



Joshua Craver, Joshua Gerovac, Jennifer Boldt, Dean Kopsell, and Roberto Lopez\*

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\*Michigan State University; E-mail: [rglopez@msu.edu](mailto:rglopez@msu.edu)

Microgreens are seedlings of vegetables and herbs that are marketed and consumed at a very young stage. They are utilized as garnish, or to enhance the flavor, color, and texture of various foods. Their high market value and relatively short production time of one to two weeks make them an ideal crop to grow in vertical indoor farms and containers. Their wholesale price can range from \$30 to \$50 per pound depending on the market. Species from the *Brassica* genus are often grown as microgreens due to the ease of germination, short production time, and wide offering of intense flavors and colors.

One common form of producing microgreens involves the use of inexpensive hydroponic systems including soilless media, fiber pads or capillary mats placed in troughs or trays. Within indoor farms, light-emitting diode (LED) fixtures are used to provide sole-source lighting. However, little research based information is available on the ideal light intensity and quality for producing colorful, nutrient and health-promoting microgreens indoors.

Purple kohlrabi (*Brassica oleracea*), mustard (*B. juncea*) 'Garnet Giant' and mizuna (*B. rapa*) were sown in trays containing polyethylene terephthalate fiber pads. Trays were placed in a walk-in growth chamber at a constant 70 °F (21 °C), relative humidity of 80% and CO<sub>2</sub> concentration of 500 ppm. LED fixtures provided light ratios (%) of 8:18:74 blue:green:red, 13:87 blue:red, or 9:84:7 blue:red:far-red and light intensities of 105, 210, or 315  $\mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$  for 16 hours to achieve daily light integrals of 6, 12, and 18  $\text{mol}\cdot\text{m}^{-2}\cdot\text{d}^{-1}$ , respectively. Three days after germination, the temperature was changed to 70/63 °F (21/17 °C) day/night [D/N (16 h/8 h)].

Microgreens were harvested and fresh weight, hypocotyl length, leaf area, total phenolic, carotenoid, chlorophyll, and anthocyanin (color) concentration, and nutrient content were assessed.

## Summary of Findings

### As DLI increased:

- Hypocotyl length and leaf area of microgreens decreased
- Harvestable yield did not appreciably increase
- Carotenoids, macronutrients and micronutrients levels decreased
- Total anthocyanins increased

### Under a light ratio of 13:87 blue:red light

- Kohlrabi and mustard microgreens produced the highest total chlorophyll concentration

### Under a light ratio of 8:18:74 blue:green:red

- hypocotyl length was greatest

### Under a light ratio of 9:84:7 blue:red and far-red

- Fresh weight of was kohlrabi and mizuna was greatest

## Take-Home Message

- Generally, high-quality, nutrient, phenolic, and carotenoid dense brassica microgreens can be harvested under DLIs between 6 to 10  $\text{mol}\cdot\text{m}^{-2}\cdot\text{d}^{-1}$ . Higher DLIs and blue light increase anthocyanins and chlorophylls.

