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Optimization of methanol biosynthesis by Methylosinus trichosporium OB3b: To improve methanol production using sodium chloride.

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Methanotrophic bacteria are a group of bacteria that can grow aerobically on methane as a sole source of carbon and energy. They possess methane monooxygenase oxidizing methane to methanol, and methanol dehydrogenase (MDH) catalyzing methanol oxidation to formaldehyde. Type strain, Methylosinus trichosporium OB3b, was used to synthesize methanol from methane. Cell cultivation was performed by applying gas mixture (methane:air=1:1, v/v) to medium from sealed gas reservoir using pump. The optimum pH and temperature for growth were 7.0 and 30℃, respectively, and the initial copper concentration was 5μM. Cells were harvested by centrifugation and washed three times using 10 mM phosphate buffer (pH 7.0). To biosynthesize methanol, MDH activity should be suppressed to inhibit further oxidation of methanol to formaldehyde. 250 mM of sodium chloride was used as a MDH inhibitor for the maximum production of methanol. The reaction temperature was 30℃, and the treated concentrations of cell and sodium formate in the reaction mixture were 0.6 mg dry cell wt/ml and 20 mM, respectively. During 36 hr reaction, 7.7 mM methanol was accumulated maximally in the reaction mixture.