UNIVERSITI SAINS MALAYSIA

APEX™

Researchers:

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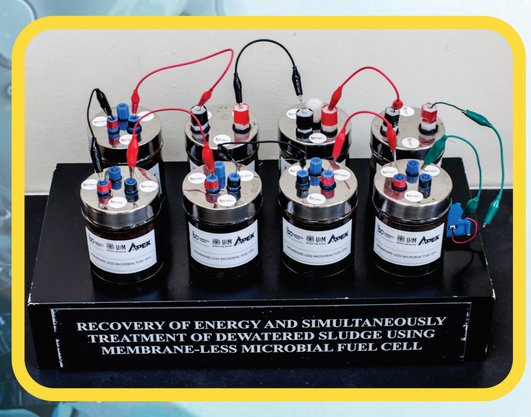
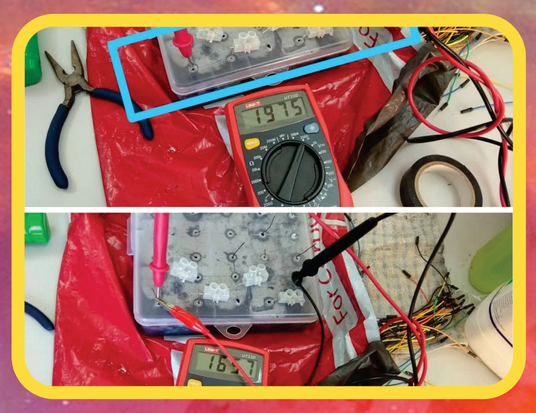
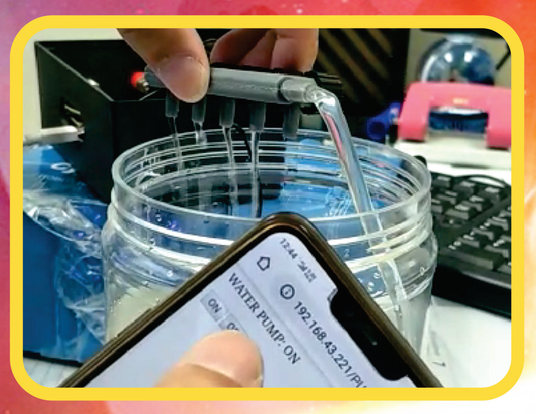
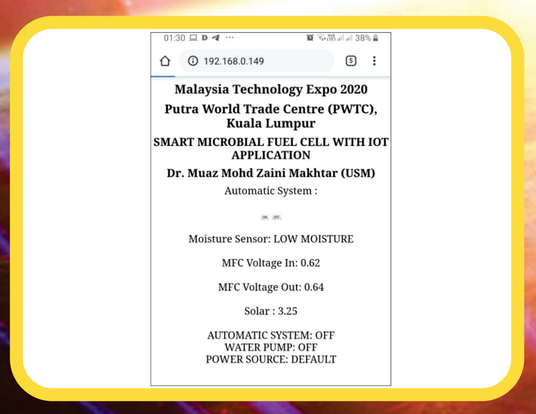
INTELLECTUAL PROPERTY:
TRADE SECRET
PATENT FILING THE SYSTEM
(NOVEL, INVENTIVE, INDUSTRIAL APPLICATION)

Smart Membrane-Less Microbial Fuel Cell (ML-MFC) for Electricity Generation using Dewatered Sludge with Internet of Things (IOT) Application









INTRODUCTION

Microbial fuel cell (MFC) is an alternative renewable energy which converts chemical energy to electrical energy by the catalytic reaction of microorganisms.

PROBLEM STATEMENT

- Depletion of natural resources
- Global warming
- High cost of sludge disposal management and limited space for landfill
- Annual increase in volume of sludge at wastewater treatment plant

NOVELTY AND INVENTIVENESS

a) Microbial fuel cell (Air-cathode, membrane-less, mediator-less, co-culture; strain A and B)
b) Self – sustain MFC (Using it own energy to feed itself. Prolong the electricity generation)
c) Internet of Things IoT (Data of voltage and moisture can be displayed online via smartphone)
d) Automatic Watering system (Save the labour cost and reduce water wastage)

INTELLECTUAL PROPERTY (IP) STATUS

- Trade secret (Strain A and B in MFC) (Novel, Inventive, Industrial Application)
- Patent filing the system (Novel, Inventive, Industrial Application)

USEFULNESS AND APPLICATION

- Continuously generate electricity
- Harvesting energy and store in a small power bank
- Online monitoring of voltage and moisture content via smart phone
- The smart MFC can self-sustain (pump in new 'food' or inoculum) using own energy
- The smart MFC can be commanded via smart phone for automatic mode or manual mode
- This technology also suitable for plantation for the watering system purpose
- Reduce the labor cost and wastage of water as the sensor will detect precisely the moisture content

STATUS OF INVENTION

TRL 4

COMMERCIAL POTENTIAL

On-going to sign contract research with Farmivo Sdn Bhd for the technology trial.
Alternative green, affordable, safe energy and can easily be set up either at home or industrial site.

POTENTIAL PARTNERS

- The success of energy recovery from dewatered sludge has created a potential collaboration with a waste management company such as E-Idaman Sdn Bhd, Indah Water Konsortium Sdn Bhd.
- Suitable to all plantation; the crops will obtain sufficient water and lead to the higher yield production

KNOWLEDGE MANAGEMENT

Grant - Research University Grant (RM135,000), FRGS (RM139,464), Short Term Grant (RM42,2884)
Talent development - 1 PhD, 1 Msc, 1 Undergraduate
Journal - 4 (ISI Q1, Q2, Q3 and 1 Scopus)

IMPACT OF THE PRODUCT

INDUSTRY: alternative renewable energy for electricity and wastewater treatment, opportunity for industries to generate their own electricity supply
ECONOMIC: alternative cheap renewable energy from wastes instead of non-renewable energy
SOCIETY: a cheaper renewable energy which is green and clean. By recycling biosolids, pollution due to its disposal can be reduced and provide free-pollution to the environment.
SUSTAINABLE DEVELOPMENT: reduce utilization of non-renewable resource (gas/fossil fuels) for electricity and reduce pollution potential

Contact Person

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