

EFFECT OF BUFFERING AND FERTILIZER ENRICHMENT OF COCOPEAT NURSERY MEDIA ON SEEDLING GROWTH OF LETTUCE



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ABSTRACT

The research was undertaken to assess the impact of buffering and fertilizer enrichment on cocopeat-based nursery media concerning the growth performance of lettuce (*Lactuca sativa*) seedlings. Cocopeat serves as a sustainable substitute for peat. However, it necessitates buffering and nutrient enrichment to enhance its chemical and physical characteristics for seedling cultivation. The experiment was executed using a Completely Randomized Design (CRD) featuring six treatments that integrated various levels of buffering and fertilizer enrichment. Growth metrics such as germination percentage, leaf count, root length, plant fresh weight, and plant dry weight were evaluated to determine the effectiveness of the treatments.

The findings indicated that buffering and fertilizer enrichment significantly affected the growth of lettuce seedlings ($p < 0.05$). Among the treatments, T6 (control – commercial rooting plugs) exhibited the highest fresh weight (5.92 ± 0.58 g) and root length (7.53 ± 0.76 cm), suggesting improved vegetative growth under nutrient-rich and high electrical conductivity conditions. Conversely, the maximum dry weight (0.92 ± 0.17 g per five plants) was recorded in T3, which was supplemented with 1.5 g/L concentration of 20:20:20 fertilizer, indicating superior dry matter accumulation and nutrient assimilation efficiency. The least growth performance was noted in T5 (unbuffered, unfertilized media), underscoring the necessity of nutrient supplementation and pH stabilization in cocopeat based systems.

These results affirm that the integration of buffering and appropriately balanced fertilizer enrichment significantly enhance seedling vigor, nutrient uptake, and biomass production in lettuce. Consequently, well-enriched and buffered cocopeat media can act as a cost effective and sustainable alternative to commercial nursery substrates, improving the quality and uniformity of lettuce seedlings for hydroponic and greenhouse cultivation.

Keywords: Buffering, Cocopeat, Dry weight, Fertilizer enrichment, Growth performance, Lettuce seedlings, Nursery media.

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