

## Effect of Cinnamon Wood Biochar Preparation Methods on Nutrient Retention and Release

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In Sri Lanka, farmers use inorganic fertilizer under the conventional farming methods. However, farmers have not been able to obtain the expected yield for a long time due to soil fertility problems associated with nutrient retention and leaching. Cinnamon wood has the potential to produce value added product like biochar. This study monitored the effect of different the cinnamon wood biochar preparation methods, namely, a with methods of cone pit method at 20 min and 45 min, a double barrel method for 1 hour, and a muffle furnace method for 1 hour at 400 °C and 500 °C on nutrient retention and release. Experiment was carried out over 1 month using a nutrient solution (20% Urea ( $\text{CO}(\text{NH}_2)_2$ ), 10% Triple Super Phosphate ( $\text{Ca}(\text{H}_2\text{PO}_4)_2 \cdot \text{H}_2\text{O}$ ), and 10% Muriate of Potash (KCl)) at the rate of 1 L per column at the beginning and at the middle of the experimental period. The column only with the subsoil recorded the highest total Nitrogen (N), Phosphorus (P) and Potassium (K) in the leachate and showed the lowest nutrient retention in the media. The lowest total N, P and K in the leachate and the highest nutrient retention in the media were observed in the treatment that consisted of biochar prepared by the muffle furnace method at 500 °C. This method was found to be the best method to reduce nutrient leaching, while it also had the highest capacity to retain more nutrients. Regarding outcomes relevant to global agriculture, the results show that the cinnamon wood biochar preparation methods can affect nutrient retention and release while opening the possibility of using cinnamon wood biochar as a soil amendment.

**Keywords:** Biochar, Cinnamon wood, Nutrient leaching, Nutrient retention, Soil amendments