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GROWTH, YIELD AND NITROGEN USE EFFICIENCY OF GREEN BEAN (*Phaseolus vulgaris* L.) AS INFLUENCED BY RATE OF BIOCHAR AND NITROGEN FERTILIZER AT JIMMA, SOUTHWESTERN ETHIOPIA

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Based on the national soil database, most of the southwest Ethiopian soils are deficient in macronutrients (Nitrogen) and affected by ongoing acidification problems. This has affected growth, yield and NUE of legumes in general and that of green beans in particular. However, studies on the combined application of inorganic and organic fertilizer or amendments to improve the growth yield and NUE of green bean is scant. Therefore, a pot experiment was conducted to determine the rate of biochar and nitrogen fertilizer on growth, yield and NUE of green bean on the acidic soil of Jimma in 2017/2018. The treatments consisted of four biochar rates (0, 2, 4 and 6 t ha⁻¹) and four nitrogen fertilizer rates (0, 23, 46 and 69 kg ha⁻¹) and laid out using 4x4 factorial arrangements in a randomized complete block design with three replications. ANOVA show that combined application of biochar and Nitrogen fertilizer highly significantly ($P < 0.001$) total pod yield, nitrogen use efficiency and soil pH, total nitrogen and organic carbon. The highest pod yield (48.72g plant⁻¹), NUE (12.69 gg⁻¹) was obtained from the combined application of 6 t biochar and 23 kg N fertilizer ha⁻¹, The highest total number of nodules (121.33) at 2 t ha⁻¹ BC +23 kg ha⁻¹ N fertilizer and the highest soil pH (6.01) resulted when the pots received of 6 t biochar ha⁻¹ alone. Therefore, The improved soil chemical properties, pod yield, and nitrogen use efficiency through combined use of biochar and N fertilizer suggests the importance of integrated use of biochar with N fertilizer to ensure that green bean crops are adequately supplied with N for NUE and total pod yield in tropical acid soils for sustainable green bean production in the long term.

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