

TITLE: HIDROGEN SULFIDE REMOVAL FROM BIOGAS USING BIOTRICKLING FILTER PACKED WITH AN ALTERNATIVE SUPPORT MATERIAL

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ABSTRACT:

Developing countries are in critical energy crisis. The renewable and sustainable energy resources are best substitute to the conventional fuels and energy. The methane present in biogas is one of the most promising. But his application may be limited by contaminants such as hydrogen sulfide due its corrosion power and environment issues. For that reason, many chemical and biological technologies have been studied to eliminate these contaminants. The process of biotrickling filtration is based on a biological reactor that consists of a column packed with an inert material on which the biofilm is developed and the contaminated gas passes through the packed column and is then biodegraded by the microorganisms. This study presents the results obtained during 110 days of operation of an biotrickling filter packed (3L) with inert material for biomass immobilization (strips of Polyvinyl Chloride - PVC pipe) to remove H₂S from the biogas produced in a local municipal wastewater treatment plant (MWTP) in Matão – SP, Brazil. During the first 70 days of operation, the biogas empty bed residence time (EBRT) was 4.8 min, Inlet Load (IL) of 13.2 gS.m⁻³_{reactor}.h⁻¹ and presented mean removal efficiency (RE) of 80 % (H₂S). For EBRT of 2.4 min and IL of 40,0 gS.m⁻³_{reactor}.h⁻¹, the RE attained 72 % and for EBRT of 1.6 minutes (IL = 58.0 gS.m⁻³_{reactor}.h⁻¹) the biotrickling filter was able to remove 90 % of H₂S from biogas. The optimum temperature was 36 °C with a RE of 96%. In temperatures higher than 36.7 °C and lower than 35.2 °C the removal dropped to 76% and 83%, respectively. Therefore, the results of the present investigation showed that biotrickling filter packed with PVC stripes (low cost material) can be used to remove hydrogen sulfide from biogas produced in a wastewater treatment plant.

Keywords: Biotrickling filter, support material, PVC, hydrogen sulfide

Development Agency: Fundação de Amparo à Pesquisa do Estado de São Paulo