

## Nitrogen Use Efficiency of Paddy Husk Biochar-Based Organic Fertilizers Applied to Capsicum Plants Grown in an Entisol

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Use efficiency of N fertilizers (NUE) in vegetable cultivation is very low. Effectiveness of organic fertilizers made using rice husk biochar to increase the NUE was evaluated. Fish tonic and cattle slurry were impregnated into rice husk biochar separately and pelletized together with K-Humate to produce two N enriched organic fertilizers (BOF<sub>FT</sub> and BOF<sub>CS</sub>, respectively). Their effectiveness on improving growth, N uptake and NUE of Capsicum (*Capsicum annum*) grown in an Entisol (Reddish Brown Latosols) were compared against urea only, urea enriched rice husk biochar (SRF<sub>U</sub>) and no N control treatments under greenhouse condition. Rates of N applied to all treatments, except the control treatment, were 106 mg N /kg soil and was based on the recommended level. Total N content of BOF<sub>CS</sub> and BOF<sub>FT</sub> were 1.1% and 2%, respectively while that of SRF<sub>U</sub> were 23%. Application of SRF<sub>U</sub> significantly ( $P<0.05$ ) improved the greenness (2-7%) and the plant growth (60%) when compared with the currently practiced urea only treatment. Application of BOF<sub>FT</sub> significantly ( $P<0.05$ ) improved the greenness and the plant growth when compared with no N control and were not different from those of SRF<sub>U</sub>. Apparent recovery of N and agronomic efficiencies were significantly ( $P<0.05$ ) improved by SRF<sub>U</sub> (73% and 15 kg/kg, respectively) and BOF<sub>FT</sub> (38.8% and 7.8 kg/kg, respectively) when compared with the urea only treatment (35.7% and 6.59 kg/kg, respectively). Organic fertilizer made using cattle slurry (BOF<sub>CS</sub>) did not improve any parameter measured and was comparable to the control treatment. Poor performance of the two novel organic fertilizers when compared to SRF<sub>U</sub> could be due to the very slower release of organic N during the growing period that could not synchronize with the plant demand. However, BOF<sub>FT</sub> has a better potential to be used as an organic N fertilizer than BOF<sub>CS</sub> with further modifications.

**Keywords:** Nitrogen use efficiency, Organic fertilizer, Rice husk biochar, Slow release fertilizer, Urea

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