

AN ABSTRACT OF A THESIS

THE EFFECTS OF AGITATION RATES ON MICROBIAL DESULFURIZATION OF NATURAL GAS USING THIOBACILLUS DENITRIFICANS

Ajay T. Sinkre

Master of Science in Chemical Engineering

The main purpose of this study was to examine the effects of agitation rates on the microbial removal of H_2S in natural gas using Thiobacillus denitrificans. Additional studies involving the effects of temperature, and sulfide concentration were also conducted.

Reactor contents were analysed for sulfate, nitrate, thiosulfate, and ammonium ion concentrations. The Folin-Ciocalteu method was used to evaluate the protein content in the biomass. Reactor off-gas was analysed using a gas chromatograph.

Studies of H_2S oxidation by Thiobacillus denitrificans exhibited contradictory results in the presence and absence of residual thiosulfate. The formation and utilization of both sulfate and nitrate ions were found to be more in the presence of residual thiosulfate. Similar results were found for the case of biomass proteins. Although most of the sample turbidity in the presence of thiosulfate, was due to elemental sulfur precipitation, normal growth of the microorganism was observed in the absence of residual thiosulfate. Agitation rate was found to influence H_2S oxidation in the absence of residual thiosulfate.

THE EFFECTS OF AGITATION RATE ON MICROBIAL DESULFURIZATION OF
NATURAL GAS USING THIOBACILLUS DENITRIFICANS

A Thesis
Presented to
the faculty of the Graduate School
Tennessee Technological University
by
Ajay Sinkre

In Partial Fulfillment
of the Requirements for the Degree
MASTER OF SCIENCE
Chemical Engineering

May 1991

CERTIFICATE OF APPROVAL OF THESIS

THE EFFECTS OF AGITATION RATE ON MICROBIAL DESULFURIZATION
OF NATURAL GAS USING THIOBACILLUS DENITRIFICANS

by

Ajay T. Sinkre

Graduate Advisory Committee:

Chairman

date

Member

date

Member

date

Member

date

Approved for the Faculty

Dean, Graduate School

Date