dairy bacterium displays in vitro probiotic properties for the pharyngeal mucosa by antagonizing group a streptococci and modulating the immune response
Alkalizing reactions streamline cellular metabolism in acidogenic microorganisms

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Authors: Arioli, S., Ragg, E., Scaglioni, L., Fessas, D., Signorelli, M., Karp, M., Daffoncio, D., De Noni, I., Mulas, L.,
Oggioni, M., Guglielmetti, S., Mora, D.
Number of pages: 8
Pages: 1-8
Publication date: 2010
Peer-reviewed: Yes

Publication information
Journal: PLoS One
Volume: 5
Issue number: 11, e15520
ISSN (Print): 1932-6203
Ratings:
Scopus rating (2016): CiteScore 3.11 SJR 1.201 SNIP 1.092
Scopus rating (2015): SJR 1.414 SNIP 1.131 CiteScore 3.32
Scopus rating (2014): SJR 1.545 SNIP 1.141 CiteScore 3.54
Scopus rating (2013): SJR 1.74 SNIP 1.147 CiteScore 3.94
Scopus rating (2012): SJR 1.945 SNIP 1.142 CiteScore 4.15
Scopus rating (2011): SJR 2.369 SNIP 1.23 CiteScore 4.58
Scopus rating (2010): SJR 2.631 SNIP 1.161
Scopus rating (2009): SJR 2.473 SNIP 0.985
Scopus rating (2008): SJR 2.323 SNIP 0.96
Scopus rating (2007): SJR 1.289 SNIP 0.525
Original language: English
DOI:
10.1371/journal.pone.0015520

Bibliographical note
Contribution: organisation=keb bio,FACT1=1
Source: researchoutputwizard
Source-ID: 7708
Research output: Scientific - peer-review › Article

Altered mineralogy associated with stirred tank bioreactor leaching of a black schist ore

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Authors: Bhatti, T. M., Bigham, J. M., Riekkola-Vanhanen, M., Tuovinen, O. H.
Pages: 181-184
Publication date: 2010
Peer-reviewed: Yes

Publication information
Journal: Hydrometallurgy
Volume: 100
Issue number: 3-4
ISSN (Print): 0304-386X
Ratings:
Scopus rating (2016): SJR 1.148 SNIP 1.737 CiteScore 2.8
Scopus rating (2015): SJR 1.173 SNIP 1.888 CiteScore 2.78
A novel biosensor for the detection of zearalenone family mycotoxins in milk

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Authors: Välimaa, A., Kivistö, A. T., Leskinen, P. I., Karp, M. T.
Pages: 44-48
Publication date: 2010
Peer-reviewed: Yes

Publication information
Journal: Journal of Microbiological Methods
Volume: 80
Issue number: 1
ISSN (Print): 0167-7012
Ratings:
Scopus rating (2016): SJR 0.723 SNIP 0.8 CiteScore 2.05
Scopus rating (2015): SJR 0.816 SNIP 0.873 CiteScore 2.04
Scopus rating (2014): SJR 0.903 SNIP 1.037 CiteScore 2.28
Scopus rating (2013): SJR 0.917 SNIP 1.019 CiteScore 2.5
Scopus rating (2012): SJR 0.87 SNIP 1.004 CiteScore 2.32
Scopus rating (2011): SJR 0.9 SNIP 0.972 CiteScore 2.29
Scopus rating (2010): SJR 0.945 SNIP 1.05
Scopus rating (2009): SJR 0.993 SNIP 1.156
Scopus rating (2008): SJR 0.926 SNIP 1.031
Scopus rating (2007): SJR 0.942 SNIP 1.111
Scopus rating (2006): SJR 1.138 SNIP 1.251
Scopus rating (2005): SJR 0.964 SNIP 1.141
Scopus rating (2004): SJR 0.921 SNIP 1.037
Scopus rating (2003): SJR 0.933 SNIP 1.217
Scopus rating (2002): SJR 0.821 SNIP 1.002
Application of a luminescent bacterial biosensor for the detection of tetracyclines in routine analysis of poultry muscle samples

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Authors: Pikkemaat, M., Rapallini, M., Karp, M. T., Elferink, J.
Pages: 1112-1117
Publication date: 2010
Peer-reviewed: Yes

Publication information
Journal: Food Additives and Contaminants Part A: Chemistry Analysis Control Exposure and Risk Assessment
Volume: 27
Issue number: 8
ISSN (Print): 1944-0049
Ratings:
Scopus rating (2016): SJR 0.766 SNIP 0.915 CiteScore 2.12
Scopus rating (2015): SJR 0.756 SNIP 0.86 CiteScore 2.11
Scopus rating (2014): SJR 0.76 SNIP 0.968 CiteScore 2.07
Scopus rating (2013): SJR 1.023 SNIP 1.161 CiteScore 2.55
Scopus rating (2012): SJR 0.907 SNIP 1.12 CiteScore 2.12
Scopus rating (2011): SJR 0.855 SNIP 1.051 CiteScore 2.06
Scopus rating (2010): SJR 0.719 SNIP 0.883
Scopus rating (2009): SJR 0.627 SNIP 0.984
Original language: English
DOI:
10.1080/19440041003794866

Bibliographical note
Contribution: organisation=keb bio,FACT1=1
Source: researchoutputwizard
Source-ID: 9502
Research output: Scientific - peer-review › Article

