



Effects of nutrient solution concentration on plant growth and phytochemical accumulation in substrate-grown spinach

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Abstract:

The effect of the electrical conductivity of a complete nutrient solution and of the spinach cultivar (*Spinacia oleracea* L. 'Regia' and 'Manatee') on the growth, nitrates, total phenols compounds, riboflavin, ascorbic acid, and photosynthetic pigments contents, antioxidant power (FRAP, DPPH) and ascorbate peroxidase activity was evaluated. Soil-blocked spinach seedlings (five seedlings per block) were transplanted (on 25 January 2018) at 18 days after emergence to Styrofoam planting boxes (100 cm long × 25 cm wide × 10cm high) filled with 14 L of substrate. Each planting box was irrigated daily by drip and fertilized with nutrient solution. The nutrient solution adopted had two concentrations of nutrients, corresponding to an EC of 1.2 ± 0.2 and 1.7 ± 0.2 dS m⁻¹. Fresh yield was not to be found affected by the EC of the nutrient solution or by the cultivar. Shoot biomass percentage and leaf-blade NO₃ increased as the EC of the nutrient solution increased. Leaf-blade riboflavin was found to be affected by the interaction between EC and cultivar, reaching the highest value in 'Regia' (565.06 µg 100 g⁻¹ fresh weight) while EC 1.2 dS m⁻¹. Nutrient solution EC was not found to have an influence on the content of total phenols compounds, ascorbic acid, chlorophyll a and b, carotenoids and ascorbate peroxidase. The cultivar was found to have an influence on nitrates and photosynthetic pigments content and ascorbate peroxidase activity.

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