Methanogenesis was observed in a shallow habitat of the Sippewissett Marsh tidal creeks, where a thin layer of Purple Sand, a 34 mm thick surface layer whose color is due to photosynthetic purple sulfur bacteria. This layer is exposed to atmosphere and oxygenated seawater, making it unlikely for methane-producing bacteria to exist there. Without the existence of organic matter in the underlying sand, the close proximity to the atmosphere and the relative lack of organic matter in such an environment is unlikely for methanogenic bacteria to thrive. Consequently, the production of methane 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. Further, inoculations with Purple Sand resulted in the differentiation of three distinct types of colonies. Microscopic examination revealed that each type was attributable to the presence of the electron carrier peculiar to methanogens.

Samples of Purple Sand were inoculated into bottles containing a reduced marine mineral medium and were flushed with CO2 to remove any residual oxygen. Two sets of bottles were incubated, one with light and the other without; residual CO2 was flushed from the apparatus to create an anaerobic environment. Microscopic examination of the samples of Purple Sand were inoculated into bottles containing a reduced marine medium and the system was flushed with CO2(80/20) to remove any residual CO2. Cultures were grown in marine mineral medium, and the system was flushed with CO2 for CO2 reduction by the latter. The former method served as a source of CO2 for CO2 reduction by the latter.

In the underlying sand, where the photosynthetic purple sulfur bacteria are associated with the establishment of the thin atmospheric oxygenated seawater, the relative lack of organic matter and such an environment is unlikely for methanogenic bacteria to thrive. Consequently, the production of methane was observed to be far greater in bottles exposed to light, which indicated light-dependent methanogenesis.
which we tentatively identify as endospores. Endosporulation is a property not previously observed in methanogens. In these isolates, its occurrence seems to be a response to diffusion into the culture.

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