

ELECTRIC POWER PRODUCTION FROM HEAT GENERATED BY MICROBIAL PROCESSES

INVENTION DESCRIPTION

One of the major problems our society faces today is the steady worldwide growing energy demand. Alternative technologies, not fossil and not nuclear, are promising energy sources although they are not wholly competitive. There are biological systems allowing direct conversion of biomass into electricity by electrogenic bacteria -that produce electrons when oxidize organic matter-, they are known as Microbial Fuel Cell (MFC). The electric yield of MFCs has significantly improved in recent years, mainly by increasing the ratio electrode area/ reactor volume. However, the best results have been obtained for small-scale (in devices of volumes lower than 1 liter). Therefore, the development of technological improvements in procedures for electricity production by microbial cultures is needed.

Researchers from University of Valencia have revealed electricity production from exothermic microbial culture by thermoelectric or Peltier-Seebeck effect, that is to say, by conversion of heat produced by microbial growth to electric power. Furthermore, they have developed the device required to achieve efficiently that energetic transformation. This conversion of heat produced by exothermic microbial growth to electricity allows designing devices and coupling them to existing microbial reactors. Besides, it is possible to obtain an electricity source competent for local electricity production and heat recycling that could be incorporated in future developments of cellular electric installations, based on microbiology.

BUSINESS APPLICATION SECTORS

The procedure can be applied to any exothermic microbial culture in the industry, such as agro-food and biotechnology, making efficient use of the heat produced in fermentation processes such as alcoholic beverages (wine, beer), bioremediation, waste treatment, autotrophic thermal aerobic digestion, for electricity production.

TECHNICAL ADVANTAGES AND BENEFITS

The most remarkable advantages provided by this technology are:

- Taking advantage of an undesirable by-product, the metabolic heat generated by microbial fermentations.
- The culture survival is prolonged since this method controls the internal temperature of the microbial process.
- It is universal, since the procedure can be applied to any exothermic microbial culture, i.e. alcoholic fermentation in industries such as agro-food, or in waste treatments.

DEVELOPMENT STATUS OF TECHNOLOGY

Technology developed at laboratory level.

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INTELLECTUAL PROPERTY RIGHTS

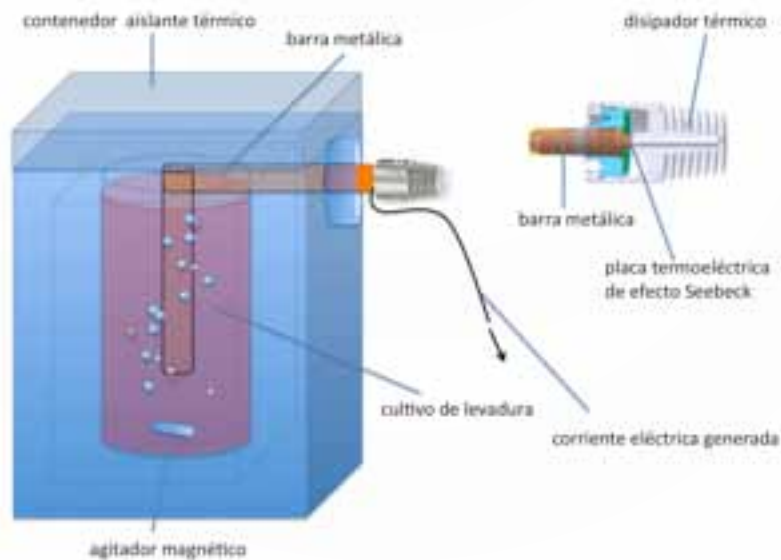
The technology is protected through the following patents:

Spanish patent application P201200977, titled "Dispositivo termoeléctrico microbiano y método asociado a dicho dispositivo".

COLLABORATION SOUGHT

- License agreement, manufacturing or marketing.
- R & D project to complete the development or apply to other sectors.
- Subcontracting agreement with another company.
- Possible spin-off (looking for partners)

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