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Supplementary Material

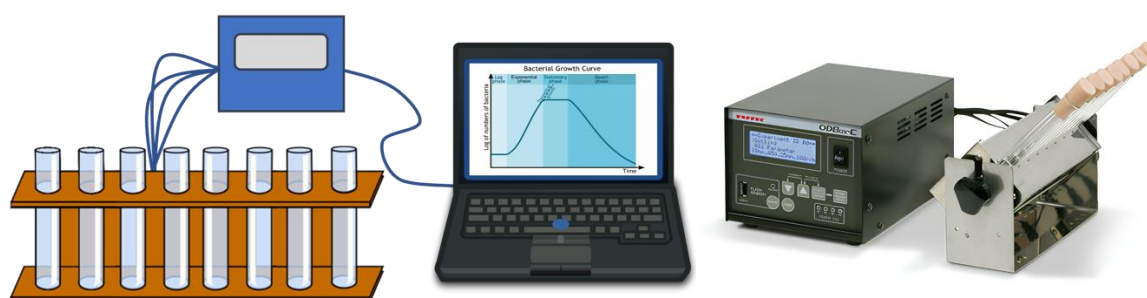


Fig. S1: Schematic of the continuous optical density (OD₆₀₀) monitoring system showing the culture tube, non-contact turbidimeter, OD-control unit, and PC running OD Viewer software

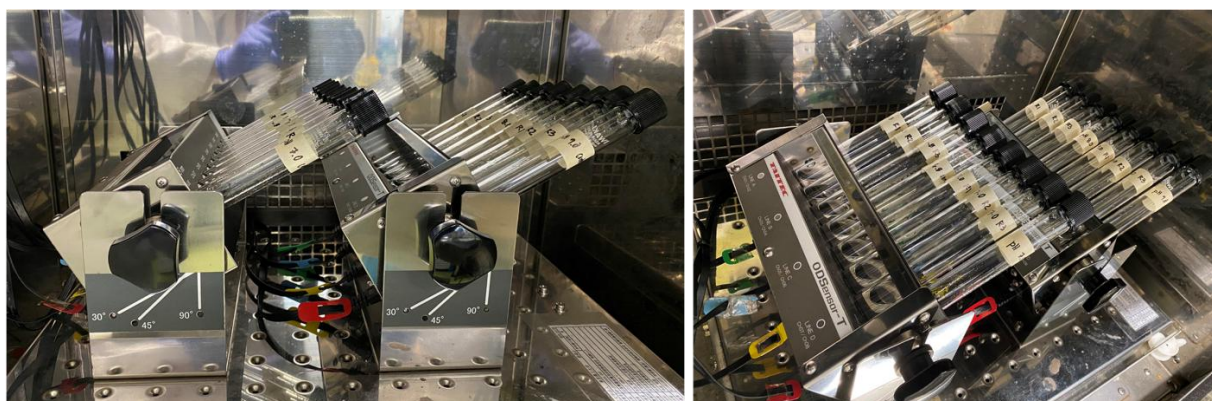


Fig. S2: Shaker-mounted cultivation system equipped with the non-contact turbidimeter for continuous OD₆₀₀ monitoring of MC49 cultures

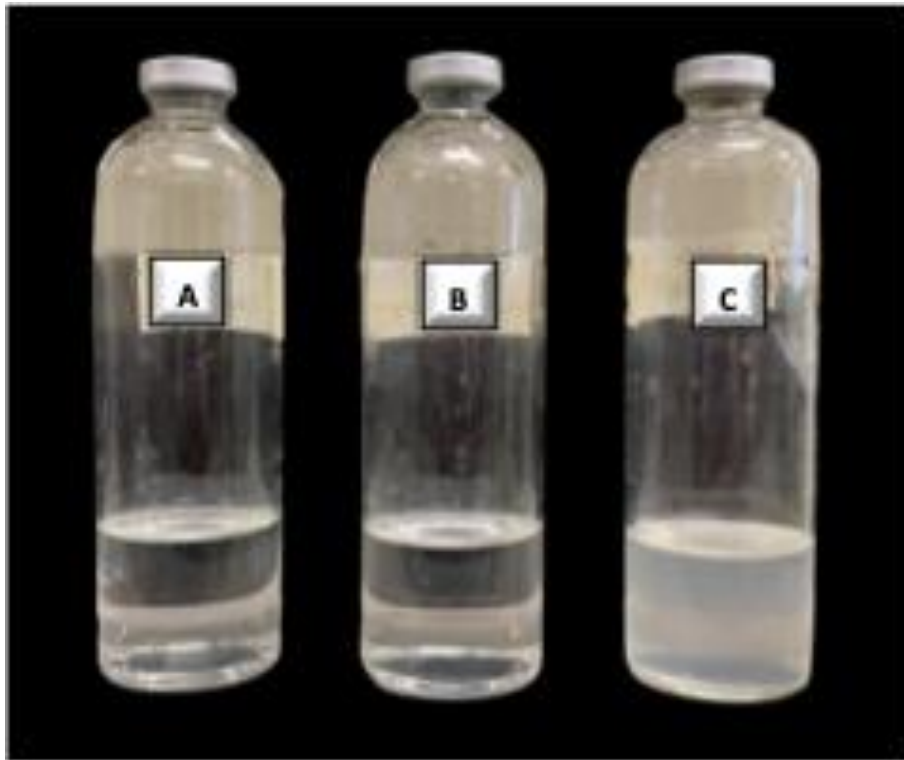


Fig. S3: Visual appearance of liquid cultures of *Methylosinus* sp. strain C49 in nitrate mineral salts (NMS) medium under methane-rich conditions. Panel (A) shows the negative control vial without inoculation, displaying a clear, transparent medium indicative of no microbial growth. Panel (B) depicts the culture immediately after inoculation with an initial OD₆₀₀ of approximately 0.32, reflecting the initial cell density. Panel (C) shows the culture after 14 days of incubation at 30°C with shaking at 130 rpm, exhibiting noticeably increased turbidity corresponding to a maximum OD₆₀₀ of 0.357, confirming substantial bacterial growth and successful culture revival from cryopreserved stocks.