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Evaluation of arsenic and mercury concentration in a community river water supply source at the Tarkwa district of Ghana

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River Bonsa serves as the only source of water supply distributed to communities in the gold mining Tarkwa district, Ghana; however present concentration of heavy metals in river water due to mining activities has not been reported. River water and sediment concentrations of arsenic, mercury, copper, manganese and aluminum during the rainy season were determined by AAS and INAA. Arsenic (1.52 ± 0.03 μg/L) and mercury (0.38 ± 0.01 μg/L) concentrations increased by 85.4 and 660 % from previous background concentration of 0.82 μg/L and 0.05 μg/L determined in 2001 respectively. However arsenic, mercury and manganese (380 ± 190 μg/L) except aluminium (4400 ± 160 μg/L) concentrations were below the WHO's maximum permissible limits of 10 μg/L, 6 μg/L, 400 μg/L and 100 μg/L for drinking water respectively. Validity of method was achieved with IAEA-405/158 and recoveries within 95 - 102 %. Mercury and arsenic in sediment, correlated negatively with TOC, sulphate and pH but positively with aluminium and manganese (p-value < 0.01). The pH (5.52 ± 0.003) of the sediment was weakly acidic, which indicated that arsenic and mercury flux from phases into river water was likely by speciation and dissolution processes. Sulphate (358 ± 10.82 mg/Kg) and total organic carbon (715 ± 5.00 mg/ kg) in sediment were determined by turbidimetric and Walkley-Blacky titrimetric method respectively. Pollution level assessment indicated a moderately polluted area with mercury. This preliminary results indicate that river and sediment transported pollutants is one of the factors that debase water quality from River Bonsa.

Biography

Andrews Obeng Affum has completed a master's degree with thesis in chemistry at the age of thirty-four at the Chemistry Department of University of Florida, USA. He is a Research Scientist at the Nuclear Chemistry and Environmental Research Centre of Ghana Atomic Energy Commission in Ghana. He has supervised Mphil student's final year dissertation. Since 2008 he has published about nine research papers in international peer reviewed Journals. He is also an editorial member of Wudpecker Journal of Medicinal Plants.

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