

EFFECT OF HEAVY METAL CONTAMINATION ON MICROBIAL POPULATION, ORGANIC CARBON AND NITROGEN MINERALIZATION IN SOIL PLANTED TO LEGUMES

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ABSTRACT

This study was carried out to investigate the effects of heavy metal contamination on the microbial population, organic carbon and nitrogen mineralization in the soil planted to legumes. Two heavy metals (*Zinc and lead*) were used at 150mg kg⁻¹ and 200mg kg⁻¹ concentrations respectively. Four legumes (*Mucuna, Cowpea, Soyabean and Centrosema*) were planted in pots filled with 4kg of 2mm sieved soil. The experiment was a 3 x 5 factorial, arranged in a completely randomized design with three replications. The soil reaction (pH), organic carbon, nitrate nitrogen (NO₃-N), ammonium nitrogen (NH₄-N) and microbial count were determined at 4 and 8 weeks after contamination (WAC). The soil pH ranged from 6.49 to 7.11 and 6.42 to 7.02, organic carbon ranged from 14.3 to 27 g kg⁻¹ and 10.5 to 20.0 g kg⁻¹ at 4 and 8 WAC respectively. Nitrate nitrogen ranged from 140 to 159.7 mg kg⁻¹ and 12.0 to 101.7 mg kg⁻¹, NH₄-N also ranged from 31.7 – 980 mg kg⁻¹ and 17.7 to 80.7 mg kg⁻¹ at 4 and 8 WAC, respectively. Contamination with heavy metal increased the soil pH, organic carbon content, and nitrogen mineralization in some pots while reduction occurred in others. Microbial population was found to increase significantly with contamination at 8 WAC. The organic carbon content was increased by about 40 % and 42% at 4 and 8 WAC, respectively. The increase in nitrate nitrogen mineralization was about 80% and 52 % at 4 and 8WAC, respectively. Microbial population increased by about 57 % and 62 % at 4 and 8 WAC, respectively.

Key words: mineralization; contamination; heavy metals.