



PROPOSAL

Enhancement of Anaerobic Membrane Reactor Wastewater Treatment Performance Utilizing Solar-Still

WT087K

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**Wastewater Treatment and Reclamation
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ABSTRACT (SUMMARY OF NOT MORE THAN 300 WORDS) (ملخص لا يزيد عن 300 كلمة)

Given the lack of freshwater resources in Kuwait, enhancing wastewater reuse is of utmost importance for the country with the production of, approximately, over 1.2 Mm³ of wastewater per day. Ostensibly, wastewater has been treated with the objective of safe disposal, while in the past decade, resource recovery and energy sufficiency became the main objectives. A technology that responds to these objectives is the anaerobic membrane bioreactor (AnMBR), which would enhance energy balance for wastewater treatment if the wastewater conditions are optimized. In this research project, a solar still is introduced to the AnMBR to improve the characteristics of the wastewater while partially recovering water using free solar heat. This process is a bona fide innovation in this field. The development and testing of this process will be done via five tasks using a pilot-scale design installed at Sulaibiya Research Plant (SRP). The testing will include effluent quality, methane production, and energy footprint of the process.

The project is expected to be accomplished over a period of 27 mo with a total budget of KD212,515.

KEY WORDS: أهم المصطلحات:

Wastewater, solar energy, anaerobic, membranes, methane, energy footprint

استمارة الأهداف

OBJECTIVES SHEET

Objectives

- To design and install an innovative pilot-scale solar-still/AnMBR wastewater treatment system.
- To evaluate the performance of the solar-still/AnMBR system in terms of selected wastewater parameters with special emphasis on removal of pathogens and virus.
- To evaluate the energy footprint of the solar-still/AnMBR system including energy requirement and methane production.

Development Returns:

- Development of an innovative, energy-efficient solar-still/AnMBR wastewater treatment process.
- Evaluation of a pilot design of the solar-still/AnMBR wastewater treatment process in terms of effluent quality and energy footprint.
- Obtaining a patent for the system.