Evaluation of formaldehyde concentration in the ambient air of a most populated Iranian city, Tehran

Exposure to high levels of formaldehyde is known as both acute and chronic health problems, but the studies analyzing ambient concentrations of formaldehyde, especially in Middle East cities such as Tehran, are still rare. The aim of this study is to survey the variations in the concentration of formaldehyde in several areas with a high traffic volume of Tehran city during different seasons. The other objectives include understanding the influence of carbon monoxide, ozone, and nitrogen dioxide concentrations, ambient temperature, relative humidity, and air pressure on the variation of formaldehyde concentration. Measurements were carried out during the period of 6 months between 2013 (December 22 to February 14) and 2014 (April 27 to June 20 at five different locations within the city, together with a background site. One hundred and eight samples, each averaged over 3h from 11am to 2pm, were taken from the sampling locations. The average concentration of formaldehyde in the spring (22.7±5.3 ppb) was found about 1.31 times higher than winter (17.3±4.2 ppb). Formaldehyde concentrations demonstrated a significant correlation with the changes in air temperature (in the range of 0.46 to 0.66 for different locations) but not having any strong correlation with humidity and pressure. Carbon monoxide and nitrogen dioxide showed a significant coefficient of determination with formaldehyde concentrations with $R^2$ as 0.80 and 0.67 during the winter, respectively, whereas the corresponding $R^2$ values during spring were 0.39 and 0.41. Ozone showed a significant correlation with formaldehyde ($R^2=0.64$) during the spring and has not such a significant correlation during the season winter ($R^2=0.23$). Overall, it concluded that road vehicles were recognized as the main contributor of formaldehyde production during both the seasons, especially in the winter, also, photochemical oxidation was another important and considerable contributor producing formaldehyde during the spring.

Biography
Mohammad Hadi Dehghani (PhD) is a Full Professor at the Tehran University of Medical Sciences (TUMS), School of Public Health, Department of Environmental Health Engineering, Tehran, Iran. His scientific research interests include the Environmental Health, Air Pollution, Water Pollution and Solid Waste. He is the author of various research studies published at national and international journals, conference proceedings and Head of several research projects at the TUMS. He has authored 8 books and more than 150 full papers published in peer-reviewed journals. He is an editorial board member and reviewer in many internal and international journals and is a member of several international science committees around the world. He has a supervisor and advisor PhD and MSc theses at the TUMS. He is currently also a member of the Iranian Association of Environmental Health (IAEH) and member of the Institute for Environmental Research (IER) at the TUMS.

Notes: