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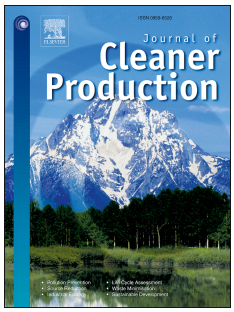

Feasibility analysis of anaerobic co-digestion of activated manure and petrochemical wastewater in Kuantan (Malaysia)

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Feasibility analysis of anaerobic co-digestion of activated manure and petrochemical wastewater in Kuantan (Malaysia)

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Abstract

Although anaerobic digestion provides numerous advantages, it is not extensively applied in the petrochemical industries due to slow reaction, longer hydraulic retention time and lack of process stability. This study was designed to measure the green, energy-related and financial sustainability of anaerobic co-digestion (ACD) of petrochemical wastewater (PWW) and activated manure (AM) in a continuous stirred tank reactor. The results indicated that ACD using a ratio of 50 % PWW/50 % AM achieved an 80 % methane yield of 11.1 m^3 m^{-3} d^{-1} with 98.57±0.5 % elimination of chemical oxygen demand at five days' hydraulic retention time. Similarly, this auspicious procedure also provides 0.85 m^3 irrigation water/m^3 substrate and 0.08 m^3 agricultural supplement/m^3 substrate, with 95.5 % moistness and a potential return income of 0.79 million USD/y and 27 % with a payback period of 3.75 yrs. This work may depict the environmental and financial feasibility of renewable technology that will open the scope for deeper study in minimizing the environmental issues of petrochemical manufacturing in the future.

Keywords: anaerobic co-degradation, petrochemical wastewater, activated manure, methane production, fiscal viability