

Studies on Hydrogen Sulfide Oxidase from *Pseudomonas* sp.

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Background: Biogas resultant from the anaerobic treatment of sludge is composed mainly of CH₄ and CO₂. H₂S, a minor component, is of particular concern due to its corrosive and environmentally hazardous properties. Some microorganisms are able to perform enzymatic oxidation of H₂S to sulfur and/or sulfate. Biological treatment using these microorganisms can be an alternative to physical/chemical processes, avoiding the production of secondary waste.

Objectives: This work aims at the characterization of enzyme(s) responsible for H₂S oxidation in *Pseudomonas* sp.

Methods: Isolates A9, B9 and C1, identified as *Pseudomonas* spp., were isolated through enrichment from wastewater treatment plant deodorant bioreactor supplied with H₂S streams. These strains were screened for the presence of genes responsible for H₂S oxidation by PCR using degenerated primers for group II *sulfide quinone:oxidoreductase*¹. Fragments with the expected size were purified from the gel and subjected to sequencing. Translated sequences were compared using the BLAST software. Total protein profiles were screened by SDS-PAGE, before and after the addition of H₂S. Activity tests were conducted using crude cell extract as catalyst and measuring the formation of sulfate as the reaction product.

Conclusions: The amplified fragment from isolate A9 showed 51% identity with an *oxidoreductase* from *Pseudomonas* sp. M1, indicating that this bacterium has the machinery required to the desired activity. The protein profile of the strains when grown in the presence H₂S differ from the profile of the same strain grown without sulfide.

References : ¹ Pham *et al* (2008) Microbiology 154:3112-3121.

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