



Evaluation of Concentrations of Volatile Organic Hydrocarbons on Air Quality in Some Petrol Stations in Tehran, Iran



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Abstract

Gas as an organic chemical compound is highly volatile in atmosphere. These volatile compounds are found in the human body in different ways. For this reason, a research on determining the concentration of organic hydrocarbon compounds benzene, xylene carried out. Furthermore, their impacts on air quality in the fuel supply in two season of cold season (winter) and warm (summer), two locations and three different time (morning, evening, night), is the refueling stations of vehicles and a distance of four feet from the refueling stations in Tehran, is investigated. The absorbent of NIOSH -1501 and SKC 226-01 were used for the study. The results showed that the amount of benzene in refueling stations of vehicles and a distance of four feet from the refueling stations in the evening was higher than the two other time measured, in the winter, 1.11 and 0.22 ppm respectively. However, in summer, benzene was high at night besides the evening as well. Thus, benzene at studied station could threaten the health of the staffs. In terms of xylene, the pattern follows the same trend as benzene. However, the amount of xylene in the workplace and the surrounding environment was less than the determined limit (100 ppm). Consequently, the xylene was less than the amount of dangerous and positioned for the health of the staffs and other people in the areas.

Purpose

The vapor pressure of volatile organics, in normal condition high evaporation, is high; therefore, they are released into the atmosphere easily. This material contains thousands of chemical compounds that have adverse effects on human health. These compounds can be benzene and xylene was investigated in this project. Moreover, the changes in air concentrations of volatile organic hydrocarbons within the fuel supply stations in Tehran were evaluated alike.

Materials and Methods

Sampling was done at the three times – morning, evening, night – in two positions of the fuel supply and four meters far from there. Sampling frequency carried out in both warm and cold seasons of the year. To investigate the changes in pollution concentrations, sampled at intervals of 8 hours per day (three times) during the two seasons.

Results and Discussion

Winter

The results showed that the mean difference of pollutants of benzene and xylene, and the distance between two places on were significant. Therefore, the amount of pollutants in the winter in four meter from the gas station was a significant difference (Fig 4.1(a) and (b)). This result is similar with Roukos and et al 2009.