Attenuation of pollutants in sanitary sewer overflow: Comparative evaluation of treatment with fixed media bioreactors

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Authors: Tao, J., Mancl, K. M., Tuovinen, O. H.
Pages: 1781-1786
Publication date: 2010
Peer-reviewed: Yes

Publication information
Journal: Bioresource Technology
Biodegradation of aqueous organic matter over seasonal changes: bioreactor experiments with indigenous lake water bacteria

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Authors: Kolehmainen, R. E., Crochet, L. M., Kortelainen, N. M., Langwaldt, J. H., Puhakka, J. A.
Pages: 607-615
Publication date: 2010
Peer-reviewed: Yes

Publication information
Journal: Journal of Environmental Engineering: ASCE
Volume: 136
Issue number: 6
ISSN (Print): 0733-9372
Ratings:
Scopus rating (2016): SJR 0.403 SNIP 0.726 CiteScore 1.23
Scopus rating (2015): SJR 0.471 SNIP 0.75 CiteScore 1.07
Scopus rating (2014): SJR 0.544 SNIP 0.702 CiteScore 0.99
Scopus rating (2013): SJR 0.498 SNIP 0.821 CiteScore 1.04
Scopus rating (2012): SJR 0.699 SNIP 0.886 CiteScore 1.18
Scopus rating (2011): SJR 0.508 SNIP 0.597 CiteScore 0.9
Scopus rating (2010): SJR 0.399 SNIP 0.587
Scopus rating (2009): SJR 0.574 SNIP 0.766
Scopus rating (2008): SJR 0.729 SNIP 1.023
Biohydrogen and 1,3-Propanediol production using halophilic fermentative bacteria

General information
State: Published
Ministry of Education publication type: B3 Non-refereed article in conference proceedings
Organisations: Department of Chemistry and Bioengineering
Authors: Kivistö, A., Santala, V., Karp, M.
Pages: 21-21
Publication date: 2010

Host publication information
Title of host publication: ESF-Bielefeld-CeBiTec Conference, Microbes and Industrial Biotechnology, Bielefeld, Germany, 21-24 November 2010, Booklet of Abstracts

Biographical note
Contribution: organisation=keb bio,FACT1=1
Source: researchoutputwizard
Source-ID: 8411
Research output: Scientific › peer-review › Article

Biological hydrogen sulfide production in an ethanol-lactate fed fluidized-bed bioreactor

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Authors: Nevatalo, L. M., Mäkinen, A. E., Kaksonen, A. H., Puhakka, J. A.
Pages: 276-284
Publication date: 2010
Peer-reviewed: Yes

Publication information
Journal: Bioresource Technology
Volume: 101
Issue number: 1
ISSN (Print): 0960-8524
Ratings:
Scopus rating (2016): SJR 2.191 SNIP 1.91 CiteScore 5.94
Scopus rating (2015): SJR 2.255 SNIP 1.908 CiteScore 5.47
Scopus rating (2014): SJR 2.41 SNIP 2.104 CiteScore 5.3
Scopus rating (2013): SJR 2.412 SNIP 2.503 CiteScore 5.97
Scopus rating (2012): SJR 2.389 SNIP 2.465 CiteScore 5.25
**Biooxidation and precipitation for iron and sulfate removal from heap bioleaching effluent streams**

**General information**
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Pages: 7-14
Publication date: 2010
Peer-reviewed: Yes

**Publication Information**
Journal: Hydrometallurgy
Volume: 101
Issue number: 1-2
ISSN (Print): 0304-386X
Ratings:
Scopus rating (2016): SJR 1.148 SNIP 1.737 CiteScore 2.8
Scopus rating (2015): SJR 1.173 SNIP 1.888 CiteScore 2.78
Scopus rating (2014): SJR 1.247 SNIP 2.25 CiteScore 2.7
Scopus rating (2013): SJR 1.626 SNIP 2.967 CiteScore 2.95
Scopus rating (2012): SJR 1.523 SNIP 2.4 CiteScore 2.6
Scopus rating (2011): SJR 1.521 SNIP 1.796 CiteScore 2.42
Scopus rating (2010): SJR 1.104 SNIP 1.672
Scopus rating (2009): SJR 1.185 SNIP 2.458
Scopus rating (2008): SJR 1.066 SNIP 1.56
Scopus rating (2007): SJR 1.027 SNIP 1.45
Scopus rating (2006): SJR 0.972 SNIP 1.482
Scopus rating (2005): SJR 1.076 SNIP 1.605
Scopus rating (2004): SJR 1.089 SNIP 1.869
Scopus rating (2003): SJR 0.843 SNIP 1.565
Scopus rating (2002): SJR 0.833 SNIP 1.308
Scopus rating (2001): SJR 0.481 SNIP 1.317
Scopus rating (2000): SJR 0.596 SNIP 1.44
Scopus rating (1999): SJR 0.717 SNIP 1.166
Characterization of jarosites produced by chemical synthesis over a temperature gradient from 2 to 40 °C

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Pages: 121-128
Publication date: 2010
Peer-reviewed: Yes

