




Article

Effects of oxygen-enriched nutrient solution on greenhouse cucumber and pepper production

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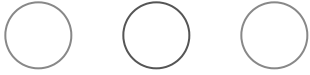


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Abstract

A series of experiments were conducted with greenhouse cucumber and pepper plants to determine the effects of oxygen enrichment of the irrigation water on yield and fruit shelf-life. The experiments were carried out in soilless culture in research greenhouses. Depending on the experiment, treatments included sub-ambient (2 mg L⁻¹), ambient (5–6 mg L⁻¹), medium (16 mg L⁻¹) and high (30–40 mg L⁻¹) levels of oxygen in the supply tank. Cucumber plants were grown in yellow cedar sawdust and pepper plants in either sawdust or perlite. Oxygen enrichment resulted in a promotion of cucumber yield in only one experiment; in two other experiments, none of the oxygen treatments, including those at sub-ambient levels, had an effect. There were no effects of oxygen enrichment on pepper yield. However, in both cucumber and pepper, fruit shelf-life was extended in oxygen-enriched treatments. In terms of system efficacy, oxygen levels in the irrigation water were measured at the dripper and found to decrease by 20–67% of initial values compared to the supply tank values, depending on the initial oxygen concentration and on the experiment. Oxygen concentrations decreased even further to virtually ambient levels when measured in the drain water or in the substrate reservoir. Cucumber plant growth was promoted under conditions which facilitated consistently high oxygen in the root zone, achieved through heavy irrigation (1 min in two) with oxygen-enriched nutrient solution of plants grown in saturated



are infrequent. However, fruit shelf-life may be improved.

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