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Effects of day length on mineral concentration, chlorophyll content and yield of kale microgreens

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Proper selection of environmental conditions such as light quality, intensity and day length is necessary for efficiently producing high quality nutritional food in indoor farms. Different day lengths impact plant growth and development. In addition, light management is an important economical factor affecting the final cost of the produce. In this experiment, hydroponically-grown kale (*Brassica oleracea* L. var. *acephala*) microgreens were studied under different day length regimens of 12 (moderate), 14 (long) and 18 (extremely long) hours, simulated by light emitting diodes (LEDs) in an environmentally controlled growth room. Mineral composition, canopy cover, SPAD chlorophyll meter readings (SCMR) and yield of microgreens were measured and plants were monitored using infrared thermal and visible imagery techniques during the growth period. Results showed that, while daylength differences did not influence significant differences in yield and canopy cover, microgreens grown under long light regimen accumulated significantly higher concentrations of manganese (Mn), iron (Fe) and calcium (Ca) (0.59, 0.89 and 66.4 mg per 100 g fresh weight (FW) respectively) compared to moderate day length (0.45, 0.78 and 57.9 mg/100 g FW respectively). Extremely long light regimen also resulted in higher Mn, Fe and Ca (0.59, 0.89 and 66.4 mg/100 g FW respectively) but these were not significantly high enough to justify the additional energy costs. Similarly, the leaves showed significantly higher SCMR values in long (54.3) and extremely long (60) than the moderate (46) day length treatments. No statistically significant differences in SCMR, mineral content, canopy cover and yield were observed among microgreens grown in 14 and 18 hours light conditions. These results suggest that a 14 hours of day length regimen is optimal for improving the nutritional quality of kale microgreens without additional micronutrient fertilization.

Biography

Mahya Tavan pursued her BSc (Hons) in Horticultural Sciences at the University of Tehran, Iran. She has started her research on nutritional quality of microgreens and soilless systems in 2017. Her main area of research interests is evaluation of the effects of environmental factors on quality of leafy vegetables by implementing non-destructive methods.

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