

DETERMINATION OF SURFACE ACTIVE SUBSTANCES AND ANIONIC DETERGENTS IN SEAWATER AND SEA SURFACE MICROLAYER IN THE MEDITERRANEAN

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Summary. Surface active substances were measured by electrochemical methods during 1979, 1980 and 1981 in samples of the open water of the Western Mediterranean, and in a few characteristic coastal areas in the Adriatic Sea of different biological activity and different influence of man activity. Data on sea surface microlayer samples collected during 1977, 1978 and 1981 in the Rijeka Bay, which is an integral part of the Adriatic Sea, at different locations and seasons are presented and discussed in more detail.

Résumé. Les substances actives à la surface ont été mesurées au moyen de méthodes électrochimiques durant les années 1979, 1980 et 1981, dans les échantillons de mer ouverte de Méditerranée Occidentale et dans quelques zones littorales caractéristiques de l'Adriatique selon différentes activités biologiques et différentes influences de l'activité humaine. Les données sur les échantillons de la microcouche superficielle collectés pendant les années 1977, 1978 et 1981 dans la baie de Rijeka, partie intégrante de l'Adriatique, en divers lieux et en différentes saisons sont présentées et discutées en détail.

Study of the content, composition and fate of different classes of organic substances in the sea is of substantial interest and importance for understanding biogeochemical processes in the sea. The method of choice should be enough sensitive for direct determination without pretreatment procedures in order to avoid changes in the composition or organic substances initially present in the sample.

Surfactant content of seawater and sea surface microlayer samples has been measured in the Adriatic Sea since 1973 using electrochemical methods and the spectrophotometric methylene blue method (Zvonarić et al., 1975; Kozarac et al., 1976; Ćosović et al., 1977; Kozarac et al., 1977; Zvonarić and Žutić, 1979; Ćosović et al., 1979; Žutić et al., 1981; Ćosović and Žutić, 1981; Ćosović and Vojvodić, 1982).

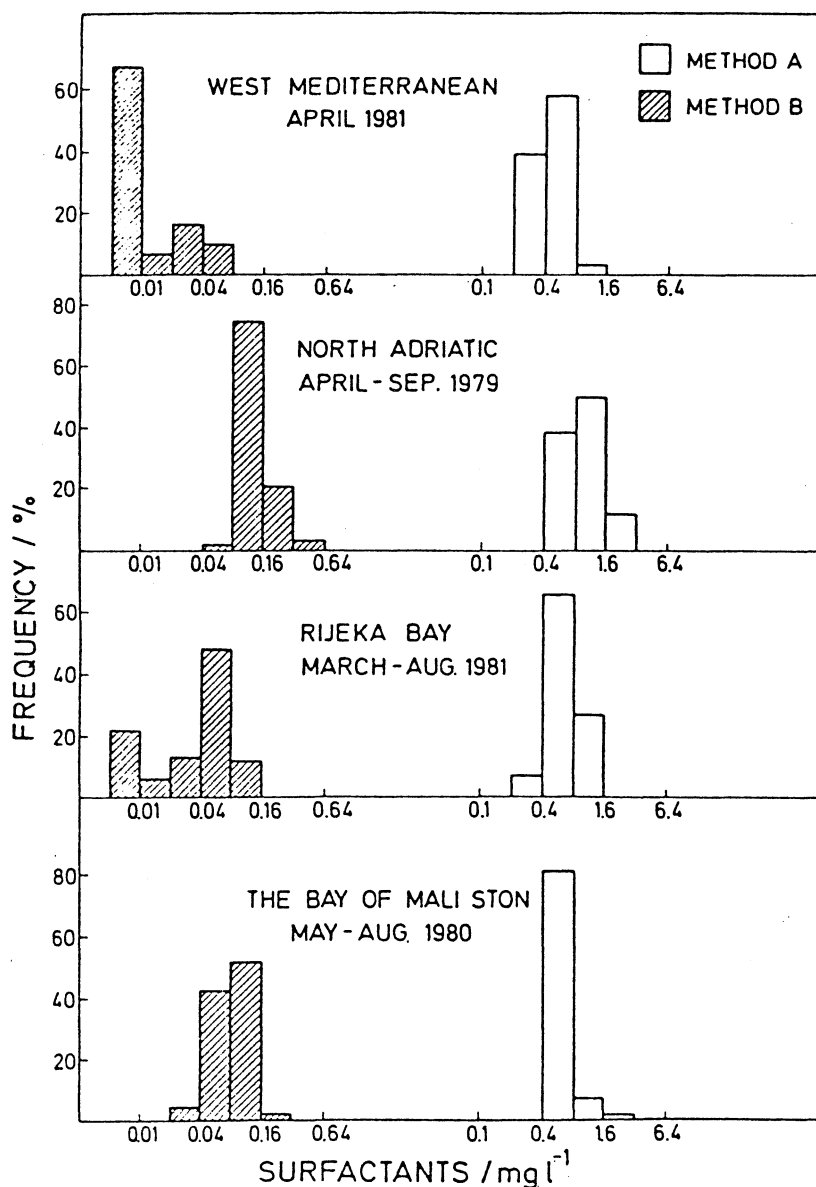
The aim of this work was to determine levels of naturally occurring surface active substances in the open waters of the Mediterranean and the Adriatic Sea and to estimate the pollution levels of natural and synthetic surfactants in some coastal areas in the Adriatic Sea.

Three characteristic areas in the Adriatic Sea were analyzed in more detail:

- the North Adriatic, a shallow basin which is under the influence of the Po river, known for a high biological activity and frequent phytoplankton blooms,

- the Rijeka Bay, a marine environment characterized by an increasing impact of man due to growing population, traffic and industry based on oil and its derivatives, but known for a low biological activity in comparison to other regions of the Adriatic Sea,

- the Bay of Mali Ston, a closed bay in the South Adriatic region with a long tradition in the mariculture, specially with regards to oysters. The bay, influenced by surface freshwater springs, is characterized by a high diversity and primary productivity of phytoplankton species (Viličić, 1983).



In Fig. 1 are shown the frequency distributions of the content of surface active substances, measured by electrochemical methods (A and B), of the open water samples of the Western Mediterranean, and open and

coastal waters in the Adriatic Sea during seasons of increased biological activity, i.e. spring, summer and autumn.

It was found that type and concentration of natural surface active material vary within different Mediterranean regions and along the depth profile of the water column.

Petroleum hydrocarbons and detergents were found to be prevalent pollutants responsible for high surfactant activity values. Pollution effects are most pronounced in the sea surface microlayer.

Electrochemical methods are proposed for a research and monitoring of surface active substances in the sea.

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