Publication information
Journal: International Journal of Mineral Processing
Volume: 94
Issue number: 3-4
ISSN (Print): 0301-7516
Ratings:
Scopus rating (2016): SJR 0.795 SNIP 1.518 CiteScore 2.03
Scopus rating (2015): SJR 0.811 SNIP 1.578 CiteScore 1.78
Scopus rating (2014): SJR 0.896 SNIP 1.847 CiteScore 1.8
Scopus rating (2013): SJR 1.145 SNIP 2.272 CiteScore 2.02
Scopus rating (2012): SJR 0.939 SNIP 2.104 CiteScore 1.8
Scopus rating (2011): SJR 0.888 SNIP 1.875 CiteScore 1.74
Scopus rating (2010): SJR 0.936 SNIP 1.348
Scopus rating (2009): SJR 1.066 SNIP 1.856
Scopus rating (2008): SJR 0.769 SNIP 1.395
Scopus rating (2007): SJR 0.822 SNIP 1.18
Scopus rating (2006): SJR 0.926 SNIP 1.384
Scopus rating (2005): SJR 1.14 SNIP 1.693
Scopus rating (2004): SJR 0.738 SNIP 1.736
Scopus rating (2003): SJR 1.203 SNIP 2.233
Scopus rating (2002): SJR 0.7 SNIP 1.418
Scopus rating (2001): SJR 0.545 SNIP 1.182
Scopus rating (2000): SJR 0.447 SNIP 1.175
Scopus rating (1999): SJR 0.831 SNIP 1.188

Characterization of secondary arsenic-bearing precipitates formed in the bioleaching of enargite by Acidithiobacillus ferrooxidans

General information
State: Published
Direction of glucose fermentation towards hydrogen or ethanol production through on-line pH control

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Authors: Karadag, D., Puhakka, J. A.
Pages: 10245-10251
Publication date: 2010
Peer-reviewed: Yes

Publication information
Volume: 35
Issue number: 19
ISSN (Print): 0360-3199
Ratings:
Scopus rating (2016): CiteScore 3.74 SJR 1.142 SNIP 1.286
Scopus rating (2015): SJR 1.294 SNIP 1.319 CiteScore 3.46
Effect of changing temperature on anaerobic hydrogen production and microbial community composition in an open-mixed culture bioreactor

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Authors: Karadag, D., Puhakka, J. A.
Pages: 10954-10959
Publication date: 2010
Peer-reviewed: Yes

Publication information
Volume: 35
Issue number: 20
ISSN (Print): 0360-3199
Ratings:
Scopus rating (2016): CiteScore 3.74 SJR 1.142 SNIP 1.286
Scopus rating (2015): SJR 1.294 SNIP 1.319 CiteScore 3.46
Scopus rating (2014): SJR 1.212 SNIP 1.494 CiteScore 3.96
Scopus rating (2013): SJR 1.456 SNIP 1.837 CiteScore 4.42
Scopus rating (2012): SJR 1.589 SNIP 1.871
Scopus rating (2011): SJR 1.589 SNIP 1.871
Scopus rating (2010): SJR 1.589 SNIP 1.871
Scopus rating (2009): SJR 1.333 SNIP 1.885
Scopus rating (2008): SJR 1.401 SNIP 2.096
Scopus rating (2007): SJR 1.279 SNIP 2.201
Scopus rating (2006): SJR 1.073 SNIP 2.161
Scopus rating (2005): SJR 1.107 SNIP 1.787
Scopus rating (2004): SJR 1.225 SNIP 1.626
Scopus rating (2003): SJR 1.003 SNIP 1.319

Original language: English
DOIs:
10.1016/j.ijhydene.2010.07.139

Bibliographical note
Contribution: organisation=keb bio,FACT1=1
Source: researchoutputwizard
Source-ID: 8290
Research output: Scientific - peer-review › Article
Enhancement of anaerobic hydrogen production by iron and nickel

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Authors: Karadag, D., Puhakka, J. A.
Pages: 8554-8560
Publication date: 2010
Peer-reviewed: Yes

Publication information
Volume: 35
Issue number: 16
ISSN (Print): 0360-3199
Ratings:
Scopus rating (2016): CiteScore 3.74 SJR 1.142 SNIP 1.286
Scopus rating (2015): SJR 1.294 SNIP 1.319 CiteScore 3.46
Scopus rating (2014): SJR 1.212 SNIP 1.494 CiteScore 3.54
Scopus rating (2013): SJR 1.278 SNIP 1.467 CiteScore 3.38
Scopus rating (2012): SJR 1.515 SNIP 1.729 CiteScore 3.96
Scopus rating (2011): SJR 1.456 SNIP 1.837 CiteScore 4.42
Scopus rating (2010): SJR 1.589 SNIP 1.871
Scopus rating (2009): SJR 1.333 SNIP 1.885
Scopus rating (2008): SJR 1.401 SNIP 2.096
Scopus rating (2007): SJR 1.279 SNIP 2.201
Scopus rating (2006): SJR 1.073 SNIP 2.161
Scopus rating (2005): SJR 1.107 SNIP 1.787
Scopus rating (2004): SJR 1.225 SNIP 1.626
Scopus rating (2003): SJR 1.003 SNIP 1.319
Scopus rating (2002): SJR 0.763 SNIP 1.157
Scopus rating (2001): SJR 0.487 SNIP 1.185
Scopus rating (2000): SJR 0.518 SNIP 0.866
Scopus rating (1999): SJR 0.382 SNIP 0.897
Original language: English
DOIs:
10.1016/j.ijhydene.2010.07.070

Bibliographical note
Contribution: organisation=keb bio,FACT1=1
Source: researchoutputwizard
Source-ID: 8291
Research output: Scientific - peer-review › Article
[FeFe]-hydrogenase gene quantification and melting curve analysis from hydrogen-fermenting bioreactor samples

