

Study of N-Alkanes and Polycyclic Aromatic Hydrocarbons in the Mussel *Unio tigris* at Tigris River in Iraq

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ABSTRACT

N-alkanes and 18 polycyclic aromatic hydrocarbons (PAHs) with fat content in the tissue of the mussels *Unio Tigris* were collected from seven locations along the Tigris River in Maysan Province, Iraq. These sites were distributed along Al-Uzair, Qal'at Salih, Al-Majar, Al-Amara, Al-Kumait, Ali Al-Sharqi, and Ali Al-Garbi. Sampling locations along the Tigris River in Amara city showed high levels of pollution. The values of the n-alkanes in the samples ranged from 0.240 at station 7 to 3.724 at station 4 ug/ g dry weight, respectively, while the values of PAH compounds ranged from 5.070 at station 7 to 9.230 at station 4 ug/ g dry weight. In the study area, carbon numbers C19 through C31 were predominant. Sources of petroleum and microbes are responsible for the even n-alkanes in the C14–C24 range. In contrast, the domination of the odd n-alkanes in the range C15–C33 is pointed to biogenic sources, particularly the C23, C25, C27, C29 and C31, otherwise the mean of fat ranged from 0.75 at station 7 to 0.97 at station 4. The HMW-PAHs are prevalent at elevated quantities. Nevertheless, LMW-PAHs are absent in the majority of locations. The prevalence of HMW-PAHs in numerous locations was ascribed to oil refineries, oil fields, various power plants, road traffic, vehicle emissions, electrical generators, waste incineration, and other activities reliant on high-temperature fuel combustion, which generates substantial quantities of PAHs, leading to the accumulation of these pervasive pollutants in the samples. High molecular weight PAH concentrations predominated in the samples, and the LMW/HMW ratio was below one, signifying petrogenic pollution origins. The overall findings revealed that the alkanes consistently exhibited moderate pollution levels. The PAH pollution was quantified by the total concentration of PAHs, which showed the highest contamination among all the PAHs throughout the year-long study. This study is among the most extensive investigations into the presence and distribution of n-alkanes and polycyclic aromatic hydrocarbons in mussels from the Tigris River. In addition, it offers important data on other sources of n-alkane and PAH inputs through the use of such mussels as bioindicators of oil pollution in this area.

INTRODUCTION

Water pollution has a significant environmental issue affecting humans and ecosystems in advanced and emerging countries. There are many materials that can be