

A COMPARATIVE STUDY OF SOME HEAVY METALS
IN COMMON EDIBLE ORGANISMS FROM AEGEAN COAST OF TURKEY

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Abstract:

In this investigation, FAAS was used for the determination of the heavy metals (Fe, Zn, Cu, Pb, Cd, Hg), in *Trachurus trachurus* L., (Av. 19.0 cm-80 g.) *Sardina pilchardus* WALB., (Av. 13.7 cm-28 g.) *Scomber scomber* L., (Av. 21.7 cm-95 g.) and some molluscs. Such as, *Mytilus galloprovincialis* L., (Av. 4.3 cm-9.6 g.) *Patella vulgata* L., (Av. 3.4 cm-4.5 g.) *Monodonta turbinata* BORN., (Av. 1.4 cm-2.5 g.). These were collected from the Aegean coast of Turkey. Average heavy metal levels determined on wet weight basis for these species were as follows: In fish species, Fe 1.90-94.35, Zn 2.50-20.60, Cu 0.15-2.33, Pb <0.02-4.23, Cd <0.01-3.10, Hg 0.02-0.50 and in mollusc species, Fe 19.42-520.0 Zn 7.50-52.12, Cu 1.04-24.62, Pb 1.02-11.42, Cd 0.04-1.09, Hg 0.01-0.50 µg/g in wet weight.

Due to gradual increase in the volume of industrial effluents, touristic, urban and agricultural sewage, important quantities of chemical pollutants are being introduced into our coasts from different sources without any previous treatment. The bays and estuaries of the Aegean coasts are considered as important fishing grounds and evaluating rate of contaminations by the toxic substances is of vital importance for public health. Sampling was carried out from 10 stations, 20 specimens for each species along the Aegean coast, for each season during 1985 (Fig 1).



Fig 1. Sampling sites a long line in Aegean coast line.

Table I. Mean Concentrations in the Species (µg/g W.W.)

	Cu	Zn	Fe	Pb	Cd	Hg
T. trachurus	0.83±0.56	5.08±1.37	10.8±14.57	0.81±0.44	0.09±0.06	0.12±0.11
S. scomber	0.89±0.38	5.70±1.52	7.26±4.33	1.31±1.02	0.13±0.11	0.13±0.09
S. pilchardus	0.90±0.31	9.18±4.43	19.23±4.27	1.17±0.92	0.12±0.09	0.19±0.15
M. galloprovincialis	1.84±1.11	27.37±13.18	68.12±41.7	1.61±2.12	0.17±0.16	0.09±0.11
P. vulgata	2.75±0.98	17.77±6.83	155.7±39.1	3.32±1.68	0.40±0.19	0.11±0.11
M. turbinata	15.5±4.35	14.3±4.94	186.7±82.7	0.43±0.27	0.10±0.11	0.10±0.05

* <0.05

The variations of metal concentrations in the species are different as reported in our previous studies (UYSAL, TUNCER 1983 a). The average content of Fe and Zn are high for all species, concentration of Fe is maximum in *S. pilchardus* and *M. turbinata*. The same results have also been pointed out by CAPELLI et al. (1980) and UYSAL and TUNCER (1983) in *Engraulis encrasicolus*. Hg concentrations in the mentioned species are less than the other metals.

There are still no toxic levels in the mentioned species; that could be dangerous to the consumers in our coasts, but it will be better to continue the comparative study on the pollution effects, on representatives of the different biotopes of common food chain organisms, for the benefit of public health.

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PETROLEUM HYDROCARBONS IN ALEXANDRIA COASTAL SEDIMENTS
AS ASSESSED BY EMISSION AND SYNCHRONOUS FLUORESCENCE SPECTRA

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Introduction: Sediments (1,2,3&4) act as sink for unoxidised petroleum hydrocarbons and provide a better means of assessing contamination in any given area than the overlying water. Hydrocarbons enter Alexandria coastal environment from the "Sumed" loading terminal at Sidi Kreir, west, ship traffic to and from Alexandria western harbour, the wastes of an oil refinery in Mex Bay, and oil fields, 100 km to the west of Alexandria. The objectives of the present work are threefold:

- to generate base-line data on THCs in sediments off Alexandria, earlier information being too fragmentary (5) or dealing only with beach and water contamination. (6&7)
- to intercompare the oils commonly transported through the area.
- to attempt to trace back the petroleum hydrocarbons in Alexandria sediments by fluorescence synchronous spectra.

Methodology: 30 coastal stations were sampled (Fig. 1).

and the samples were extracted by n-hexane. (8&9) UVF analyses was carried out using a Baird-Atomic SFR-100 ratio-recording spectro-fluorimeter. The intensity of fluorescence emission at 360 nm when excited at 310 nm (10) was compared. Chrysene, El-alamein, Saudi-Arabian and Iranian crude oils were used as references. Synchronous ($\lambda = 25$) spectra were recorded for the crude oils and for each sample.

Results and discussion: The ratio R for crude oil standards as given by: $R = \frac{\text{Fluorescence of chrysene solution} \times \text{Wt. of petroleum}}{\text{Fluorescence of petroleum solution} \times \text{Wt. of chrysene}}$ was 1:2.9:5.4:6 using chrysene, El-Alamein (Egyptian), Safanya (Saudi Arabian), Kharg Island (Iranian) crude oils respectively. The 30 samples analysed yielded the following ratio 1:2.8:5.6:5.9 respectively. Taking in consideration the weathering variability between the samples, the two sets of ratios appear to be in fair agreement. Estimated oil concentrations in the sediments ranged from less than 0.1% to .7% of the total organic carbon present.

The proportion of organic carbon attributable to oil is unrelated to either particle size or the amount of organic carbon in the investigated sediments. The types of aromatic hydrocarbons present are indicated by synchronous spectra which are sensitive enough to changes in composition. Aquatic Environmental Pollution Project, EGY/73/058. Alexandria University.

The spectra obtained from the extracts were compared with those of the crude oils used. The synchronous spectra of the samples could be divided into five types. They are shown together with those of the crude oils. Most samples exhibited their maximum fluorescence at 350 or 325 nm, showing that they contained mostly 2,3 and 4 ring aromatics. Smaller peaks at 400, 445 and 460 nm indicate more condensed aromatics, thought to be generated by pyrolysis reactions during fossil fuel combustion. (12) The synchronous spectra of only two samples (station 2&5) correspond to the spectrum of El-Alamein crude oil.

Most of the remaining samples exhibit no clear resemblance to any spectrum type, suggesting the diversity of origins of oils in the studied area.

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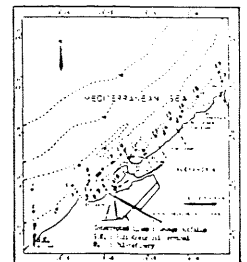


Fig. (1) Area of study and sampling stations.