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Authors: Tolvanen, K. E., Santala, V. P., Karp, M. T.
Pages: 3433-3439
Publication date: 2010
Peer-reviewed: Yes

Publication information
Volume: 35
ISSN (Print): 0360-3199

Ratings:
Scopus rating (2016): CiteScore 3.74 SJR 1.142 SNIP 1.286
Scopus rating (2015): SJR 1.294 SNIP 1.319 CiteScore 3.46
Scopus rating (2014): SJR 1.212 SNIP 1.494 CiteScore 3.54
Scopus rating (2013): SJR 1.278 SNIP 1.467 CiteScore 3.38
Scopus rating (2012): SJR 1.515 SNIP 1.729 CiteScore 3.96
Scopus rating (2011): SJR 1.456 SNIP 1.837 CiteScore 4.42
Scopus rating (2010): SJR 1.589 SNIP 1.871
Scopus rating (2009): SJR 1.333 SNIP 1.885
Scopus rating (2008): SJR 1.401 SNIP 2.096
Scopus rating (2007): SJR 1.279 SNIP 2.201
Scopus rating (2006): SJR 1.073 SNIP 2.161
Scopus rating (2005): SJR 1.107 SNIP 1.787
Scopus rating (2004): SJR 1.225 SNIP 1.626
Scopus rating (2003): SJR 1.003 SNIP 1.319
Scopus rating (2002): SJR 0.763 SNIP 1.157
Scopus rating (2001): SJR 0.487 SNIP 1.185
Scopus rating (2000): SJR 0.518 SNIP 0.866
Scopus rating (1999): SJR 0.382 SNIP 0.897
Original language: English
DOIs: 10.1016/j.ijhydene.2010.01.132

Bibliographical note
Contribution: organisation=keb bio,FACT1=1
Source: researchoutputwizard
Source-ID: 9418
Research output: Scientific - peer-review › Article

Formation of Fe-sulfides in cultures of sulfate-reducing bacteria

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Authors: Gramp, J. P., Bigham, J. M., Jones, F. S., Tuovinen, O. H.
Pages: 1062-1067
Publication date: 2010
Peer-reviewed: Yes

Publication information
Journal: Journal of Hazardous Materials
Volume: 175
ISSN (Print): 0304-3894
Hydrogenotrophic sulfate reduction in a gas-lift bioreactor operated at 9°C

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Authors: Nevatalo, L. M., Bijmans, M. F., Lens, P. N., Kaksonen, A. H., Puhakka, J. A.
Pages: 615-621
Publication date: 2010
Peer-reviewed: Yes

Bibliographical note
Contribution: organisation=keb bio,FACT1=1
Source: researchoutputwizard
Source-ID: 7952
Research output: Scientific - peer-review › Article
Hydrogen production from glycerol using halophilic fermentative bacteria

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Authors: Kivistö, A., Santala, V., Karp, M.
Pages: 8671-8677
Publication date: 2010
Peer-reviewed: Yes

Publication information
Journal: Bioresource Technology
Volume: 101
ISSN (Print): 0960-8524
Ratings:
- Scopus rating (2016): SJR 2.191 SNIP 1.91 CiteScore 5.94
- Scopus rating (2015): SJR 2.255 SNIP 1.908 CiteScore 5.47
- Scopus rating (2014): SJR 2.41 SNIP 2.104 CiteScore 5.3
- Scopus rating (2013): SJR 2.412 SNIP 2.503 CiteScore 5.97
- Scopus rating (2012): SJR 2.389 SNIP 2.465 CiteScore 5.25
- Scopus rating (2011): SJR 2.314 SNIP 2.508 CiteScore 5.56
- Scopus rating (2010): SJR 2.086 SNIP 2.355
- Scopus rating (2009): SJR 1.912 SNIP 2.231
- Scopus rating (2008): SJR 1.734 SNIP 2.732
- Scopus rating (2007): SJR 1.529 SNIP 2.423
- Scopus rating (2006): SJR 1.315 SNIP 1.98
- Scopus rating (2005): SJR 1.269 SNIP 2.006
- Scopus rating (2004): SJR 1.197 SNIP 1.659
- Scopus rating (2003): SJR 0.948 SNIP 1.639
- Scopus rating (2002): SJR 0.882 SNIP 1.3
- Scopus rating (2001): SJR 0.541 SNIP 1.208
- Scopus rating (2000): SJR 0.464 SNIP 1.049
- Scopus rating (1999): SJR 0.669 SNIP 1.061
Original language: English
DOIs:
10.1016/j.biortech.2010.06.066

Bibliographical note
Contribution: organisation=keb bio,FACT1=1
Source: researchoutputwizard
Source-ID: 8834
Research output: Scientific peer-review Article
Microbial community structure in anaerobic co-digestion of grass silage and cow manure in a laboratory continuously stirred tank reactor

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Authors: Wang, H., Tolvanen, K., Lehtomäki, A., Puhakka, J., Rintala, J.
Pages: 135-146
Publication date: 2010
Peer-reviewed: Yes

