

Arsenic and other trace elements contamination in groundwater and a risk assessment study for the residents in the Kandal Province of Cambodia

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Abstract: Concentrations of arsenic and other trace elements in groundwater were examined at three villages (PT, POT and CHL) in the Kandal Province of Cambodia. Concentrations of arsenic in the groundwater ranged from 6.64 (in POT village) to 1543 $\mu\text{g/L}$ (in PT village), with average and median concentrations of 552 and 353 $\mu\text{g/L}$, respectively. About 86% out of fifteen samples contained arsenic concentrations exceeding the WHO drinking water guidelines of 10 $\mu\text{g/L}$. Concentrations of arsenic (III) varied from 4 (in POT village) to 1334 $\mu\text{g/L}$ (in PT village), with an average concentration of 470 $\mu\text{g/L}$. In addition, about 67%, 80% and 86% of the groundwater samples had higher concentrations for, respectively, barium, manganese and lead than the WHO drinking water guidelines. These results reveal that groundwater in Kandal Province is not only considerably contaminated with arsenic but also with barium, manganese and lead. A risk assessment study found that one sample (PT25) had a cumulative arsenic concentration (6758 mg) slightly higher than the threshold level (6750 mg) that could cause internal cancer in smelter workers with chronic exposure to arsenic from groundwater. High cumulative arsenic ingestion poses a health threat to the residents of Kandal Province. © 2008 Elsevier Ltd. All rights reserved.

Author Keywords: Arsenic; Barium; Groundwater; Kandal Province; Lead; Manganese

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