

Effects of plumbing premise on the occurrences and variability of heavy metals in desalinated and blended tap water

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ABSTRACT

Chronic exposure to heavy metals in tap water has been linked to various health effects. The regulatory agencies often monitor heavy metals in water treatment plant and water distribution system (WDS) while people are exposed to water from tap in house. Stagnation of water in plumbing pipes (PP) and hot water tanks (HWT) prior to reaching the tap is likely to increase the concentrations of few heavy metals, which may exceed the regulatory guidelines. In this study, occurrences and variability of 17 heavy metals in water were investigated in WDS, PP and HWT through a 7-month sampling program. The water samples were collected and analyzed for 7 times a day on bi-weekly basis. The concentrations of heavy metals in HWT were 1.2–8.1 and 1.4–6.7 times the concentrations in WDS and PP respectively. Among the priority pollutants, concentrations of As, Cr, Cu, Pb, Hg, Ni and Zn were in the increasing order of WDS, PP and HWT. Higher concentrations of heavy metals in PP and HWT increase metal concentrations in tap water, which can pose elevated risk to humans. The concentrations of several heavy metals were seasonally variable with higher values in summer. The findings highlight the limitations of current sampling locations for regulatory compliance, exposure analysis and risk control from heavy metals in tap water.

Keywords: Desalinated and blended water; Heavy metals; Plumbing premise; Water stagnation; Water quality monitoring

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