SURFACTANT PRODUCTION BY MARINE MICROFLAGELLATE *Dunaliella tertiolecta* IN AXENIC CULTURE

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Summary Production of surface active materials has been studied in an axenic culture of marine phytoplankton using the electrochemical methodology that allows a direct characterization of dissolved surface active materials and surface active aggregates. Microflagellate *Dunaliella tertiolecta* was systematically studied. Fluid surface active aggregates were found to be the predominant surfactant class in the culture in all growth phases.

During their growth algal cells excrete organic molecules, a significant fraction of these products being surface active. Surfactant activity of a culture medium was found to depend on the particular species, physiological state of the cells and the age of the culture (Žutić et al. 1981). However, our previous work could not discern the role of bacteria and cell lysis in the surfactant production by marine phytoplankton, since only the net effect has been measured cultures containing bacteria.

In this paper we present a detailed study of production of surface active materials in axenic cultures using the electrochemical methodology that allows a direct characterization of dissolved surface active materials and surface active aggregates (Pleše and Žutić, 1984; Žutić et al., 1934).

Microflagellate *Dunaliella tertiolecta* was systematically studied in axenic culture and in presence of bacteria and cadmium. Fluid surface active aggregates were found to be the predominant surfactant class in the culture in all growth phases. Irregular perturbations in the current-time curves at the dropping mercury electrode provoked by coalescence of fluid vesicles and the cells themselves and their fast reorganization into the adsorbed layers at the hydrophobic positively charged interface mercury/seawater.

Dunaliella cells were found to have a high affinity for the hydrous alumina surface. Since the cells and fluid vesicles coalesce and reorganize into the adsorbed layers at the mercury/seawater interface within 10 - 500 ms, it might be assumed that the interactions at mineral interfaces are comparabily fast. These findings have important imlications in the understanding interaction mechanisms of phytoplankton at marine interfaces, such as sinking particles

(Avnimelech et al. 1982) and dissolving bubbles (Johnson and Cooke, 1980) in seawater.

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