

Bioresource Technology

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Application  
of

## microbial electrolysis cells to treat spent yeast from an alcoholic fermentation (Article) ([Open Access](#))

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### Abstract

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Spent yeast (SY), a major challenge for the brewing industry, was treated using a microbial electrolysis cell to recover energy. Concentrations of SY from bench alcoholic fermentation and ethanol were tested, ranging from 750 to 1500mgCOD/L and 0 to 2400mgCOD/L respectively. COD removal efficiency (RE), coulombic efficiency (CE), coulombic recovery (CR), hydrogen production and current density were evaluated. The best treatment condition was 750mgCOD/LSY+1200mgCOD/L ethanol giving higher COD RE, CE, CR (90±1%, 90±2% and 81±1% respectively), as compared with 1500mgCOD/LSY (76±2%, 63±7% and 48±4% respectively); ethanol addition was significantly favorable (p value=0.011), possibly due to electron availability and SY autolysis. 1500mgCOD/LSY+1200mgCOD/L ethanol achieved higher current density (222.0±31.3A/m<sup>3</sup>) and hydrogen production (2.18±0.66 LH<sub>2</sub>/day/LReactor) but with lower efficiencies (87±2% COD RE, 71.0±.4% CE). Future work should focus on electron sinks, acclimation and optimizing SY breakdown. © 2015 The Authors. Published by Elsevier Ltd.

### SciVal Topic Prominence

Topic: [Microbial fuel cells](#) | [Bioelectric Energy Sources](#) | [cell MFC](#)

Prominence percentile: 99.978

### Reaxys Database Information

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### Author keywords

COD removal

Coulombic efficiency

Hydrogen

Microbial electrolysis cell

Spent yeast

## Indexed keywords

### Engineering controlled terms:

Antigen-antibody reactions Electrolysis Electrolytic cells Ethanol Fermentation  
Hydrogen Microbial fuel cells Regenerative fuel cells Yeast

### Engineering uncontrolled terms

Alcoholic fermentation COD removal COD removal efficiency Coulombic efficiency  
Electron sink Ethanol addition P-values Treatment conditions

### Engineering main heading:

Hydrogen production

### EMTREE drug terms:

alcohol hydrogen organic matter alcohol

### GEOBASE Subject Index:

alcohol biotechnology brewing industry chemical oxygen demand  
concentration (composition) efficiency measurement electrokinesis ethanol  
fermentation hydrogen microbial activity yeast

### EMTREE medical terms:

acclimatization alcoholic fermentation Article autolysis chemical oxygen demand  
controlled study current density electrolysis electron fermentation optimization  
fermentation technique microbial community microbial degradation  
microbial electrolysis cell nonhuman priority journal reactor spent yeast  
waste component removal yeast bacterium biochemical oxygen demand  
chemistry electrolysis equipment design fermentation metabolism pH  
temperature

### MeSH:

Autolysis Bacteria Biological Oxygen Demand Analysis Electrolysis Electrons  
Equipment Design Ethanol Fermentation Hydrogen Hydrogen-Ion Concentration  
Temperature Yeasts

## Chemicals and CAS Registry Numbers:

alcohol, 64-17-5; hydrogen, 12385-13-6, 1333-74-0;

Ethanol; Hydrogen

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