Publication information
Journal: BIODEGRADATION
Volume: 21
Issue number: 1
ISSN (Print): 0923-9820
Ratings:
Scopus rating (2016): SJR 0.804 SNIP 1.069 CiteScore 2.41
Scopus rating (2015): SJR 0.888 SNIP 1.055 CiteScore 2.37
Scopus rating (2014): SJR 0.968 SNIP 1.195 CiteScore 2.42
Scopus rating (2013): SJR 1.103 SNIP 1.435 CiteScore 2.63
Scopus rating (2012): SJR 1.113 SNIP 1.213 CiteScore 2.22
Scopus rating (2011): SJR 1.052 SNIP 1.102 CiteScore 2.31
Scopus rating (2010): SJR 1.096 SNIP 0.991
Scopus rating (2009): SJR 1.009 SNIP 1.208
Scopus rating (2008): SJR 0.961 SNIP 1.193
Scopus rating (2007): SJR 0.874 SNIP 1.107
Scopus rating (2006): SJR 0.984 SNIP 1.105
Scopus rating (2005): SJR 0.805 SNIP 0.953
Scopus rating (2004): SJR 0.87 SNIP 0.765
Scopus rating (2003): SJR 0.738 SNIP 0.854
Scopus rating (2002): SJR 0.815 SNIP 0.686
Scopus rating (2001): SJR 0.651 SNIP 0.954
Scopus rating (2000): SJR 0.688 SNIP 0.81
Scopus rating (1999): SJR 0.87 SNIP 0.676
Original language: English
DOIs:
10.1007/s10532-009-9288-5

Bibliographical note
Contribution: organisation=keb bio,FACT1=1
Source: researchoutputwizard
Source-ID: 9585
Research output: Professional › Chapter

Mine wastewater treatment using Phalaris arundinacea plant material hydrolyzate as substrate for sulfate-reducing bioreactor

General information
State: Published
Molecular methods for studying mixed hydrogen-fermenting microbial communities

General information
State: Published
Ministry of Education publication type: G5 Doctoral dissertation (article)
Organisations: Department of Chemistry and Bioengineering
Authors: Tolvanen, K.
Publication date: 2010

Publication information
Place of publication: Tampere
Publisher: Tampere University of Technology
Original language: English

Publication series
Name: Tampereen teknillinen yliopisto. Julkaisu
Publisher: Tampere University of Technology
Volume: 911
ISSN (Print): 1459-2045
Oral bacteria as potential probiotics for the pharyngeal mucosa

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Authors: Guglielmetti, S., Taverniti, V., Minuzzo, M., Arioli, S., Stuknyte, M., Karp, M., Mora, D.
Pages: 3048-3058
Publication date: 2010
Peer-reviewed: Yes

Publication information
Journal: Applied and Environmental Microbiology
Volume: 76
Issue number: 12
ISSN (Print): 0099-2240
Ratings:
Scopus rating (2016): SJR 1.691 SNIP 1.243 CiteScore 4.08
Scopus rating (2015): SJR 1.896 SNIP 1.351 CiteScore 4.14
Scopus rating (2014): SJR 1.862 SNIP 1.402 CiteScore 4.02
Scopus rating (2013): SJR 1.909 SNIP 1.41 CiteScore 4.25
Scopus rating (2012): SJR 1.967 SNIP 1.427 CiteScore 4.29
Scopus rating (2011): SJR 1.91 SNIP 1.453 CiteScore 4.12
Scopus rating (2010): SJR 1.885 SNIP 1.431
Scopus rating (2009): SJR 1.975 SNIP 1.529
Scopus rating (2008): SJR 2.168 SNIP 1.574
Scopus rating (2007): SJR 2.045 SNIP 1.652
Scopus rating (2006): SJR 2.054 SNIP 1.594
Scopus rating (2005): SJR 2.078 SNIP 1.646
Scopus rating (2004): SJR 2.123 SNIP 1.641
Scopus rating (2003): SJR 2.108 SNIP 1.806
Scopus rating (2002): SJR 2.044 SNIP 1.739
Scopus rating (2001): SJR 2 SNIP 1.737
Scopus rating (2000): SJR 1.958 SNIP 1.75
Scopus rating (1999): SJR 2.316 SNIP 1.723
Original language: English
DOIs:
10.1128/AEM.00109-10

Oxidative dissolution of bornite by Acidithiobacillus ferrooxidans

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Authors: Bevilaqua, D., Garcia Jr., O., Tuovinen, O. H.
Number of pages: 6
Pages: 101-106
Predictive modelling of Fe(III) precipitation in iron removal process for bioleaching circuits

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Authors: Nurmi, P., Özkaya, B., Kaksonen, A. H., Tuovinen, O. H., Puhakka, J. A.
Pages: 449-456
Publication date: 2010
Peer-reviewed: Yes

Publication information
Journal: Bioprocess and Biosystems Engineering
Volume: 33
Issue number: 4
ISSN (Print): 1615-7591
Ratings:
Scopus rating (2016): SJR 0.628 SNIP 0.956 CiteScore 1.96
Scopus rating (2015): SJR 0.687 SNIP 0.887 CiteScore 1.97
Scopus rating (2014): SJR 0.699 SNIP 0.968 CiteScore 1.95
Scopus rating (2013): SJR 0.792 SNIP 1.085 CiteScore 2.16
Scopus rating (2012): SJR 0.767 SNIP 1.111 CiteScore 2.14
Pretreatment of turkey fat-containing wastewater in coarse sand and gravel/coarse sand bioreactors

