Hydrogen sulfide biological oxidation by pure cultures of heterotrophic bacteria

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Biogas is a mixture of gases produced during anaerobic treatment of sludge whose composition depends on the type of digested materials as well as on the operating conditions of bioreactor. This consists mainly of CH_4 and CO_2, but components such as H_2S is of particular interest due to its corrosive, toxic and environmentally hazardous properties. Removal of H_2S present in biogas can be achieved through physical and chemical processes, which are effective but produce secondary waste, which in turn gives rise to another problem of pollution. Biological treatment can be used to removing H_2S using different species of microorganisms whose specific enzymes catalyze the biological oxidation of H_2S, including photoautotrophic and chemotrophs organisms.

This work aims to compare the biotechnological removal of H_2S from biogas in aerobic conditions through heterotrophic microbial biomass and biocatalytic treatments.

Heterotrophic microorganisms were isolated from microbial enrichments supplied with H_2S streams from a wastewater treatment plant and were characterized based on their ability to grow in mineral medium with acetate as source of carbon. Isolates retrieved were mainly affiliated to the class of γ-proteobacteria with a strong prevalence of the genus *Pseudomonas*. Isolates A9, B9 and C1 all identified as *Pseudomonas* spp., revealed as the species with higher potential for H_2S removal, growing at concentrations of H_2S up to 16 mM. Total protein profiles were screened by SDS-PAGE for the three isolates, before and after the addition of H_2S, with the aim of purifying enzyme fractions involved in the oxidation process.

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