

Light Source Effects on Hydroponically Grown Miniature ‘Little Gem’ Lettuce[©]

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There is growing concern about food safety, environmental impact, and efficient energy usage in agricultural production systems. Producing lettuce under artificial lighting can be a solution addressing these concerns. Light-emitting diodes (LEDs) offer the advantage of a narrow light spectrum, low power consumption, and little heat production. Light emitting plasma offer high light intensity, sun-like full spectrum, and long life. The objective of this study was to determine the effects of different light sources on the growth of miniature ‘Little Gem’ romaine lettuce in a non-circulating hydroponic system. Lettuce seedlings were started in Oasis[®] cubes that were transferred to net pots and put in 1.9-L containers containing a hydroponic nutrient solution. The solution was Hydro-Gardens’ Hobby Formula 10-8-22 hydroponic fertilizer with added magnesium sulfate (9.8% Mg). The lettuce was grown in a lab under different light treatments: red plus blue plus white LEDs, light emitting plasma (LEP), and high-output T-5 fluorescent lights. The light level was $253.7 \mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$ with an air temperature of 20.9°C . At the end of the study, the fluorescent lights resulted in significantly greater plant height than the LED and LEP treatments. There was no significant difference in plant height between the LED and LEP treatments. Percent partitioning of dry weight to roots was greater with the LEP treatment than the fluorescent lights treatment. There was no significant difference in percent partitioning of dry weight to roots between the LEP and the LED treatments and between the LED and the fluorescent lights treatments. There were no significant differences in shoot dry weight, root dry weight, total dry weight, and percent partitioning or dry weight to shoots among the treatments. In conclusion, LEDs and LEP may provide alternative lighting sources for miniature lettuce.

