Dethiosulfovibrio Strain F2b: A New Non-Thiosulfate Reducing Bacterium that Degrades Mariculture Waste

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Dethiosulfovibrio strain F2b, a new fermentative marine bacterium recently isolated from protein-rich mariculture waste, was described, and growth conditions, metabolic traits, and genetic comparisons were all investigated. No specific hypotheses were developed, as the goal was to conduct a broad study on strain F2b and to compare it to similar organisms. Cell cultures were maintained in a sterile, anaerobic environment under an N2-CO2 atmosphere, and artificial seawater infused with B-vitamins and peptone was used as growth medium. Cell density changes over time were measured via spectrophotometry, and the presence of sulfide post-growth was tested optically via the methylene blue reaction. Phase-contrast photomicroscopy was used to image cells. Substrates were added from filter-sterilized stock solutions, and wet cell mass was pelleted and sent to the DSMZ for determination of G+C content via HPLC. Motile, vibrioid cells of 2-7 μm in length and 1-2 μm in diameter were observed. Growth occurred at 20°C-40°C, pH 6.5-8.0, and NaCl 0.0-1.6 M with optimum at 30°C, pH 7.5, and NaCl 0.4 M. Peptides and casamino acids were utilized. Yeast extract was necessary for growth on fatty acids or single amino acids. G+C DNA base composition was 49.9%, and DNA/DNA hybridization with other strains of Dethiosulfovibrio has yet to be carried out. Neither thiosulfate nor elemental sulfur was reduced to sulfide. As such, strain F2b represents an ideal model for large-scale degradation of marine fish waste without endangering the methanogenic archaea upon which such a process depends. Also, on the basis of significant metabolic and genetic differences from other organisms, strain F2b is suspected to represent a new species.