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Authors: Singh Gaur, R., Cai, L., Tuovinen, O. H., Mancl, K. M.
Pages: 1106-1110
Publication date: 2010
Peer-reviewed: Yes

Publication information
Journal: Bioresource Technology
Volume: 101
Issue number: 3
ISSN (Print): 0960-8524
Ratings:
Scopus rating (2016): SJR 2.191 SNIP 1.91 CiteScore 5.94
Scopus rating (2015): SJR 2.255 SNIP 1.908 CiteScore 5.47
Scopus rating (2014): SJR 2.41 SNIP 2.104 CiteScore 5.3
Scopus rating (2013): SJR 2.412 SNIP 2.503 CiteScore 5.97
Scopus rating (2012): SJR 2.389 SNIP 2.465 CiteScore 5.25
Scopus rating (2011): SJR 2.314 SNIP 2.508 CiteScore 5.56
Scopus rating (2010): SJR 2.086 SNIP 2.355
Scopus rating (2009): SJR 1.912 SNIP 2.231
Scopus rating (2008): SJR 1.734 SNIP 2.732
Scopus rating (2007): SJR 1.529 SNIP 2.423
Scopus rating (2006): SJR 1.315 SNIP 1.98
Scopus rating (2005): SJR 1.269 SNIP 2.006
Scopus rating (2004): SJR 1.197 SNIP 1.659
Scopus rating (2003): SJR 0.948 SNIP 1.639
Scopus rating (2002): SJR 0.882 SNIP 1.3
Scopus rating (2001): SJR 0.541 SNIP 1.208
Scopus rating (2000): SJR 0.464 SNIP 1.049
Scopus rating (1999): SJR 0.669 SNIP 1.061
Silage supports sulfate reduction in the treatment of metals- and sulfate-containing waste waters

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Authors: Wakeman, K. D., Erving, L., Riekkola-Vanhanen, M. L., Puhakka, J. A.
Pages: 4932-4939
Publication date: 2010
Peer-reviewed: Yes

Publication information
Journal: Water Research
Volume: 44
Issue number: 17
ISSN (Print): 0043-1354
Ratings:
Scopus rating (2016): SJR 2.629 SNIP 2.558 CiteScore 7.49
Scopus rating (2015): SJR 2.689 SNIP 2.507 CiteScore 6.63
Scopus rating (2014): SJR 2.957 SNIP 2.727 CiteScore 6.13
Scopus rating (2013): SJR 2.956 SNIP 2.693 CiteScore 6.02
Scopus rating (2012): SJR 2.966 SNIP 2.456 CiteScore 5.15
Scopus rating (2011): SJR 2.867 SNIP 2.374 CiteScore 5.43
Scopus rating (2010): SJR 2.582 SNIP 2.196
Scopus rating (2009): SJR 2.319 SNIP 2.225
Scopus rating (2008): SJR 2.065 SNIP 2.19
Scopus rating (2007): SJR 1.994 SNIP 2.208
Scopus rating (2006): SJR 1.895 SNIP 2.214
Scopus rating (2005): SJR 2.114 SNIP 2.337
Scopus rating (2004): SJR 2.227 SNIP 2.106
Scopus rating (2003): SJR 1.696 SNIP 1.917
Scopus rating (2002): SJR 1.54 SNIP 1.775
Scopus rating (2001): SJR 1.321 SNIP 1.711
Scopus rating (2000): SJR 1.305 SNIP 1.688
Scopus rating (1999): SJR 1.456 SNIP 1.576
Original language: English
DOI: 10.1016/j.watres.2010.07.025

Sulfate-reducing fluidized-bed bioreactor processes for acidic metal- and sulfate-containing waters

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
The effect of sub-optimal temperature on specific sulfidogenic activity of mesophilic SRB in an H2-fed membrane bioreactor

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering
Authors: Nevatalo, L. M., Bijmans, M. F., Lens, P. N., Kaksonen, A. H., Puhakka, J. A.
Pages: 363-368
Publication date: 2010
Peer-reviewed: Yes

Publication information
Journal: Process Biochemistry
Volume: 45
Issue number: 3
ISSN (Print): 1359-5113
Ratings:
Scopus rating (2016): SJR 0.819 SNIP 1.075 CiteScore 2.87
Scopus rating (2015): SJR 0.923 SNIP 1.234 CiteScore 3.01
Scopus rating (2014): SJR 0.989 SNIP 1.438 CiteScore 3.05
Scopus rating (2013): SJR 0.994 SNIP 1.493 CiteScore 3.06
Scopus rating (2012): SJR 1.191 SNIP 1.455 CiteScore 2.93
Scopus rating (2011): SJR 1.165 SNIP 1.419 CiteScore 3.05
Two recombinant peptides, SpStronglylocins 1 and 2, from Strongylocentrotus purpuratus, show antimicrobial activity against Gram-positive and Gram-negative bacteria

**General information**

State: Published

Ministry of Education publication type: A1 Journal article-refereed

Organisations: Department of Chemistry and Bioengineering

Authors: Li, C., Blencke, H., Smith, L., Karp, M. T., Stensvåg, K.

