



**“Gheorghe Asachi” Technical University of Iasi, Romania**



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## DETERMINATION OF WATER QUALITY PARAMETERS IN IZMIT BAY (MARMARA SEA) AND CONCENTRATIONS OF HEAVY METALS BY ICP-OES

**Arzu Morkoyunlu Yuce<sup>1\*</sup>, Huseyin Altundag<sup>2</sup>**

<sup>1</sup>*Kocaeli University, Hereke O. I. Uzunyol Vocational Schools, 41000 Kocaeli/Turkey*

<sup>2</sup>*Sakarya University, Faculty of Arts and Sciences, Department of Chemistry, 54187, Sakarya, Turkiye*

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### Abstract

In this paper, seawater heavy metal concentrations (Al, As, Cu, Ba, Zn, Fe, Cd, Co, Cr, Pb, Mn, Mo and Ni) measured by ICP-OES and water quality parameters (NH<sub>4</sub>-N, NO<sub>3</sub><sup>-</sup>, N, NO<sub>3</sub>, PO<sub>4</sub>-P, PO<sub>4</sub><sup>-3</sup>, suspended solids, temperature, conductivity, pH and dissolved oxygen) were evaluated in Izmit Bay (The Marmara Sea). The study was carried out seasonally between December 2015 and September 2016 at four separate sampling stations. The mean concentrations of heavy metals in mg L<sup>-1</sup> were: Al: 0.074, As: 0.020, Cu: 0.020, Ba: 0.043, Zn: 0.091, Fe: 0.253, Cd: 0.010, Co: 0.022, Cr: 0.010, Pb: 0.010, Mn: 0.291, Mo: 0.013 and Ni: 0.014. The mean annual value of water quality parameters were: NH<sub>4</sub>-N: 0.19, NO<sub>3</sub>-N: 1.79, NO<sub>3</sub><sup>-</sup>: 8.16, PO<sub>4</sub>-P: 0.20, PO<sub>4</sub><sup>-3</sup>: 0.37, suspended solids: 16.61 mg L<sup>-1</sup>, temperature: 16.47 °C, conductivity: 38.19 µS/cm, pH: 7.52 and dissolved oxygen: 9.52 mg L<sup>-1</sup>. Generally, when the physical and chemical parameters measured at the sampling stations were evaluated according to above-ground water quality regulation, the water quality was Class II, as defined by national regulations. The correlation between physico-chemical parameters and heavy metals measured at the research stations was investigated. There was a negative correlation between NO<sub>3</sub><sup>-</sup> and both Cu and Mn ( $p < 0.05$ ). There was also a positive correlation between suspended solids and As ( $p < 0.05$ ). concentrations of Fe and Mn values were found to be high at the 2<sup>st</sup> and 4<sup>th</sup> stations. This is probably due to the fact that there are many maritime port facilities around the stations and intensive port transportation. Other heavy metal concentrations were found to be in accordance with the criteria.

*Key words:* heavy metals, ICP-OES, Izmit Bay, physico-chemical parameters

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\* Author to whom all correspondence should be addressed: e-mail: arzu.yuce@kocaeli.edu.tr; Phone: +90 5056290142; Fax: +90 2625676