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Short term exposure to some airborne trace elements and its potential cancer risk

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Cancer prediction may afford significant approach to assess risk and prognosis. Over 2.3 million of pilgrims stay in Makkah during Hajj season creating unspecified amount of trace elements pollution in air. This study aimed to determine cancer risk (ECR) for population exposed to (Cd, Cr, As, Be) compared to short term exposure during hajj. The study was conducted in Arafat area, air samples were collected using mini volume Hi-sampler for 24 hrs once in a week through summer and autumn 2015 including Hajj season. Concentrations of PM10 trace elements (Cd, Cr, As, Be) were analysed using ICP-MS 7300 (Perkin Elmer, USA). Collected sample filters were analysed in reference to a standard solution of trace elements using a protocol certified by (US-NIST). Each filter was extracted with 7 ml of nitric acid and 2 ml of ultra-pure water. The recovery yields of trace elements were higher than 95% with detection limits ≤ 3 ng/m³ for all trace metals. Concentration of PM₁₀ in Arafat during Hajj period in autumn was 786.6 mg/m³ compared to 204.7 mg/³ in summer, both showed greater values than European Commission annual standards. Atmospheric Cd, Cr and As concentrations were elevated during Hajj season comparing with summer months, The ECR during hajj season was found to be $(5.08 \times 10^{-4}, 9.21 \times 10^{-4}, 7 \times 10^{-6}$ and 7.4×10^{-6}) for Cd, Cr, As and Be respectively, compared to $(1.08 \times 10^{-4}, 7.21 \times 10^{-4}, 4 \times 10^{-6}$ and 4.6×10^{-6}) in summer months exceeding USEPA's level of acceptable inhalation risk (10-6) for each element.

Biography

Heba M Adly has completed her PhD from Ain Shams University and Postdoctoral studies from American University in Cairo. She is an Assistant Professor of environmental health and supervisor of environmental health lab, Faculty of Medicine, Umm Al-Qura University. Her technical expertise includes air modelling, environmental chemistry, gas chromatography, mass spectrometry and atomic absorption. She is a member of many academic and administrative committees at UQU.

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