

DETERMINATION OF THE CHEMICAL COMPOSITION OF THE SLUDGE GENERATED FROM DRINKING WATER TREATMENT PLANTS IN ANURADHAPURA DISTRICT

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Sludge is an unavoidable waste generated from the water treatment process and usually accumulates at water treatment plants. The type of coagulants used during the treatment process as well as suspended and soluble solids in the raw water affect the chemical composition of sludge. Twenty sludge samples were collected from sludge accumulating tanks. The pH, EC, OM, total N, P, K Ca, Mg, trace elements (Mn, Al, Fe, Zn), and heavy metals (As, Cd, Pb) were determined with three lab replicates. According to the results, pH, EC, OM, total N, total P, Mg, Mn, Zn, Al, and Fe content were found to be significantly different ($p < 0.05$). However, the total P and Ca content of sludge were not significantly different ($p > 0.05$) among each sludge sample of different water treatment plants. Heavy metals were not detected in any sludge samples studied. The total calcium (1000 mg kg^{-1}), manganese ($10\text{-}50 \text{ mg kg}^{-1}$), and iron (10 mg kg^{-1}) content of sludge in all water treatment plants are higher than the recommended level. The total Mg content for healthy soil is 19.4 mg kg^{-1} while the Mg content of sludge in *Galnewa*, *Eppawala*, and *Kalawewa* treatment plants were 2895, 4649, and 4811 mg kg^{-1} respectively. The sludge from the *Galnewa* water treatment plant had more Zn content (474 mg kg^{-1}) than in healthy soil level ($1\text{-}200 \text{ mg kg}^{-1}$). The amount of total Fe in the sludge from the water treatment plants in *Nuwarawewa* and *Thuruwila* is less than the recommended amount (10 mg kg^{-1}). All sludge samples contained an acceptable amount of Al. Sludge generated from water treatment plants may be used as a soil conditioner in agriculture for safe disposal considering the constituents of sludge.

Keywords: Chemical composition, Drinking water treatment plants, Sludge, Soil nutrients, Water purification