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Health Risk Assessment of Heavy Metals in Particulate Materials Collected in Seoul Metropolitan Area

Eun-Jung Park, Misun Kang, Dae-Eun You, Kwangsik Park,
Dae-Seon Kim[1], Seung-Do Yu[1]
College of Pharmacy, Dongduk Women's University, Seoul 136-714, Korea,
[1]National Institute of Environmental Research, Incheon 404-170, Korea

Particulate materials(PM) less than 10 um in diameter are of special interest in air pollution because they are respirable and responsible for the increasing mortality rate of lung cancer and cardiovascular diseases. These particles are often referred to as PM10 and they are divided into a coarse fraction and a fine fraction which is also often referred to as PM2.5. In this study, we monitored the TSP, PM10, PM2.5 concentration of ambient air collected in northern part of Seoul and measured heavy metals such as Cr, Mn, Zn, As, Cd, and Pb. All the heavy metals were found in the collected particles and the concentrations were variable in the PM10 and PM2.5, respectively. The detected concentration ranges were Cr; ND~7,337 ng/m^3, Mn;2~503 ng/m^3, Zn;ND~889 ng/m^3, As;ND~28 ng/m^3, Cd;ND~4 ng/m^3, and Pb;ND~839 ng/m^3. Heavy metal toxicity of the particles were also tested and compared among the metals in cultured H9C2 cells derived from rat cardiomyocytes. As for the results of health risk assessment calculated by using IRIS unit risk and reference concentration, the heavy metals in ambient air of Seoul metropolitan area were found to be responsible for the increase of total excess cancer risk.

Keyword: Particulate materials, heavy metals, cardiomyocytes, risk assessment