World Academy of Science, Engineering and Technology
International Journal of Mathematical and Computational Sciences
Vol:14, No:12, 2020

Assessment of Heavy Metal Bioaccumulation by Tissues of Ipomoea Batatas and Manihot Esculenta Irrigated with Water from Muhammad Ayuba Dam, Kazaure, Jigawa State, Nigeria

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Abstract : Scarcity of quality water in many communities compels inhabitants to use any available water resources for domestic, recreational, industrial and agricultural purposes. Global concern on the potential health hazards of anthropogenic inputs into our ecosystems imposes the need for constant monitoring of levels of pollutants in order to ensure compliance with internationally acceptable criteria. In this research, assessment of bioaccumulation of Cd, Co, Cu, Pb and Zn was carried out using tissues of Ipomoea batatas (sweet potato) and Manihot esculenta (cassava) irrigated with water from Muhammad Ayuba Dam in Kazaure, Jigawa State. The metal concentrations were determined using Flame Atomic Absorption Spectrophotometer (FAAS). The result of the analysis revealed the presence of the metals in varying concentrations. Cd and Co showed higher concentrations in the tubers of Manihot esculenta but all the other investigated metals were more concentrated in the leaves of the plant. Cd and Cu on the other hand showed higher concentration in the root of Ipomoea batatas while the remaining investigated metals were concentrated more in the leaves of the plant. The result of analysis of water samples from five sampling stations in the Dam showed the presence of the metals as follows: Cd, (0.063±0.02 mg/L), Co (0.086±0.03 mg/L), Cu (0.167±0.08 mg/L), Pb (0.22±0.01 mg/L) and Zn (0.047±0.01 mg/L) respectively. The results of bioaccumulation studies using the Bioaccumulation Factors (BAF) index indicated Ipomoea batatas to have higher bioaccumulation potential for Cd, Co and Cu while Pb and Zn were more accumulated in Manihot esculenta. The levels of the metals in both the water samples and plant tissues were all below the WHO permissible limit. This is indicative that the inhabitants of the community under investigation are not at any health risk.

Keywords : agriculture, bioaccumulation, heavy metal, plant tissues
Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development
Conference Location : Chicago, United States
Conference Dates : December 12-13, 2020