The Qatari marine environment is endangered due to high industrial expansion and anthropogenic pressure over the last few decades. The presence of common contaminants such as Total Petroleum Hydrocarbons (TPHs) and Polycyclic aromatic hydrocarbons (PAHs) is a threat to the marine environment. The aim of this study is to determine the environmental threats and risks posed by organic contaminants to Qatar’s marine environment using pearl oyster ‘Pinctada Radiata’ as the indicator study organism. The samples (marine sediment, seawater, and oysters) were collected from four sites in different locations in Qatar and Al Khor (Simaisma, Al Khor, Um Bab, and Al Wakra) in March 2017, December 2017, May 2018, and November 2018. A total of 144 samples were analyzed, 48 samples of seawater, 48 samples of sediment and 48 samples of oysters. Levels of organic contaminants (TPHs and PAHs) were quantified in seawater, marine sediment and oyster tissues (P. radiata). In addition, the TOC and particle sizes were measured in abiotic matrices as well as the temperature, salinity, and pH of seawater in the study areas. Overall, the organic contaminants (TPHs and PAHs) were more readily detected in oyster tissue samples than marine sediment and seawater samples collected from the same areas. The surface seawater samples showed negligible levels of PAHs, while TPHs were ranged from 1.16 to 27.17 μg/L. The concentration of TPHs and PAHs in marine sediment samples were ranged between (75.02 − 1751.82) and (4.25 − 36.73) μg/kg dry weight respectively. In oyster tissue samples, the level of TPHs was ranged from 633.35 to 6666.67 μg/kg dry weight, with the highest concentrations measured in Simaisma, while PAHs concentration showed an extreme variation from 25.90 to 2244.03 μg/kg dry weight. The present study could, however, provide useful background information for further investigations to understand the presence of organic contaminants in Qatar’s marine environment.

**Sampling and Study Area**

- **Sampling procedure:**

**Results and Discussion**

- **Preparation of sediment and oyster tissues samples**

Wet oyster tissues for each site were mixed with minor to have a homogeneous mixture.

- **Sediment and Oyster tissues Extraction for GC Analysis**

Ten grams of sediment sample (or 1 g of biota sample) was mixed with 5 g dimethoxyethane and placed in an extraction cell that contained 50 plm. Then, the cell was rinsed with dichloromethane. This cleaned extract underwent further concentration process using nitrogen gas to about 100 μL. Then the extract was diluted with GC-MSD and GC-FID for TPH and PAHs analysis.

- **Seawater Extraction for GC Analysis**

EP (350°C) extraction process of organic pollutants from water samples by the liquid to liquid extraction was performed. Briefly, 1 l of water sample was separated in separating funnel by adding 50 ml of hexane and shaking for 2 minutes resulting in the formation of two layers. Then, the organic layer was taken off and cleaned by 50-μm cartridge before concentrating it to 1 ml using nitrogen gas.

**Samples Analysis**

- **Analysis of TOC**

TOC content in marine sediment samples was measured indirectly by analyzing total carbon (TC) and total inorganic carbon (TIC) using (PrimaScNCO100 – SKALAR instrument). Peak area results for TC and TIC obtained from the instrument were used in the standard calibration curve equation to calculate % TC and % TIC. The % TOC was determined by the following formula: % TOC = % TC − % TIC.

- **Analysis of particle size**

About 2 to 5 g (depending on the sediment texture) of fresh wet marine sediment samples were served through 2 mm mesh size sifter and analyzed for size distribution by Mastersizer 8000, Malvern analyzer.

- **Analysis of TPHs and PAHs**

The TPHs was analyzed using an Agilent 6890N Network Gas Chromatograph (GC) with Flame Ionization Detector (FID), and for the PAHs analysis Agilent 7890B gas chromatograph coupled to a 5975C triple-axis mass spectrometer (GC/MS) was used. Table 12 and 13 show the conditions of the GC used for the analysis.

<table>
<thead>
<tr>
<th>GC/MS condition</th>
<th>GC/MS conditions used for analysis of TPHs</th>
<th>GC/MS condition</th>
<th>GC/MS conditions used for analysis of PAHs</th>
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<tr>
<td></td>
<td>Injection volume 1 ml</td>
<td>Detector flame ionization</td>
<td>Injection volume 1 ml</td>
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<td></td>
<td>Carrier gas He @ 1 ml/min</td>
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<td>Oven temperature 60°C @ 10°C/min, 250°C @ 30°C/min</td>
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**Conclusion**

- The organic contaminants (TPHs and PAHs) were more detected in oyster tissue samples than marine sediment and seawater.
- Levels of PAHs in oyster tissues were higher than levels found in previous local study.
- Benzo (a) pyrene was the highest PAHs detected found in oyster tissue samples.

**Tables and Figures**

- Table 1: GC/MS conditions used for analysis of TPHs.
- Table 2: GC/MS conditions used for analysis of PAHs.
- Figure 1: Location of the sampling sites in Qatar coastal area.
- Figure 2: Mean TPHs and PAHs concentration in biotic and abiotic matrices from Qatar Marine Environment.
- Figure 3: Concentration of detected Benzo (a) pyrene in the Oyster tissues samples (μg/kg dry weight).
- Figure 4: Overall TPHs and PAHs concentrations in oyster tissues samples from Qatar Marine Environment.