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**The Interaction between Methanol Dehydrogenase
and MxaJ Protein of a Marine Methylophilic Bacterium
Methylophilus aminisulfidivorans MP^T**

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ABSTRACT

Methylophilus aminisulfidivorans MP^T, a restricted facultative marine methylophilic bacterium, was able to utilize methanol as a sole carbon and energy source, and possessed a methanol dehydrogenase (MDH) that is a key enzyme in the process of methanol oxidation. During purification of MDH, three types of MDH (MDH I, II, and III) were obtained in the cell free extracts from MP^T cells grown on methanol. When analyzed by SDS-PAGE and ESI-FT ICR MS, MDH I was confirmed to consist of two subunits and with molecular masses of ~66 and ~10 kDa, respectively, in a form of $\alpha_2\beta_2$. While MDH II and MDH III contained an additional ~30 kDa protein, designated γ , in a form of $\alpha_2\beta_2\gamma$ and $\alpha_2\beta_2\gamma_2$, respectively. MDH III showed 1.5–2.0 times higher activity than MDH II, while MDH I remained the lowest activity. Based on these observations and experimental data, it seems that the original MDH conformation is $\alpha_2\beta_2\gamma_2$ within MP^T growing on methanol, and subunit γ keeps MDH in an active form, and/or makes MDH easily bind to the substrate, methanol.