

## PAHs levels, sources and seasonal / spatial distribution in the heart of Tehran city: it's implication for health risks

**Summary:** There are various pollutants in the air endangering human health. Their effects depend on the type of contaminant, contact time and their concentrations. Among air pollutants, polycyclic aromatic hydrocarbons are amongst the strongest carcinogens. Therefore, exposure to these toxic pollutants in the air causes irreversible effects on humans.

**Methods-Results:** In this study, the characteristics of PAHs compounds, their sources and risk assessments are discussed in the in the center of Tehran. To do this, first of all, 10 points of the tehran city were selected using the geographical information system covering the entire surface of the city. Then, using the NIOSH1501 method, samplings were performed. During the study period, 160 samples of PAHs compounds were collected. The air samples were taken using PTFE filter based on NIOSH and EPA-TO/13A guidelines and SKC pump that average of flow rate of 3 L/min on the PM<sub>2.5</sub> was performed. In order to achieve a logical outcome for decision-making on the policies of the studied metropolis to mitigate air pollution, meteorological parameters were also measured, and the effect of each of them was tested on PAHs using SPSS software. The results indicated that the concentration of PM<sub>2.5</sub> particles was higher than the value set by WHO and EPA guidelines. On the other hand, across all of the measurement stations, PAHs compounds were observed, suggesting that PAHs are a common pollutant across the city of Tehran.

**Conclusions:** The  $\Sigma$ PAHs concentration within one year was 2.41–9.16 ng/m<sup>3</sup>. Benzo (a) pyrene (BaP), one of the dangerous hydrocarbons to the human health, claimed an above standard concentration among the other compounds. It was also found that factors such as transport fleet, car fule,

diesel car, burning of biomass and coal are sources of PAHs. Also, PAHs had a direct relationship with temperature. Humidity and wind speed had a negative and poor correlation with PAHs. Finally, the results of incremental lifetime cancer risk (ILCR) estimations indicated that the carcinogenicity risk values in the studied region are not acceptable.