

SURFACTANT PRODUCTION BY MARINE PHYTOPLANKTON. FIELD
OBSERVATIONS AND LABORATORY CULTURE EXPERIMENTS

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Much interest centers on the extent, nature and control of the extracellular products of phytoplankton¹. Problems in studying extracellular release of phytoplankton in laboratory cultures arise from difficulties in interpreting measurements of culture filtrates^{2,3}.

Electrochemical methods based on adsorption of organic molecules at mercury electrode/solution interface offer a very efficient, simple and direct way for the rapid determination of surface active constituents in natural and polluted seawater and sea surface microlayer samples, as well as in phytoplankton culture media. These methods are sensitive to dissolved lipid material, proteins, polysaccharides and glycoproteins in the concentration range 0.02 to 100 mg/l. No pretreatment such as filtration, preconcentration or deaeration are involved⁴.

We have demonstrated earlier that surfactant activity of natural sea surface microlayer is very similar to the one measured in marine phytoplankton culture media⁴.

Here we report the investigation of surfactant production of laboratory batch cultures of marine phytoplankton species (Skeletonema costatum, Thalas-

Siosira pseudonana, Cryptomonas sp., Isochrysis galbana, Monochrysis lutheri, and Dunaliella tertiolecta) and axenic cultures of freshwater unicellular algae (Chlorella vulgaris and Euglena gracilis). Measured response was found to depend on the particular species, age of culture and illumination. Total surfactant content generally increases with cell density, while surfactant content per cell shows well-defined inverse relation to cell concentration.

Surfactant activity of natural populations is best illustrated by surfactant measurement of seawater samples during various stages of phytoplankton bloom in Northern Adriatic. Significant correlation has been calculated between surfactant activity and chlorophyll *a*, pH, as well as oxygen saturation measured independently at the same stations (Deggobis, Smodlaka, to be published).

References

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