Pages: 286-292

Publication date: 2010

Peer-reviewed: Yes

**Publication information**

Journal: Developmental and Comparative Immunology

Volume: 34

Issue number: 3

ISSN (Print): 0145-305X

Ratings:

Scopus rating (2016): SJR 1.127 SNIP 1.109 CiteScore 3.58

Scopus rating (2015): SJR 1.325 SNIP 1.1 CiteScore 3.46

Scopus rating (2014): SJR 1.113 SNIP 1.082 CiteScore 3.28

Scopus rating (2013): SJR 1.156 SNIP 1.163 CiteScore 3.39

Scopus rating (2012): SJR 1.165 SNIP 1.067 CiteScore 3.25

Scopus rating (2011): SJR 1.124 SNIP 1.027 CiteScore 3.39

Scopus rating (2010): SJR 1.02 SNIP 1.036

Scopus rating (2009): SJR 1.023 SNIP 1.009

Scopus rating (2008): SJR 0.901 SNIP 0.949

Scopus rating (2007): SJR 0.919 SNIP 1.058

Scopus rating (2006): SJR 1.316 SNIP 1.178

Scopus rating (2005): SJR 1.1 SNIP 0.979

Scopus rating (2004): SJR 1.104 SNIP 1.231

Scopus rating (2003): SJR 0.831 SNIP 1.07

Scopus rating (2002): SJR 0.931 SNIP 0.991

Scopus rating (2001): SJR 0.932 SNIP 0.994

Scopus rating (2000): SJR 0.904 SNIP 0.774

Scopus rating (1999): SJR 0.576 SNIP 0.836
Comparison of the total mercury content in sediment samples with a mercury sensor bacteria test and Vibrio fischeri toxicity test

The suitability of a luminescent bacterial sensor strain Escherichia coli MC1061(pTOO11) [Virta, M.; Lampinen, J.; Karp, M. Anal Chem 1995, 67, 667-669] for the measuring of mercury from sediment samples was evaluated. The sensor strain is based on the control of expression of a reporter gene, firefly luciferase, by a mercury sensitive regulation unit. The sensor responds to mercury by increased luminescence as a consequence of increased production of the reporter protein luciferase. The method is simple to perform since the luminescence is recorded with a portable luminometer and the sensor bacteria are freeze-dried. The results obtained from river sediment samples were compared with the total mercury content of the samples, which was measured by atomic absorption spectrometry and Leco(R) Mercury analyzer and the modified photobacteria luminescence inhibition test (Lappalainen, J.; Juvonen, R.; Vaajasaari, K.; Karp, M. Chemosphere 1999, 38, 1069-1083). The correlation between the bacterial sensor results with the total mercury content, ranging from 0.01 mg/kg to 16 mg/kg, was significant with 32 samples tested (R-2 UP to 0.8115). There was no correlation between the total mercury content and toxicity measured with Vibrio fischeri in this sample panel, (C) 2000 by John Wiley & Sons, Inc.
Detecting bioavailable toxic metals and metalloids from natural water samples using luminescent sensor bacteria

We have generated microbial sensors for analyzing the presence of various metals or metalloids by recombinant DNA technology. The strains are based on strictly regulated promoters controlling the expression of the firefly luciferase gene in microbial cells. The regulator-reporter constructs are located in shuttle plasmids capable of replicating in gram-negative or -positive microbial organisms. The sensors developed are real-time indicators of metal responsive gene expression giving results in approximately 30 min, with optimal induction times ranging from 60 to 240 min. We describe here the performance of these metal sensing bacteria for the assessment of different water samples spiked with lead, arsenic, mercury or cadmium. We show that these bacteria are sensitive detectors of metal bioavailability, which is difficult or even impossible to measure by traditional analytical chemistry methods. All measurements were done using freeze-dried bacteria, which makes these sensors reagent-like and also easy to use in field conditions. (C) 2000 Elsevier Science Ltd. All rights reserved.
A recombinant Escherichia coli sensor strain for the detection of tetracyclines

A bioluminescent Escherichia coli K-12 strain for the specific detection of the tetracycline group of antibiotics is described. A sensor plasmid, containing five genes from bacterial luciferase operon of Photorhabdus luminescens inserted under the control of tetracycline-responsive elements of the transposon Tn10, was constructed. Usage of the full-length luciferase operon in the sensor resulted in tetracycline-dependent light production without additions, i.e., self-luminescent phenotype, since all the substrates were intrinsically produced by the recombinant organism. The time needed for optimal induction of light emission was 90 min. Maximal induction of similar to 100-fold over uninduced levels by using 20 ng of tetracycline, and picomole sensitivities for the seven different tetracyclines tested, were obtained without added Mg2+ ions. The higher the pH and the magnesium ion concentration in the assay medium the higher was the amount of membrane-impermeable tetracycline-Mg2+ chelate complex. In consequence, by adjusting the pH and the Mg2+ ion concentration, the sensitivity of the assay can be modified for different analytical purposes. Different non-tetracycline antibiotics did not cause induction of light emission.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Univ Turku, University of Turku, Dept Biotechnol
Authors: Korpela, M. T., Kurittu, J. S., Karvinen, J. T., Karp, M. T.
Number of pages: 6
Pages: 4457-4462
Publication date: 1 Nov 1998
Peer-reviewed: Yes

