

Impact of Gold Mining on Soil and some Staple Foods Collected from Selected Mining Communities in and around Tarkwa-Prestea Area

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Abstract

The principle of neutron activation was used to investigate the presence of toxic elements and possible heavy metals in samples of cassava, plantain and soil from the mining communities in and around Tarkwa in the Western Region of Ghana. The results showed that the maximum concentrations of the respective metals in cassava: plantain: soil samples were arsenic (As = 0.7 µg/g:0.25 µg/g:14.35 µg/g), mercury (Hg = 0.25 µg/g:0.52 µg/g:0.09 µg/g), antimony (Sb = 0.03 µg/g: 0.03 µg/g: 2.98 µg/g), chromium (Cr = 0.72 µg/g:3.42 µg/g:40.35 µg/g), vanadium (V = 0.8 µg/g:0.76 µg/g:188.40 µg/g), zinc (Zn = 38.42 µg/g:24.92 µg/g:42.36 µg/g), and copper (Cu = 66.39 µg/g: 8.74 µg/g: 53.46 µg/g). The concentrations in cassava and plantain were higher than the values proposed by the FAO, the Expert Committee on Food Additives of the WHO and the Agency for Toxic Substance and Disease Registry (ATSDR). The concentrations of Hg (0.09 µg/g) in soil at Teberebie and of V (188.40 µg/g) at the University of Mines and Technology (UMaT) in soil were above the permitted concentrations of 5 µg/g and 90 µg/g, respectively. Samples from communities further away from the centres of mine drainages (mile 8½, mile 10½) had smaller values of element concentrations. An enrichment factor (EF) analysis for both cassava and plantain were Zn (7%) and Hg (90%). The remaining elements together add up to 3%. The enrichment factor analysis for plantain is greater than that for cassava. Mercury is the element that is chiefly enriched in both cassava and plantain. The second predominant element enriched in cassava and plantain is zinc.