PRELIMINARY ASSESSMENT OF EXPOSURE LEVELS OF HG AND MN IN SELECTED FOOD TYPES IN HAMBANTOTA DISTRICT, SRI LANKA

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ABSTRACT

This study was conducted to assess the exposure of dietary contaminants (Hg and Mn) in selected areas of Tangalle, Beliatta, Angunukolapelassa and Balangoda (reference site). Different food types were collected from selected houses where kidney failures live and some samples were collected from the local fair during the dry period of September - October, 2013. The sample pre−preparation was mainly based on acid digestion and the concentrations of Hg and Mn were measured using atomic absorption spectroscopy with the combination of cold vapor generator for Hg analysis. Questionnaire based field survey was conducted to identify the status of the hazard and to collect relevant data from the families to apply risk assessment models. Mean concentrations of Hg in Lotus rhizomes collected from Tangalle, Angunukollapellassa, Beliatta and Balangoda areas were 1.4±1.6, 7.2±0.07, 11.8±3.65 and 3.0±0.88 µg/g wet wt respectively. The mean exposures of Hg with the consumption of Lotus rhizomes for the considered populations were 0.28±0.32, 1.44±0.001, 2.36±0.68 and 0.60±0.16 µg/kg body weight/day respectively. The mean exposure of Hg with the consumption of fish (*Oreochromis niloticus*, *Puntius* sp., *Labeo rohita*, *Glossogobius* sp.) were 17.5±5.83, 103.75±104.54, 30.00±4.88 and 18.13±76.36 µg/kgbw/day respectively for the studied areas. Exposure of Hg via the consumption of fish exceeded the recommended reference dose of 1.60 µg/kg body weight/day. The mean exposure of Mn via the consumption of Lotus rhizomes were 25.96±35.4, 72.60±41.48 and 16.24±33.89 µg/kgbw/day respectively. Mean exposure of Mn via the consumption of *Lasia* sp in above four areas, were 11.67±5.85, 4.36±4.18, 4.34±8.54 and 1.89±2.15 mg/kgbw/day respectively. Accordingly, the hazard quotients for the exposure to Hg via Lotus rhizomes exceeded the unity of the model (1×10^{-6}) in all four areas and it exceeded for the consumption of rice only at Beliatta. The hazard quotients for Mn also exceeded the unity of the model at above four areas due to consumption of *Lasia* and Lotus rhizomes except at the reference site of Balangoda area. Also, high risk ratios of carcinogenic effect were observed for farmers in Angunukolapelassa as 4.00 and 5.45 for male and female respectively.

Keywords: Exposure, risk assessment, hazard quotient, Mercury, Manganese.