Description of Funded Research Projects
1st Call for H.F.R.I. Research Projects
to support Post-Doctoral Researchers

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Research Project Title:

Application of microbial electrochemical technologies towards advanced biofuels production

Principal Investigator:
Antonopoulou Georgia

Popular Title:

Application of microbial electrochemical technologies towards advanced biofuels production

Scientific Field:
Energy and Environment

Host Institution:
Foundation for Research and Technology,
Institute Of Chemical Engineering Sciences

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The META-FUELs project aspires to identify, develop and evaluate, in a comparative way, low cost, flexible and highly efficient technologies for the production of HyMet (hydrogen enriched methane) of stable quality, focusing mainly on the combination of Microbial Electrochemical Technologies (MET) with the Fermentative Microbial Processes (FMP). This will be achieved via development and application of innovative MET for hydrogen and methane production, coupled with the well-established technologies of Dark Fermentation (DF) and Anaerobic Digestion (AD), for hydrogen and biogas production, respectively. Great attention will be paid on the integration of the individual processes, since the hydrogen and methane producing reactors will be efficiently coupled directly. Assessment of the produced HyMet in terms of its combustion characteristics will be performed.

The concept will be developed using an important wastewater type, cheese whey (CW), which represents a typical Greek wastewater, the treatment, disposal and valorization of which is an environmental concern. However, the proposed research methodologies could further be applied for the exploitation of other types of wastes/ wastewaters such as olive mill wastewater, or other agro-industrial wastes, providing thus sustainable solutions for ensuring partial energy autonomy of small agro-industrial units, which will certainly have a direct impact on environment, economy and society.

Project Impact on Society

META-FUELs proposes the application of proper technology for biofuels generation by coupling innovative microbial electrochemical technologies with fermentative microbial processes, via utilization of unexploited raw materials. Thus, it is expected to provide sustainable solutions for ensuring partial energy autonomy of small agro-industrial units (such as cheese whey production units), with the further possibility to act as independent power producers, providing solutions to the increasing energy demand in Greece. META-FUELs technology is expected to be implemented at small and medium size plants, thus stimulating local activity and employment. Indeed, HyMEt production refers to decentralized energy production systems, either at the farm-scale or at community level, implying rural development and creation of new jobs, most of them being in rural areas. This is expected to enhance the quality of life with health benefits, ensure the prosperity and social cohesion, and enhance the agricultural production, whereas preventing environmental degradation, disruption of the ecosystem and deterioration of the landscape.

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To me, H.F.R.I. funding would mean...

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Gaining experience in coordination and management of research projects; creation of a disciplinary research team that will act in a complementary way; transfer of knowledge and creation of collaboration bridges with other research teams in Greece; transfer of knowledge from the Laboratory of Environmental Biotechnology of the National Institute of Agronomic Research (INRA- LBE); expertise enrichment in new scientific areas.

The Principal Investigator,
Antonopoulou Georgia

Funding

Amount: **110,000 €**

Duration: **36 months**

Foundation: **H.F.R.I.**

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Hellenic Foundation for Research & Innovation

CONTACT

127, Vasilissis Sofias Avenue
115 21 Athens, Greece
info@elidek.gr
www.elidek.gr

HELLENIC REPUBLIC
MINISTRY OF DEVELOPMENT AND INVESTMENTS

GSRT
GENERAL SECRETARIAT FOR RESEARCH AND TECHNOLOGY