

Hydrogen Sulfide Removal from Biogas Using Biofilm on Packed Bed of Salak Fruit Seeds

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Abstract : Sulfur-oxidizing bacteria were isolated and then grown on snakefruits seeds forming biofilm. Their performance in sulfide removal were experimentally observed. Snakefruit seeds were then used as packing material in a cylindrical tube. Biological treatment of hydrogen sulfide from biogas was investigated using biofilm on packed bed of snakefruits seeds. Biogas containing 27,9512 ppm of hydrogen sulfide was flown through the bed. Then the hydrogen sulfide concentrations in the outlet at various times were analyzed. A set of simple kinetics model for the rate of the sulfide removal and the bacterial growth was proposed. The axial sulfide concentration gradient in the flowing liquid are assumed to be steady-state. Mean while the biofilm grows on the surface of the seeds and the oxidation takes place in the biofilm. Since the biofilm is very thin, the sulfide concentration in the biofilm is assumed to be uniform. The simultaneous ordinary differential equations obtained were then solved numerically using Runge-Kutta method. The accuracy of the model proposed was tested by comparing the calculation results using the model with the experimental data obtained. It turned out that the model proposed can be applied to describe the removal of sulfide liquid using bio-filter in packed bed. The values of the parameters were also obtained by curve-fitting. The biofilter could remove 89,83 % of the inlet of hydrogen sulfide from biogas for 2.5 h, and optimum loading of 8.33 ml/h.

Keywords : Sulfur-oxidizing bacteria, snakefruits seeds, biofilm, packing material, biogas

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