Publication information
Journal: Analytical Chemistry
Volume: 70
Issue number: 21
ISSN (Print): 0003-2700
Ratings:
Scopus rating (2016): SJR 2.255 SNIP 1.491 CiteScore 6.08
Scopus rating (2015): SJR 2.277 SNIP 1.57 CiteScore 6
Scopus rating (2014): SJR 2.277 SNIP 1.605 CiteScore 5.79
Scopus rating (2013): SJR 2.395 SNIP 1.7 CiteScore 6.01
Scopus rating (2012): SJR 2.674 SNIP 1.715 CiteScore 5.8
Scopus rating (2011): SJR 2.61 SNIP 1.665 CiteScore 5.86
Scopus rating (2010): SJR 2.375 SNIP 1.607
Scopus rating (2009): SJR 2.318 SNIP 1.656
Scopus rating (2008): SJR 2.601 SNIP 1.593
Scopus rating (2007): SJR 2.59 SNIP 1.772
Scopus rating (2006): SJR 2.564 SNIP 1.809
Scopus rating (2005): SJR 2.497 SNIP 2.016
Scopus rating (2004): SJR 2.544 SNIP 1.929
Scopus rating (2003): SJR 2.331 SNIP 1.837
Scopus rating (2002): SJR 2.295 SNIP 1.796
Scopus rating (2001): SJR 2.545 SNIP 2.022
Scopus rating (2000): SJR 2.637 SNIP 1.981
Scopus rating (1999): SJR 2.577 SNIP 2.059
Original language: English
Keywords: XENORHABDUS-LUMINESCENS, EXPRESSION, ANTIMONITE, PROMOTER, ARSENITE, BACTERIA, BINDING, CLONING, GENES
DOIs:
10.1021/ac980740e
Source: WOS
Source-ID: 000076839000011
Research output: Scientific - peer-review Article

Fractionation of DNA with Sephacryl S-1000(R)
In this study the application of gel filtration for purification of heterogeneous DNA is described. The fractionation of partial restriction enzyme digests of bacterial chromosomal DNA on a Sephacryl S-1000 -column is easy and rapid. Simultaneously intact chromosomal DNA and low molecular weight substances are eliminated in the run. The method is
also applicable to the purification of plasmid DNA, as has been previously reported (3). Thus we are able to get pure DNA with yields over 80%.

**General information**

State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: University of Turku
Authors: Suominen, A. I., Karp, M. T., Mäntsälä, P. I.
Number of pages: 7
Pages: 209-215
Publication date: Feb 1984
Peer-reviewed: Yes

**Publication information**

Journal: Biochemistry Research International
Volume: 8
Issue number: 2
ISSN (Print): 2090-2247
Ratings:
Scopus rating (2016): SJR 0.489 SNIP 0.65 CiteScore 1.61
Scopus rating (2015): SJR 1.138 SNIP 1.027 CiteScore 2.37
Scopus rating (2014): SJR 1.064 SNIP 0.779 CiteScore 2.2
Scopus rating (2013): SJR 1.04 SNIP 0.717 CiteScore 2.19
Scopus rating (2012): SJR 0.322 SNIP 0.156 CiteScore 0.78
Scopus rating (2011): SJR 0.117 SNIP 0.193 CiteScore 0.27
Original language: English
Keywords: Acrylic Resins, Chromatography, Gel, DNA, Bacterial, Escherichia coli, Genes, Bacterial, Geobacillus stearothermophilus, Plasmids
Source: PubMed
Source-ID: 6383398
Research output: Scientific - peer-review › Article

**Time-resolved europium fluorescence in enzyme activity measurements: a sensitive protease assay**

A method for incorporating into proteins a nonradioactive Eu3+ label, which exhibits fluorescence of a long decay time in the presence of suitable ligands, is described. As an example of the use of this label the method has been developed to work as a sensitive protease assay. By hydrolyzing the Eu3+-labeled casein, bound to an insoluble matrix (Sepharose 4B or Affi-Gel 10), with proteases and measuring the Eu3+ released with a pulsed time-resolved fluorometer it was possible to detect as low as 2.5, 1.0, or 1.0 ng of alpha-chymotrypsin, trypsin, or subtilisin, respectively.

**General information**

State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: University of Turku
Authors: Karp, M. T., Hemmilä, I., Mäntsälä, P. I., Suominen, A. I.
Number of pages: 5
Pages: 399-403
Publication date: Dec 1983
Peer-reviewed: Yes

**Publication information**

Journal: Journal of applied biochemistry
Volume: 5
Issue number: 6
ISSN (Print): 0161-7354
Original language: English
Keywords: Animals, Bacillus, Cattle, Chymotrypsin, Europium, Kinetics, Microchemistry, Pancreas, Spectrometry, Fluorescence, Subtilisins, Swine, Trypsin
Source: PubMed
Source-ID: 6381465
Research output: Scientific - peer-review › Article

**Simultaneous extraction and combined bioluminescent assay of NAD+ and NADH**

A new method for extracting pyridine nucleotides from tissue samples at room temperature that allows the simultaneous extraction of both the oxidized and reduced nucleotide when using a 70% buffered ethanol solution as the extractant has
been developed. The extraction efficiencies for NAD+ and NADH were 91 and 102%, respectively. The extraction method was followed by a combined bioluminescent assay of both nucleotides. A bacterial bioluminescent system, which included luciferase and low levels of a NADH-specific oxidoreductase, was used to produce a constant light intensity directly proportional to the amount of NADH in the tissue extract sample. When the NADH had been measured, the NAD+ present in the extract was enzymatically converted to NADH by the addition of alcohol dehydrogenase, after which the second increase in light level was recorded. The sensitivity of the bioluminescent assay presented here is $5 \times 10^{-14}$ mol NADH or NAD+ per assay.