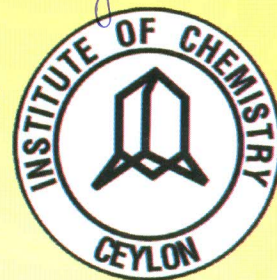




*P. Paranagawa*

# International Conference on Chemical Sciences



Conference theme

## Role of Chemistry Research in National Development



# ABSTRACTS



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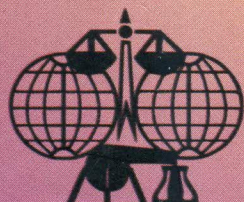
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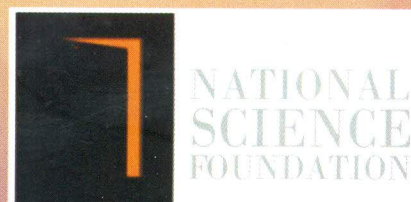
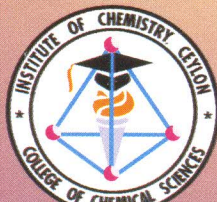
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## Determination of Arsenic Content in Synthetic and Organic Manure Based Fertilizers Available in Sri Lanka

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Sri Lanka is currently one of the world leaders in chemical fertilizer consumption, and imports. The chemical fertilizers imported to Sri Lanka in 2010 indicates that urea, triple super phosphate (TSP) and Muriate of potash (MOP) are imported to Sri Lanka in high quantity for cultivation of rice, tea, rubber and coconut to use in the agriculture. Sri Lanka is currently ranked as the largest user of chemical fertilizers in South Asian Region in the year 2008. Hence, the objective of the present study was to investigate levels of arsenic contamination in the fertilizers (synthetic and natural) and related products such as dolomite and carbide available in the Sri Lankan market. In the present study, two sets of sealed samples of each fertilizer, dolomite and calcium carbide were purchased from sales outlets. The fertilizer samples collected were TSP, MOP, Urea, Dolomite, Compost, Chicken Manure, Cattle manure mix, Charcoal, coire dust. Each sample (1 g) was digested using the US EPA method 3050B. Spiked samples (10 ppb) in duplicates were also digested to confirm the methodology. The present study showed the high level of contamination of arsenic in the phosphate containing chemical fertilizer used in Sri Lanka. In the fertilizer samples analyzed, the highest arsenic content was observed in phosphate containing chemical fertilizers used in rice cultivation. The average total arsenic content was 31 mg kg<sup>-1</sup> in TSP and ranged from 25.5 mg kg<sup>-1</sup> to 37.8 mg kg<sup>-1</sup>. Rock phosphate produced using phosphate deposits at Eppawala in Sri Lanka also show significantly higher amount of arsenic (19.4 – 21.8 mg kg<sup>-1</sup>). Among the chemical fertilizers analyzed, liquid fertilizers, MOP and urea were not contaminated with arsenic, however the mixtures of N, P, K fertilizers available in the market showed higher amount of contaminated arsenic. Moderate amount of arsenic, ranged from 6.02 mg kg<sup>-1</sup> to 7.61 mg kg<sup>-1</sup> was present in the dolomite samples when compared to the phosphate containing fertilizer. Use of the fertilizers made of natural sources are highly encouraged in Sri Lanka as they have added advantages other than the supply of macro and micronutrients to the soil. Hence the As contents in natural fertilizers were tested in different types of manures available in the Sri Lankan market. The results showed that the amount of As present in the natural fertilizer samples were negligible when compared to the chemical fertilizer. Some of the compost samples available in the market indicated that they contain artificially added phosphate (1 – 2 %) in those samples. However, the compost samples with added artificial phosphate, cattle manure and chicken manure showed a small concentration of As, ranged from 0.51 to 1.34 mg/kg. In a survey carried out for sources of contamination of arsenic in soil and ground water, it was found that calcium carbide is also heavily used in the agriculture sector as a fruit ripening agent. Therefore it was attempted to investigate the presence of As in CaC<sub>2</sub>. The results revealed that the amount of As present is in the ranged of 0.95 mg kg<sup>-1</sup> to 8.76 mg kg<sup>-1</sup> indicating CaC<sub>2</sub> could be more health hazardous due to the presence of As. **The conclusions of the present study are that arsenic content in the organic fertilizer is negligible and the farmers are encouraged to use the fertilizers with natural origin in order to avoid the contamination of As in the environment and to minimize the usage of agrochemicals contaminated with As.**