

Electroanalytical estimation of seawater pollution by aromatic hydrocarbons

by

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It has been attempted to apply the electrochemical methods (based on the adsorption phenomena at mercury electrode) for the estimation of seawater pollution by petroleum aromatic hydrocarbons. Though not specific to petroleum, the electrochemical methods are rapid, simple and could enable direct analysis of seawater samples.

Petroleum is generally accepted as deserving high priority among specific pollutants needing research and control (GESAMP, 1971).

Solubility of petroleum in seawater is generally considered low and most work connected to petroleum pollution has been devoted to petroleum at the sea surface. However, data on individual hydrocarbons show finite, though slight solubility [MCAULIFFE, 1966]. Aromatic hydrocarbons represent the most toxic fraction of petroleum soluble extracts and their content in sea water should be sensitive marker of marine pollution [BLUMER, 1969, 1970].

Although no single analytical technique can provide precise concentrations of total oil in seawater, there is great demand for sensitive and rapid methods that provide reliable estimates.

In this paper the applicability of the electrochemical techniques [ZVONARIĆ, 1972, 1974, ČOSOVIĆ 1973] to the estimation of seawater extracts of commercial petroleum fraction was investigated.

The present data demonstrate conclusively that the seawater soluble extracts of petroleum derivatives give measurable adsorption effects at the mercury electrodes. It has been proved that the higher aromatic hydrocarbons are responsible for the effects observed.

The methods have been applied for the analysis of seawater samples taken at the selected coastal stations, where petroleum is the predominant pollutant. The obtained preliminary results are reported and compared to the data of IR analysis.

The electrochemical analysis is simple, rapid and direct, but not specific to petroleum. Combined with the more selective methods of identification, electrochemical techniques could provide simple and fast estimation of the degree and distribution of petroleum pollution when large number of samples has to be analysed.

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