

THE OXIDOREDUCTION ACTIVITY OF MARINE HETEROTROPHIC BACTERIA IN THE SULFUR CYCLE

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On présente l'étude d'une souche pure d'une bactérie hétérotrophe isolée dans l'eau côtière de Barcelone (Espagne), qui est capable d'oxyder le thiosulfate quand elle est en milieu aérobie alors que, dans des conditions d'anaérobiose, elle peut réduire le sulfate en sulfure.

The fact that sulfate is the second most abundant anion in seawater has lead to the assumption that sulfur-metabolizing bacteria play a significant role in the transformation of organic carbon in the marine environment. The importance of obligately anaerobic sulfate-reducing bacteria in marine turnover of sulfur is generally accepted. It is assumed that biological oxidation of reduced sulfur compounds is largely due to the activities of chemolithotrophic bacteria of the genus *Thiobacillus*. However, several early studies have indicated that various inorganic sulfur compounds other than sulfate could be reduced to sulfide by certain facultative anaerobic bacteria (1).

The same type of bacteria were able to oxidise thiosulfate and sulfide to polythionate or sulfate (2).

In the present communication, we report on the oxidoreduction activity of heterotrophic marine bacteria.

Isolated bacteria was obtained from coastal waters of Barcelona (Spain).

The basal thiosulfate medium (with 1 % yeast extract) was used to test the ability of bacteria to grow on and oxidize thiosulfate (1).

To test sulforeductive capability of bacteria Baars medium (with 1 % thiosulfate, without sulfate) was used (3). Bacteria were incubated in both media at 28°C for a period of time, depending on the experiment involved.

After an incubation of 28 days, 89 % thiosulfate was oxidated hete-

rotrophic bacteria, while only 46 % of thiosulfate was oxidised autotrophically. Oxidation of thiosulfate was incomplete. Formation of polythionate was followed by a slight raising of pH from 6,8 to 8,1.

The same bacteria reduced thiosulfate to sulfide at anaerobic conditions in Baars medium. After 7 days of incubation 150 μg sulfide-S/ml were formed.

The occurrence of physiological groups of bacteria capable of utilizing reduced sulfur compounds as electron acceptors may imply a competition with obligately anaerobic sulfate-reducing bacteria for partially reduced inorganic sulfur. The relative abundance of inorganic sulfur intermediates and the redox potential of certain estuarine and off-shore seawater can be expected to reflect this competition. Alternatively, the two population might complement each other.

The capability of certain marine heterotrophic bacteria to oxidise and reduce inorganic sulfur compounds alternatively depend on conditions, concerning potential activity increase their importance in turnover of sulfur and carbon in marine environment.

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