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Short communication

Enrichment and cultivation of a sulfide-oxidizing bacteria consortium for its deploying in full-scale biogas desulfurization

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ABSTRACT

Operational experiences and strategies to get suitable chemolithoautotrophic sulfide-oxidizing biomass from activated sludge wastewater treatment plant for its deploying in a full-scale biogas desulfurization plant are described. An economic nutrient source was applied to foster microbial selection and rapid growth. Respirometry was implemented on full-scale installations to monitor the ability of the specialized bacteria consortium to oxidize reduced sulfur i.e. H_2S. During the deployment in the full-scale desulfurization reactor, intermittent sulfide feed from biogas scrubbing was performed to accelerate the startup the desulfurization process.

1. Introduction

Gaseous fuels, including those generated from non-fossil sources such as biogas, commonly contain significant concentrations of hydrogen sulfide (H_2S). Besides the corrosion effects caused on the pipes and in the combustion equipment, significant environmental damage is caused by the acid rain produced by the emitted SO_2.Thus, reliable economic desulfurization processes with minimum impact to the environment are needed. Physicochemical methods complemented with biological treatments have shown to satisfy these requirements, especially for biogas desulfurization [1–5].

Abbreviations: OUR, Oxygen uptake rate (g m^{-3} h^{-1}); FSB, Full-scale bioreactor; SOC, Sulfide-oxidizing consortium; ORP, Redox potential (mV); PSB, Pilot scale bioreactor; TVS, Total volatile solids (kg m^{-3}).

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