

Evaluating the effect of king coconut husk ash, biochar, together with inorganic fertilizer application to improve soil fertility in coconut lands

S.K. Shamila¹, S.S. Udumann², Kowshalya R.¹, Anjana J. Atapattu^{2*}

¹*Department of Biosystems Technology, Uva Wellassa University, Badulla, Sri Lanka*

²*Agronomy Division, Coconut Research Institute, Lunuwila, Sri Lanka*

This research evaluates the combined effects of king coconut husk ash (KCHA), biochar, and fertilizer to enhance soil fertility in coconut lands while substituting Muriate of Potash (MOP). The study followed a randomized complete block design (RCBD) with two blocks with 24 palms. Ash had substantially greater total and available potassium and pH values (16.01%, 2.10%, and 11.31) than biochar, according to the analysis of the two materials. The study tested six treatments on coconut palms by applying king coconut husk ash (A), biochar (B), and inorganic fertilizer (F). Control, F, FA, FB, FAB, and FA^{1/2}B are 6 treatments respectively. Soil samples were taken for four months with one-month intervals after treatment application. The availability of macronutrients (NPK) and Electrical Conductivity (EC) of soil showed significant differences over 16 weeks, with NPK with higher values in treatments involving KCHA application, especially in T3 with Inorganic Fertilizer, 100% Ash, No Biochar, respectively 0.947% and 5.61 ppm and 0.059%. Also, higher values of K were observed in treatments involving KCHA combined with biochar and inorganic fertilizer in T5 (0.077%) and T6 (0.083%). A decreased trend was observed in biochar-applied treatments due to its slow-release behavior. However, no significant effects were observed in soil moisture content, microbial activity, pH and available Calcium and Magnesium. T6, which used half the recommended KCH ash dosage, biochar, and fertilizer, had the greatest positive impact on soil characteristics during the study period. KCHA offers a cost-effective potassium solution for coconut lands, a natural alternative to conventional fertilizers (MOP). However, the study's findings also indicate the potential for longer-term impacts that warrant further investigation.

Keywords: Biochar, Coconut lands, King coconut husk ash, Nutrient availability, Soil fertility

*Corresponding author: aaajatapattu@gmail.com