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Note on Research of Microbial Degradation
of oils in the Marine Environment

by

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The research aimed at determination of a microbial index of oil pollution in the Baltic Sea and the bacterial activity in the process of decomposition of polluting oils.

Cultures of marine microflora degrading the oils have been prepared according to the method by W. Gunkel (1967). The substrate to be decomposed was fuel oils manufactured of crude oil of Soviet origin from the Black Sea, used by Polish shipping. The activity of oil decomposition was investigated by a bacteriologic method. The number of bacteria was determined by MPN - the Most Probable Number technique and the quantitative changes in oil in water were determined by infra-red spectrometry. Simard's method (Simard, 1951, Reissaus, 1968 and Hellmann, 1969) was adapted for determination of the quantitative degradation of hydrocarbons by microbes. For this purpose, the oils from sea water samples were extracted by means of carbon tetrachloride and then the absorption was measured within the ranges $2\ 959\text{ cm}^{-1}$ - $2\ 924\text{ cm}^{-1}$ - $2\ 857\text{ cm}^{-1}$ which corresponds to the vibrations of CH , CH_2 , CH_3 . The calculation of quantitative degradation was performed by the base line method (Heigl, 1947, Rao, 1963) after plotting the calibration curves for each type of fuel. While the quantitative bacteriologic investigation was carried out, the tribes were isolated and pure culture subjected to taxonomic investigations.

A correlation between the number of bacteria and the quantity of decomposed oil was found. In a sample of oil containing 0.5g per 1 litre sea water, there an average of 60% of decomposed oil was found after two months' exposure in room temperature and different shaking periods.

In cases of 2.5 g/l sea water a lower oil decrement (about 50%) has been found. Further taxonomic investigations are being carried out.

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