

**PREPARATION OF BIOCHAR COMPOSITE FOR SLOW RELEASE  
FERTILIZER**



**BY**

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## ABSTRACT

The overuse of nitrogen fertilizers, most frequently urea, has been identified as a major source of radiative nitrogen (Nr), which is responsible for catastrophic environmental effects owing to leaching, volatilization, and N<sub>2</sub>O emission from fertilized croplands. It has long been recognized that biochar may help increase the effectiveness of how well crops utilize nitrogen in improved areas. In this study, granular biochar composites were obtained by blending urea with cassava stem biochar supplemented with the clay mineral bentonite. These biochar composites were first characterized by microscopic analysis with FTIR and SEM, and then tested for N leaching in water in a column experiment and the growth of okra plants in pot culture compared with urea fertilizer. FTIR analysis indicated strong functional groups in the unmodified biochar and chemically modified biochar. Nitrogen release was decreased by 12.6% in urea fertilizer and 9% in the BC-60 biochar composite during a 30-day leaching experiment. According to this, nitrogen was released from the BC-60 composite at a much slower rate when urea fertilizer and biochar composites were compared. In pot culture with okra growing, total plant height was enhanced by 18 cm and root height by 4.5 cm under BC-60 biochar composite compared to UF. Furthermore, compared to urea treatments, BC-60 composite has significantly higher plant parameters. This study suggested that N in the biochar composites was shown slow release in water and okra growth promoting in soil, relative to conventional urea. As a result, biochar made from agricultural waste might be used to mix urea and substitute mineral urea, hence reducing N usage and its effect on global Nr levels.

Key word: Biochar, Urea, Nitrogen, Composite fertilizer

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