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Application of RP-HPLC/UV for the detection of polycyclic aromatic hydrocarbons in atmospheric environments

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Polycyclic aromatic hydrocarbons (PAHs) are toxic environmental pollutants of growing importance for their potent carcinogenicity. Being emitted from incomplete organic combustion, urban atmospheres under rapid economic expansion are heavily polluted with PAHs and pose special threats on the dense population. Monitoring and characterizing atmospheric PAHs is therefore of considerable importance for better management of air quality and subsequent community health conservation programmes. Although the analytical methods for PAHs seem established, being inconsistent, the primary objective of our work was to simplify the conventional techniques for sample preparation in US EPA Compendium Method TO-13A and develop relatively an economical method for routine analysis of 16 priority PAHs in air samples without compromising the accuracy. It was further accomplished with HPLC/UV detector system which was validated to be adequately precise, effective, selective and sensitive with comparable/higher criteria to the conventional GC/MS or HPLC/FLD for routine atmospheric monitoring. Over the perfect linear calibration (r= 0.99) of 16 PAHs, the detection limit ranged from sub nanogram to picogram levels with a limit of quantification for p-PAHs, 9.5pg/m^3-3.43ng/m^3. Overall recoveries and precision of the method as %RSD were highly comparable; %RSD for integration area, 1.59% and retention time, 0.68%. Particulate and gaseous PAHs in Kandy, analyzed based on this method were comparable to the world data, but at/above the upper end and well correlated with the assessed sources and health impacts. The developed HPLC/UV method would therefore widely be used in routine external exposure assessment of atmospheric PAHs in analytical toxicological studies.

Biography

A.P. Wickramasinghe, basically qualified with honored BVSc degree from Faculty of Veterinary Medicine, University of Peradeniya with distinctions, gold medal and scholarship for best performance in 1994. She transferred her carrier to the broad environmental field with post graduate qualification in Environmental Engineering in 2005, to PhD in Environmental Sciences in 2012, which covered both Environmental Engineering and Environmental Health aspects, from Faculty of Engineering with collaboration from Faculty of Medicine, University of Peradeniya. Her recent research work were published in international journals of Atmospheric Environment-2011 and Chemosphere-2012 and also presented at Planet Under Pressure-2012 conference in London.

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