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Preliminary investigation on the effect of mineral substrate on the growth of *B. subtilis* and *P. aeruginosa*

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The hypothesis that mineral substrate could act beneficial on the growth and survival of *Bacillus subtilis* and *Pseudomonas aeruginosa* was tested using sediment fractions and monominerals. The inorganic sediment fractions include those finer than 8 μm collected from marine sediments at different locations along the eastern Adriatic coast, and monomineral phases were two types of bentonite, illite and kaolinite.

The bacterial growth was evaluated by absorbance measurements (OD600) for biomass evaluation and by resazurin assay for metabolic activity. Exponential bacterial growth on mineral substrates was examined under optimal and adverse environmental conditions (with prolonged incubation duration up to 7 days): suboptimal temperatures, starvation and desiccation. Experiments were performed under both static and dynamic cultivation conditions.

The presence of minerals generally did not affect the growth of *P. aeruginosa* under either cultivation conditions at all incubation temperatures. At the same time, a positive effect of the mineral substrate on the growth of *B. subtilis* was observed. In shaking conditions effects of minerals were observed in different exponential growth curves resulting in higher carrying capacity than was observed in growth without minerals. In static conditions effects during the exponential growth phase were the most pronounced showing faster growth with all minerals except for illite. Bentonite resulted in an earlier growth peak while the final growth was the same whereas kaolinite provided a continuous, though negligible, advantage. Sediment fractions, composed mostly of aluminosilicates in different ratios, in general showed a favorable effect on the growth of *B. subtilis* in static conditions, except for the sample characterized by a high content of carbonate minerals (Mg-calcite, calcite, aragonite). Although the effect was evident at all cultivation temperatures (20°C, 28°C, and 35°C), it was most pronounced at the optimal growth temperature (35°C). During desiccation, a positive effect of sediment fractions and both bentonites on the growth of *B. subtilis* was observed. During starvation, a positive effect was observed only in the case of Ca-bentonite. While the influence of specific mineral types on bacterial growth is variable, it provides a certain level of advantage depending on environmental conditions that may affect their survival in adverse conditions.