COMPARATIVE EFFICACY OF MAGNETIZED WATER ON THE AGRONOMIC AND YIELD PERFORMANCES OF BELL PEPPER (*Capsicum annuum*) AND LETTUCE (*Lactuca sativa*) IN URBAN FARMING SYSTEMS

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Urban agriculture has become increasingly important for enhancing food security and sustainable crop production under conditions of rapid urbanization and limited agricultural land availability. This study evaluated the effects of magnetized water on the vegetative growth performance of bell pepper (*Capsicum annuum* L.) and lettuce (*Lactuca sativa*) under different urban farming systems, including soil/coir dust media and hydroponic cultivation. Three sub-experiments were conducted to assess the influence of magnetized water on plant height, leaf production, branching, root length, fresh weight, and total leaf area using linear mixed model analysis. In soil-grown bell pepper plants, magnetized water significantly enhanced plant height ($p = 0.0067$) and primary branch development ($p = 0.0004$), with significant Treatment × Week interactions indicating that treatment effects became more pronounced during later growth stages. However, leaf number and secondary branching were primarily influenced by plant maturity (week) rather than treatment. In hydroponically grown bell pepper seedlings, plant height increased significantly over time, and significant interaction effects observed during weeks 6 and 7 ($p < 0.001$) demonstrated enhanced vegetative growth under magnetized water treatment. Root length also showed positive growth trends, although treatment effects were only marginally significant. Leaf production and branching in hydroponic bell pepper were mainly influenced by growth duration (week). Among all experiments, hydroponically grown lettuce exhibited the strongest response to magnetized water. Significant treatment effects were observed for plant height, fresh weight, root length, and total leaf area ($p < 0.05$), indicating improved biomass accumulation, root development, and leaf expansion. Overall, the findings suggest that magnetized water positively influences vegetative growth and biomass production, particularly in hydroponic lettuce and soil-grown bell pepper systems, highlighting its potential as a sustainable and low-cost technology for urban agriculture and controlled environment farming.

Keywords: controlled environment farming, hydroponics, irrigation efficiency, sustainable agriculture urban cultivation, water treatment