COMPARISON OF THE EFFECT OF ANIMAL MANURES AND CHEMICALFERTILIZER ON THE GROWTH, YIELD ANDBIOACTIVE COMPOUNDS OF TOMATO

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The rapid increase in urban development and industrialization has led to reduction in land for farming activities thereby leading to overcultivation of the available land area. This and other human activities have resulted in the loss of soil fertility and inadvertently reduced nutritional quantity of agricultural produce. In the effort to find lasting solution to this problem, researchers have advocated for the use of fertilizers. The study was therefore conducted to compare the levels of bioactive compounds and antioxidant activities of tomato fruits cultivated on soil amended with different manures and fertilizer (cow dung, chicken droppings and NPK). Tomato seedlings were transplanted into pre-treated soils and watered daily for a period of five months. The growth rates such as plant height, leaf area index and stem girth were recorded weekly for 15 weeks and the fruits were harvested at maturityand subjected to both phytochemical and antioxidant activity analyses using High Performance Liquid Chromatography (HPLC) and Ultraviolet-Visible (UV) Spectrophotometer respectively. The general growth and yield performances were in the order of NPK > Chicken droppings > Cow dung. The level of beta-carotene was significantly higher ($p<0.05$) in the fruits cultivated in the soil amended with NPK fertilizer which was a different pattern to other observed phytochemical compounds. The concentrations of other phytochemical compounds were in the order of cow dung > control > NPK > chicken droppings. Although, there was no significant difference in the mean concentrations of the antioxidant activities, there were significant differences recorded in phytochemical compounds of the fruits from different treatments. This study revealed an inverse relationship between growth rate, yield performance and the concentrations of phytochemical compounds. It was observed that farming method had considerable effect on the phytochemical compounds and antioxidant activity of tomato fruits. Although, inorganic NPK fertilizer had higher growth rates and better yield, organic manures (cow dung) however had a higher stimulatory effect on bioactive compounds like phenolic, flavonoid, lycopene and antioxidant activity. This observation agrees with a lot of literatures on the effect of farming method on the quality and quantity of plants. Therefore, In the effort to balance environmental sustainability and maintaining quality fruit production, this study will recommend more usage of free and readily available organic manures as a source of soil fertility management.

Keywords - Antioxidant activity, bioactive compounds, extract,inorganic and organic soil amendments