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## Potassium and calcium enrichment alleviate salinity-induced stress in hydroponically grown endives

N.G. Tzortzakis

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Citation: Tzortzakis N.G. (2010): Potassium and calcium enrichment alleviate salinity-induced stress in hydroponically grown endives. Hort. Sci. (Prague), 37: 155-162.

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Salinity either of soil or of irrigation water causes disturbance in plant growth and nutrient balance and reduces crop yields. The effects of NaCl salinity and/or calcium or potassium level on the plant growth and severity of gray mold (*Botrytis cinerea* [De Bary] Whetzel) were investigated in endive (*Cichorium endivia* L., cv. Green Curled) grown with the nutrient film technique under greenhouse conditions during early spring. Plants were supplied with nutrient solutions containing 40 mmol/l of sodium chloride (NaCl) and/or 10 mmol/l potassium sulphate ( $K_2SO_4$ ). Additionally, plants treated with foliar spray of 15 mmol/l calcium nitrate [ $(CaNO_3)_2$ ] or distilled water. Salinity or K- and Ca-enrichment mainly affected the upper part of endive plants and reduced leaf area. However, when salinity combined with either K- or Ca-enrichment, the negative impact of salinity on plant growth was reversed. Salinized and/or K- and Ca-enriched, plants did not differ in plant biomass, leaf/root ratio, leaf fresh weight, leaf number, and root length. Salinity did not have any impacts on photosynthetic rate, stomatal conductance, and intercellular  $CO_2$  concentration. Indeed, photosynthetic rate and stomatal conductance increased with Ca foliar application and decreased with K while the opposite effects were observed for the intercellular  $CO_2$  concentration. Total nutrient uptake was reduced 2-fold in salt-treated plants compared to controls. No symptoms of tip-burn or blackheart were recorded throughout the experimental study. Endive grown in the nutrient film technique had tolerance to NaCl salinity, and this method could be used to exploit saline water in soilless culture. These findings also suggest that a proper management of the salt concentration of the nutrient solution plus external elemental enrichment may provide an efficient tool to improve the quality of leafy vegetables with little effect on yield.

**Keywords:**

calcium foliar spray; *Cichorium endivia*; growth; nutrient film technique; potassium; salinity; soilless culture

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