

### Abstract

Sediment samples obtained from 11 locations from Tripoli Port – Mediterranean Sea and the Gulf of Aqaba – Red Sea were collected, extracted and analysed using GC-FID. The sediment samples were scanned to reveal all possible HCs necessary for sediments clustering. The validated method was evaluated for selectivity and precision. Grouping the sediment samples was accomplished using PCA and HCA. To the best of our knowledge, this study is the first to classify sediment samples and to use the PCA and HCA to predict the location for future samples in blind.

### Experimental

GC-FID was used to determine the chemical profile of the sediment samples. The identification of each compound was carried out based on matching the chromatogram of each compound with the standard chromatogram of 0.10 mg/kg (i.e. retention time matching). The precision of an analytical method describes the closeness of individual measures of an analyte when the procedure is applied repeatedly to multiple aliquots of a single matrix. The precision was measured by injecting the same standard reference sample (0.10 mg/kg) in five replicates in a single day. PCA and HCA statistical analysis were performed by Chemoface software.

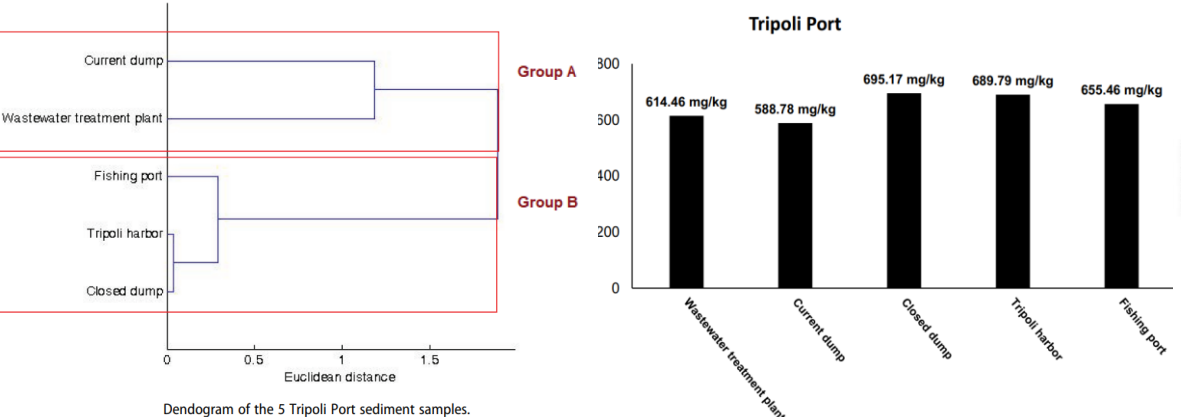
### Results And Discussion

By HCA and PCA, six sediment-origin samples in Aqaba were classified into three clusters; Industrial area alone due to the distinct content of dotriacontane, tritriacontane, hentriacontane and octacosane, Central Power Station, Tala Bay and Hotel Area in a cluster which was related to the close content of heptacosane. National Tourist Camp and Marine Science Station was in a cluster since they have close contents of pentatriacontane. For Tripoli Port samples, the two clusters revealed that Current Waste Dump and Wastewater Treatment Plant were grouped together, where Fishing Port, Tripoli Harbour and Closed Waste Dump areas were clustered in a group. Nonacosane and pentatriacontane were dominant to separate Tripoli Harbour, Fishing Port area and Closed Waste Dump, where pentacosane, dotriacontane, heptacosane, docosane and tetratriacontane were responsible to group Wastewater Treatment Plant and Current Waste Dump.

**Conclusion:** Classification of sediments based on GC-FID profile will accelerate the future profile prediction and origin-clustering of unknown sediment based on their profile. The outcomes showed that 16 hydrocarbons were quantified and identified. Dotriacontane, tritriacontane, hentriacontane, octacosane, heptacosane, pentatriacontane, docosane, tetracosane, and hexatriacontane displayed the major contents at the Gulf of Aqaba. Regarding Tripoli Port sediments; nonacosane, pentatriacontane, pentacosane, dotriacontane, heptacosane, docosane and tetratriacontane were detected.

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