

# Environmental assessment of Heavy Metals in Sediments of Tigris, Euphrates, Shatt Al-Arab rivers and northern west of Arabian Gulf.

Duha S Karem <sup>1\*</sup>, Zahra'a S Al-Shamsi <sup>1</sup>, Salah M Saleh<sup>2</sup>, Abbas H Mohammed<sup>1</sup> and Hamid T AL-saad<sup>2</sup>.

<sup>1</sup> College of Science, Department of Geology, University of Basrah, Iraq.

<sup>2</sup> College of Marine Science, University of Basrah, Iraq.

\* Corresponding author: [duha.saleh@uobasrah.edu.iq](mailto:duha.saleh@uobasrah.edu.iq)

**Abstract.** The most prevalent environmental contaminants found in sediments that suggest the presence of effluents from both home and industrial sources are thought to be heavy metals. The aim of this study was to assess the accumulation of heavy metals at surface sediment samples that were collected in order to measure the amounts of Cu, Zn, Pb, Cd, and Fe., to re-evaluate the environmental conditions and concentration of the analyzed elements in the sediment to detect any pollution of heavy metals in the studied area by using contamination factors (CF), Enrichment Factor (EF) and geo accumulation index (I-geo). To ascertain the connection between the sediment's total organic carbon (TOC) level and heavy metal pollution, measurements were taken in addition of it. Using the inductively coupled plasma atomic emission spectrometer, studies were conducted., The mean values of the element in the sediments ranged as: Cu (13.45 µg/g at location 2 to 32.44 µg/g at location 9), Zn (20.76 µg/g at location 1 to 42.49 µg/g at location 10), Pb (9.78 µg/g at location 2 to 30.04 µg/g at location 9 and 10), Cd (7.89 µg/g at location 2 to 18.72 µg/g at location 7) and Fe (459.89 µg/g at location 1 to 833.83 µg/g at location 7) dry weight. The geochemical results show that the distribution and concentration of the heavy metals in the studied sediments is within the average concentration given for the FAO/WHO reported, and the sediment of the studied area is still free from pollution, except Pb and Cd in some local areas, which shows higher concentrations than those reported for world sediments.

**Keywords:** Arabian Gulf, Heavy metals, Pollution, Shatt Al-Arab, sediments.

## 1. Introduction

Heavy metals are persistent, non-degradable, and have the potential to bioaccumulate in the environment, making heavy metal pollution a major worldwide issue. [1].

Sediment contamination occurs when heavy metals accumulate in sediment from both natural and anthropogenic sources. A report has shown that heavy metal concentrations in sediment have been increasing over time [2]. Heavy metals are released into the aquatic environment through natural geological and erosion processes [3]. Rainwater that falls on the soil's surface can dissolve or suspend these metals, which are found in rocks and sediments. They can also be carried by wind as suspended particulates from one place to another through the atmosphere. Another naturally occurring cause of heavy metal contamination is volcanic activity, which can produce acid rain that is laden with harmful substances among other pollutants. Excessive trace metal concentrations in rivers, lakes, and seas are also a result of natural occurrences including leaching, weathering of rocks, and volcanic eruptions. [4]. In addition to natural sources, industrial processes contribute significantly to environmental heavy metal pollution. These industries include, among others, the manufacture of gasoline, oil refineries, iron and steel factories, copper, glass, aluminum, tanner facilities, fertilizers, and pesticides. [5].