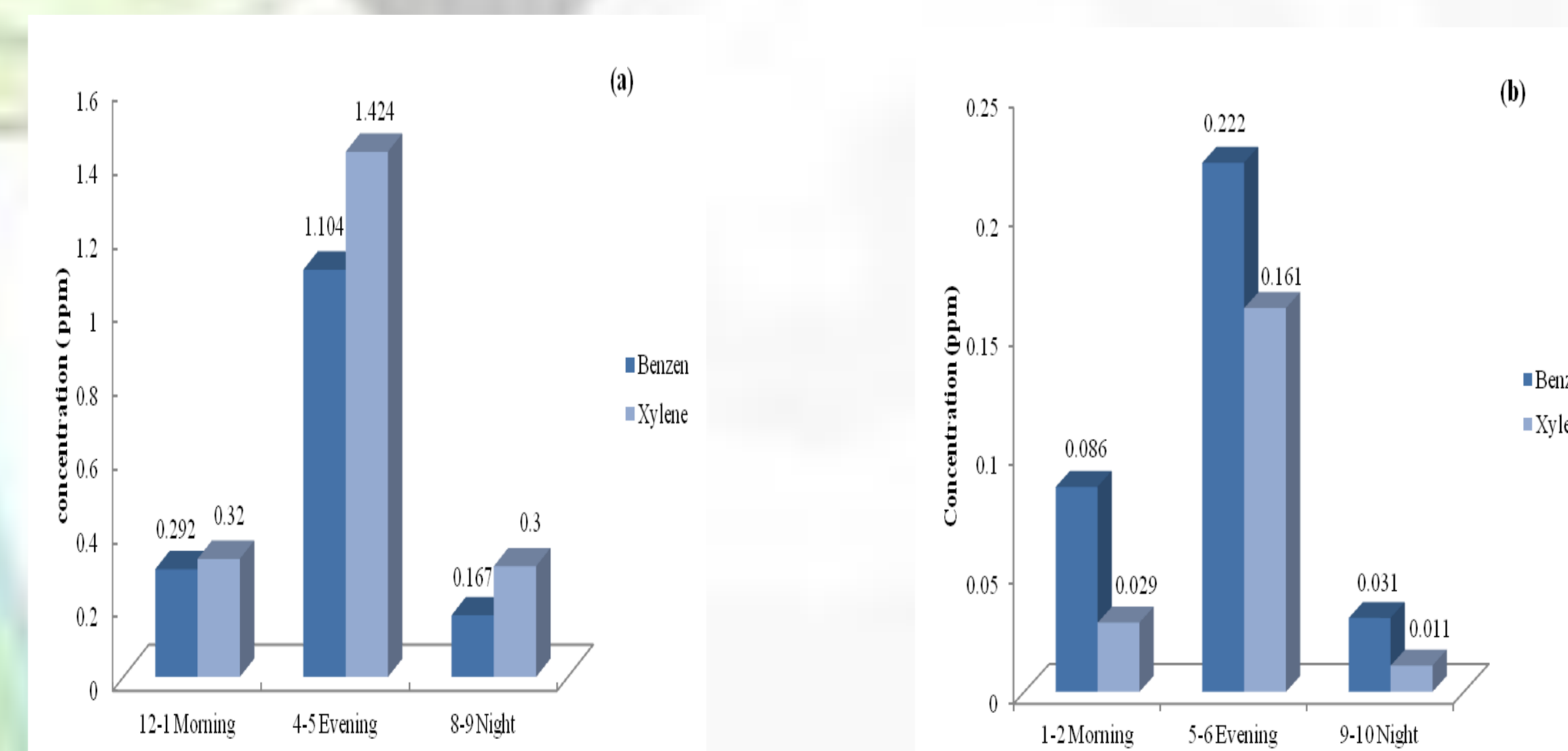


Figure 4.1. The concentration of pollutants in different times on summer season; the fuel station(a), four meters far from the fuel station

Summer

According to the results obtained values of the pollutants benzene in the summer in the distance of four meters from the supply fuel and four meters from the street was no difference (Fig 4.1(a) and (b)). Although, regarding xylene, the emissions and the distance between two places were different. In other words, in the summer, except for xylene BTEX concentrations of each pollutant on the studied stations had no difference (Fig 4.2(a) and (b)). However, there are considerable differences between the concentration in three different times studied, in both places (Karakitsias and et al 2007).

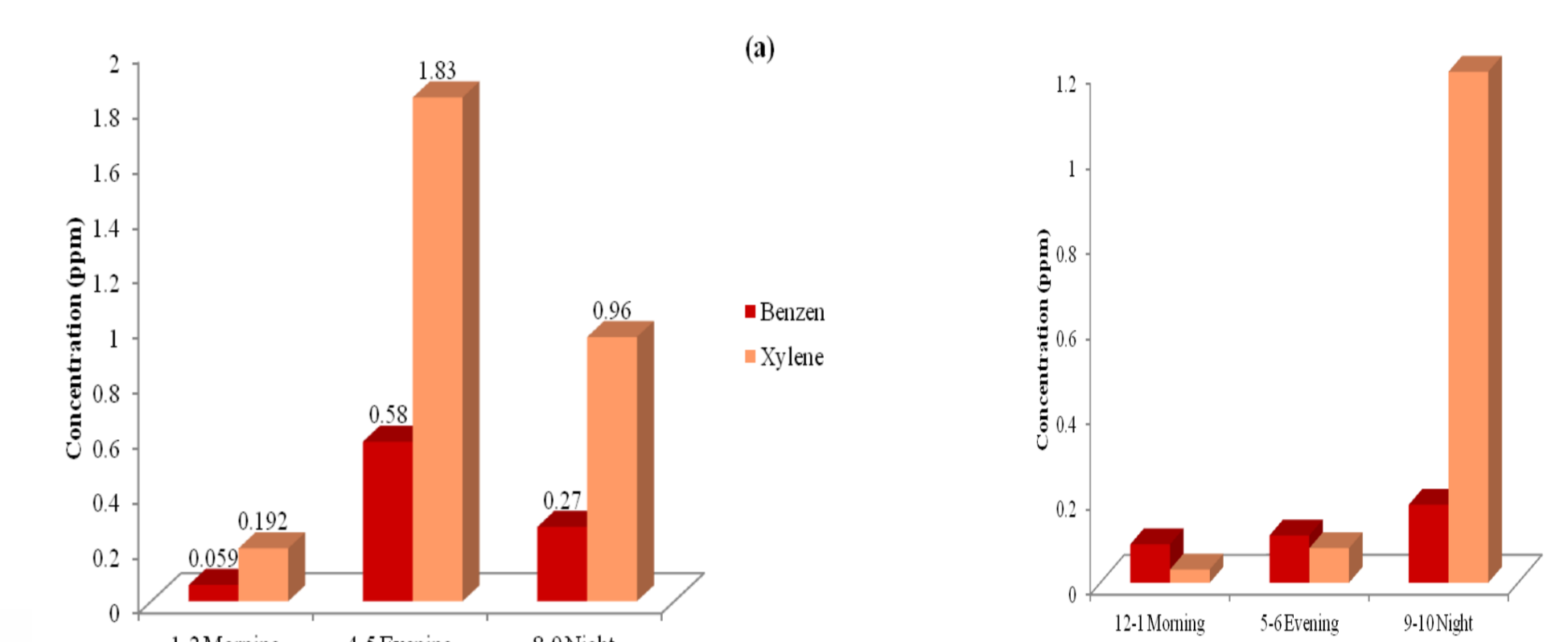


Figure 4.2. The concentration of pollutants in different times on winter season; the fuel station(a), four meters far from the fuel station

Conclusion

In summer, benzene was high at night besides the evening alike in order that benzene at studied station could threaten the health of the staffs. Turning to xylene, the pattern follows the same movement as benzene. However, the amount of xylene in workplaces and the surrounding environment was less than the determined limit (100 ppm). Thereby the xylene was less than the amount of dangerous and positioned for the health of the staffs and other people in the areas.

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