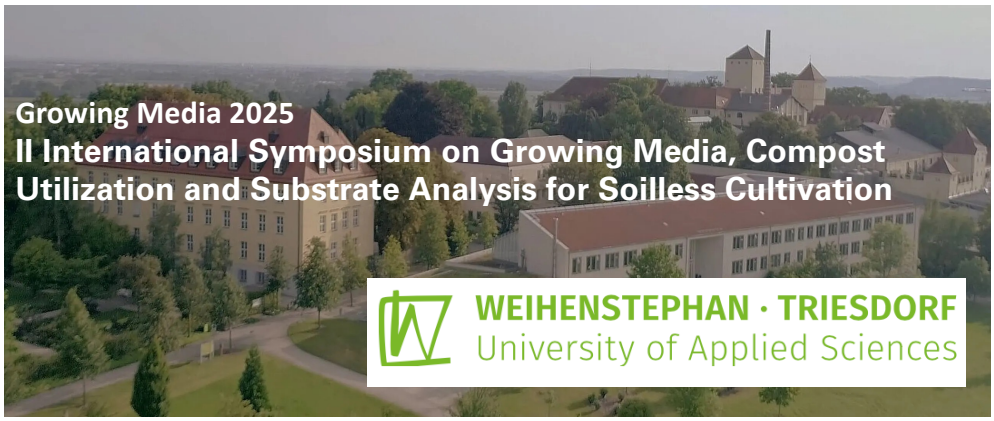

P2/I-8 - Effects of adding walnut shell to coir-based substrates on yield and quality of lettuce

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Abstract

This study aimed to evaluate the effect of using walnut shell in coir-based substrates on lettuce yield and quality. To achieve this, an experiment was conducted with five treatments: coir as the control (C) and four coir-based mixes. Three of these mixes included walnut shells at different ratios (1:1, 1:0.5, and 1:0.25 v/v), and one mix included walnut shells and biochar (10:1.5:1 v/v). The walnut shell, triturated into particles ranging from 0.35 to 3.5 mm, had a pH of 4.5, an electrical conductivity of 1.4 dS/m, and a bulk density of 0.45 g/cm³. Lettuce seedlings were transplanted into Styrofoam planting boxes filled with the substrate and irrigated daily by drip with a complete nutrient solution. The yield (fresh yield) (7.1 kg/m²) in the coir-based mix with walnut shell and biochar was not significantly different from that obtained with coir alone. Mixes with different ratios of walnut shell led to a decrease in fresh yield, probably due to an increased volume of water-drained water. Despite this, shoot dry weight was only lower in plants grown in the 1:1 mix. Walnut shell in coir-based mixes substantially reduced shoot nitrate accumulation, decreasing nitrate levels from 4000 mg NO_3^-/kg fresh weight in coir to below 2000 mg NO_3^-/kg fresh weight. Shoot total phenols and ascorbate levels were not affected by walnut shell inclusion in mixes. Combining walnut shells with biochar in a coir-based substrate can improve lettuce quality without affecting yield. When using walnut shell only with coir, the lower ratio of walnut shell should be applied, and the irrigation scheduling must be optimized for the coir-walnut shell mix.