

## Contribution Details

# Effects of conductive and non-conductive materials on the activity of a hydrogenotrophic methanogen

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Talk

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### Abstract

Several conductive materials (CM), such as carbon nanotubes (CNT), activated carbon (AC), and magnetite, have been reported to mediate interspecies electron transfer in methanogenic environments. However, CNT also accelerated methane production (MP) of pure cultures of methanogens. We hypothesize that other CM and also non-CM may affect the methanogenic activity of pure cultures. For that purpose, we incubated the hydrogenotrophic methanogen, *Methanobacterium formicicum* strain DSM 1535T, with AC, zeolite (Zeo), sand and glass beads (at 0.5 g/L), and followed MP. All materials reduced lag phases preceding the MP, and the time for complete conversion of H<sub>2</sub>/CO<sub>2</sub> to methane. The best results were obtained with Zeo, since total hydrogen conversion occurred in less than 5 days (instead of 8 days as in the control incubated without materials). Approximately 5 days with sand, and 6 days with glass beads and AC, were necessary to achieve the complete conversion. The lag phases with AC were quite short (1 day) when compared with the control assay without materials (5 days). The initial MP (determined during the first 3 days of incubation) was improved 16 times with Zeo and 11 times with AC, when compared with the cultures incubated without materials. The results show that there is not a direct relationship between conductivity and the improvement of methanogenic activity. Other physicochemical properties of the materials might be related with the beneficial effects towards methanogens.

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