

Physiological and genomic properties of *Anoxybacterium hadale* gen. nov. sp. nov., a novel bacterial genus isolated deep water of the Mariana Trench

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A novel anaerobic bacterial strain, MT110^T, was isolated from the deep seawater of the Mariana Trench. Polyphasic approach and complete genome sequencing were used to determine the taxonomy status and genomic profiles of the novel strain. Phylogenetic 16S rRNA gene analysis showed that strain MT110^T falls into the order *Clostridiales* of the class *Clostridia*, with highest sequence similarity of 94.9 % to *Anaerovorax odorimutans* NorPut^T, followed by *Aminipila butyrlica* FH042^T (94.4 %). Cells were Gram-positive, anaerobic, straight to gently curved rods (2.4-3.4 × 0.4-0.6 μm). The strain grew at NaCl concentrations ranging from 0 to 5.0 % (w/v) (optimum 0-0.5%), from pH 6 to 9 (optimum 7.5-8.0), and at temperatures between 10 and 42 °C (optimum 28 °C). Strain MT110^T was chemoorganotrophic using casamino acids and 4-aminobutyric acid as growth substrates. The major cellular fatty acids were C_{14:0} (47.7%), C_{16:1 ω7c/ω6c} (Summed feature 3, 10.7%), C_{16:0} (10.3%) and C_{18:1 ω9c} (10.0%). The complete genome contained 4,941,017-bp with a G + C content of 44.56 mol% and contained 4,337 protein-coding genes and 104 RNA genes. Based on the distinct differences in genotypic and phenotypic characteristics, strain MT110^T is sufficiently distinct to represent a novel species of a novel genus, for which the name *Anoxybacterium hadale* gen. nov. sp. nov. is proposed.