

Effects of different rates of sewage sludge on soil physicochemical properties, growth and yield of Bambara groundnut (*Vigna subterranean*) in an Ultisol, Agbani, Enugu, South Eastern Nigeria

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The study was conducted in 2018 planting season at teaching and research farm, Enugu State University of Science and Technology, Enugu State Nigeria; the study investigated the effects of different rates of sewage sludge (0,2,4,6 and 8 t/ha) on soil physicochemical properties, growth and yield of Bambara groundnut (*Vigna subterranean*) in a degraded Ultisol, Agbani, Enugu, South Eastern Nigeria. The treatments were laid out in randomized complete block design with replications. Physicochemical properties of soil SOM,N,CEC and available P) were analyzed using standard analytical laboratory methods. The obtained results from the laboratory revealed that application of sewage sludge altered a positive change on soil physicochemical properties in all amended plots than the control plots. The soils from plots treated with 8 t/ha of sewage sludge had the highest pH value of 6.9 while the least was found in soil from untreated plots with pH value of 6.1. The Om value was highest in soils from plots treated with 8 t/ha of sewage sludge with 5.18% while the least was found in soil from untreated plots with 0.97%. Total Nitrogen was found highest in the soils from plots treated with 8 t/ha of sewage sludge with a value of 2.27% while the least was found in soil from untreated plots with value of 0.12%. The CEC value was found highest in soils from plots treated with 8 t/ha of the sewage sludge with a value of 11.68 Cmol+Kg⁻¹ while the least was found in soils from untreated plots with value of 2.244 Cmol+Kg⁻¹. The available phosphorus value was highest in soils from plots treated with 8 t/ha of sewage sludge with 25.94 mg/kg while the least was found in soils from untreated plots with 15.36 mg/kg. Application of sewage sludge improved the growth characteristics and the yield of Bambara groundnut. The highest plant height at 30,60 and 90 DAP was found on plots treated with 8 t/ha of sewage sludge with a value of 11.95 (cm), 14.86 (cm) and 20.45 (cm) while the least plant height at 30,60 and 90 DAP was found on untreated plots with a value 183.79,339.79 and 680.04. The highest LAI at 30,60 and 90 DAP was found on plots treated with 8 t/ha of sewage sludge with a value of 2.67,3 and 5.69 while the least plant height at 30,60 and 90 DAP was found on untreated plots with a value of 1.03,1.21 and 4.37.

The highest plant yield at 140 DAP was found in plots treated with 8 t/ha of sewage sludge with a value of 20.62 t/ha. Hence, sewage sludge application on soil has been effective in improving soil physicochemical properties, growth and yield of Bambara groundnut. Thus, 8 t/ha of sewage sludge is recommended as it has proven to be more effective in altering a positive change on soil physicochemical properties and fertility conditions.

Keywords: Sewage sludge, Physicochemical properties, Growth, Yield, Degraded ultisol, *Vigna subterranean*.

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Biography

Oliver Ngwu is from Enugu State University of Science and Technology, Enugu State, Nigeria, Department of agronomy and ecological management. He studied B. Agric ([Soil Science](#)), MSc (Soil Fertility and Microbiology), PhD ([Soil Water Conservation and Management](#)) & Professor of Soil Science. His research has been focused on soil science.

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