

Methanogenesis was observed in a superficial habitat of the Sippewissett Marsh tidal creeks ~~in a layer known as~~ ^{in the} Purple Sand, a ^{layer} 3-4 mm thick surface layer whose color is due to purple sulfur bacteria. The layer is exposed to atmospheric N_2 and oxygenated seawater with the [#] ~~fluctuations of the tides~~ ^{tide fluctuation} and such an environment is unlikely for methane-producing bacteria because of the close proximity to the atmosphere and the relative lack of organic matter in the underlying sand. We ~~investigated the possibility of~~ ^{examined for} an association between the photosynthetic purple sulfur bacteria and methanogens, in which the former might serve as a source of H_2 for CO_2 reduction by the latter. Samples of Purple Sand were inoculated into bottles containing a reduced marine mineral medium and the system was flushed with N_2/CO_2 (80/20) to remove any residual H_2 and create an anaerobic environment. Two sets of bottles were incubated, one with light and the other without; CH_4 production was observed to be far greater in bottles exposed to light, which indicated light-dependent methanogenesis. This observation was not reproducible, but the project did lead to further examination of the methanogens present. Agar roll tubes inoculated with Purple Sand enrichments in marine mineral medium yielded three distinguishable types of colonies. Microscopic examination revealed that each type was further distinguishable on the basis of cell morphology, one being a large, irregular rod that occurred in chains, a second being vibroid, and the third a slender, highly motile rod. All three types of cells exhibited fluorescence under 420 nm UV light when observed with epifluorescent microscopy, a property attributable to the ~~presence of~~ ^S the F_{420} electron carrier peculiar to methanogens.

which we tentatively identify as endospores. Endospore formation is a property not previously observed in methanogens; in these isolates, its occurrence seems to be a response to O_2 diffusion into the culture.

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