Marine Pollution by Determination the Total Phenolic Compounds in El-Mex Bay, Alexandria (Egypt)

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El-Mex Bay, west of Alexandria, has a mean depth of 10m. Its surface area is of about 19.4 km^2 and its volume 190.3 x 10^6 m^3. It receives a heavy load of waste water (2.4 x 10^9 m^3/year) both directly from industrial outfalls and indirectly from lake Maryut via El-Mex Pumping Station. Throughout the period from January 1988 to January 1989, seven marine trips were carried out in El-Mex Bay area using a motor boat In four of them, temperature, salinity, dissolved oxygen and the total phenolic compounds were measured at surface and bottom from seven sampling stations. Fig.1, presents El-Mex Bay area and locations of the sampling stations. Phenol determinations were carried out colorimetrically with antipyrine method using a Shimadzu-Double-Beam model spectrophotometer UV-150-02. The method is described in the Standard Method of Water Analysis published by the American Public Health Association (1985). Table 1, illustrates the total phenol concentration at some stations in El-Mex Bay area. The total phenol is generally presented in higher concentrations in the near-shore stations decreasing seawards.

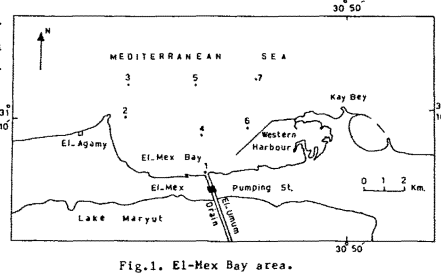

Fig.1. El-Mex Bay area.

Table 1. Total phenol concentration (ppm) at some selected stations.

	January		February		April		June	
Station No	Surface	Bottom	Surface	Bottom	Surface	Bottom	Surface	Bottom
1	186.25	100.74	212.08	202.56	154.44	125.89	231.11	76.40
2	184.76	85.38	207.46	143.29	183.94	101.96	147.10	52.48
7	62.54	25.17	90.13	21.21	87.16	44.05	77.22	38.07

The statistical analysis between data sets of the total phenolic compounds and temperature, salinity and dissolved oxygen during the period of investigation are listed in table 2.

Table 2. Linear regression analysis.

Parameter	n	$\bar{x}$	A	B	r	significant
Temperature	44	19.83	32.33	-0.070	-0.390	no
Salinity	44	29.67	43.83	-0.136	-0.626	yes
Dissolved oxygen	44	2.22	19.46	-0.040	-0.186	no

The weak correlation ($r < 0.4$) could be attributed to another independent factors such as meteorological or biological conditions. For $r = 0.4$ is not fairly bad for such type of study. Our value of ($r = -0.626$) confirms the high degree of correlation between the total phenolic compounds and salinity that was apparent from table 2. Negative values of r indicate a line going down to the right (as one of the values increases the other decreases).

Referring to table 10A (Neil R. Uliman, 1978), we find that the critical values of correlation corresponding to n = 44 are 0.2976 (at the 5% level of significant) and 0.3848 (at the 1% level of significant). Our computed coefficient was 0.626, which far exceeds even the upper value of 0.3848. Then there is a significant linear relationship between the total phenolic compounds and salinity. Fig.2. represents the best linear equation for the data given. The regression line is only for predicting phenol values from salinity-values.

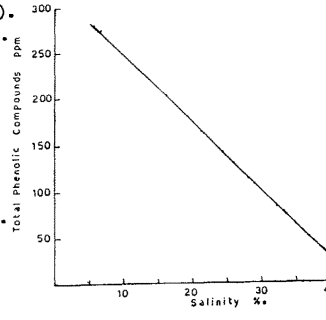

Fig 2 : A possible regression line to predict the total phenolic compounds from salinity.

References :

American Public Health Association. 1985. Standard Methods for the Examination of Water and Wastewater, 16th Edition. APHA. AWWA. WPCF, New York, 1268 p.

Neil R. Uliman. 1978. Elementary Statistics : An Applied Approach. John Wiley & Sons Inc., New York, 372 p.