ABSTRACT

Currently, sewage waste management is a serious environmental problem and one of the major growing concerns for urban areas all over the world. Utilization of biosolids (BS) for crop production may be a sustainable waste management strategy. The present study evaluated the physico-chemical and biological characteristics of biosolids from sewage ponds at Egerton University, Kenya. This was to determine its suitability for crop production. Biosolids were evaluated separately then as mixture with forest soil at rates of 0, 10, 20, 30, 40, 50 and 60% and compared with tea compost (TC) and coco peat (CP) in a completely randomized design experiment with four replications. Data collected included: macro-elements, micro-elements, heavy metals, pH, electrical conductivity (EC), bulk density (BD), water holding capacity and biological properties. Results showed that total organic carbon (0.03%), total organic nitrogen (2.0%) and Molybdenum (22 mg kg-1), in biosolids were significantly (p < 0.05) higher compared with forest soil, but not significantly different from tea compost. For heavy metals, Hg (0.33 mg kg-1), As (5.9 mg kg-1), Cr (31.1mg kg-1), Cd (0.38 mg kg-1), Ni (16.3 mg kg-1) and Zn (127 mg kg-1) were significantly (p < 0.05) higher in biosolids but within the allowable limits according to Environmental Protection Agency (EPA) standards. bulk density (1.2 to 1.5) g cm-3 and pH (5.4 to 5.8) units, but high organic matter (195 to 230) g kg-1, water holding capacity (35 to 42 %) and EC (2.6 to 5.4) µSm-1). For microbial load, total viable count (TVC) and colony forming units (CFU) registered 5 ×10-7 and 6.5×10-7 respectively. However, Escherichia coli, Salmonella sp. and Staphylococcus sp. were not detectable in the fully composted biosolids. Similar trend of these results were subsequently observed in the substrates formed in the mixture of biosolids and forest soil and this provide insight on the potential of biosolids as substrate for crop production and a reliable alternative to soil alone.

Key words: Biosolids, forest soil, organic amendment, substrate.