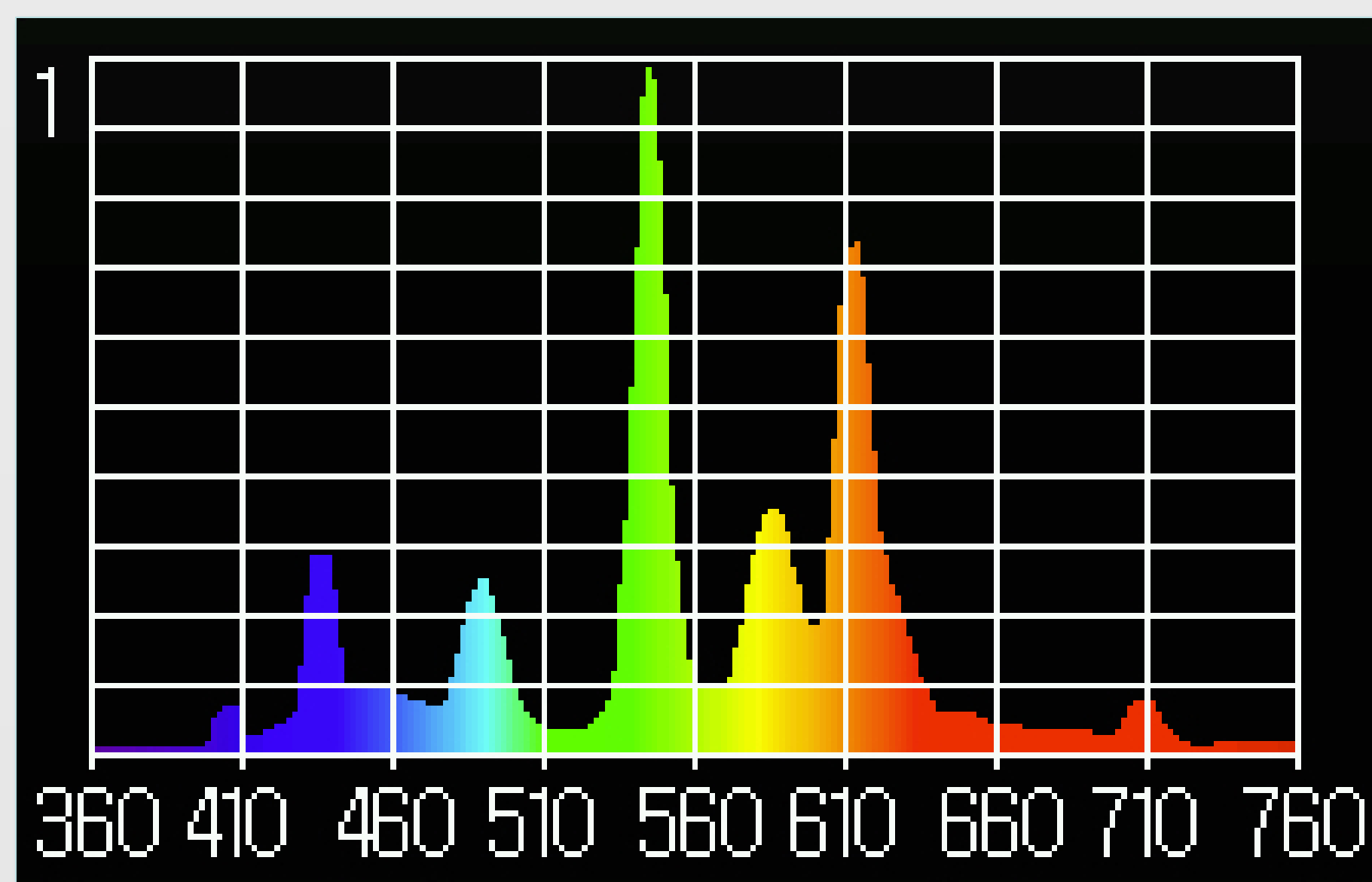


# Light Source Effects on Hydroponically Grown Compact 'Winter Density' Bibb Lettuce

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## Introduction



There is growing concern about food safety, environmental impact, and efficient energy usage in horticultural production systems. Producing lettuce under artificial lighting could be a solution addressing these concerns.

**Objective:** Determine the effects of different light sources on the growth of compact 'Winter Density' Bibb lettuce in a noncirculating hydroponic system.

## Methods

- Lettuce seeds were started in Oasis cubes. Seedlings were transferred to 5.1-cm net pots in 1.9-L containers containing a hydroponic nutrient solution.
- Solution was Hydro-Gardens' Chem-Gro Hobby Formula 10-8-22 hydroponic fertilizer and magnesium sulfate (9.8% Mg).
- Plants were grown under high output (HO) T-5 fluorescent lights. Light level was 118  $\mu\text{mol}/\text{m}^2/\text{s}$ , photoperiod 16 h.
- After 10 days, half of the plants were moved under red+blue+white light-emitting diode lights (LEDs) for 10 more days. Light level was 121  $\mu\text{mol}/\text{m}^2/\text{s}$ , photoperiod 16 h.

## Methods



High output fluorescent lighting setup

## Results

Table 1. Lettuce height and dry weight (DW).

Treatment	Plant height (cm)	Shoot dry weight (DW) (g)	Root DW (g)	Total plant DW (g)
Fluorescent then red+blue+white LEDs	8.5 b	1.52	0.29 a	1.81
Fluorescent	12.1 a	1.28	0.15 b	1.43

Table 2. Lettuce DW partitioning and SPAD reading.

Treatment	Shoot DW partitioning (%)	Root DW partitioning (%)	Shoot-root ratio	SPAD reading
Fluorescent then red+blue+white LEDs	84.1 b	15.9 a	5.3 b	39.9
Fluorescent	89.9 a	10.1 b	9.3 a	38.3

## Results

Table 3. Lettuce hydroponic nutrient solution.

Treatment	Shoot DW /nutrient solution used (mg/ml)	Nutrient solution used (ml)	EC (mS/cm)	pH
Fluorescent then red+blue+white LEDs	5.5 a	284 b	2.1 b	7.1
Fluorescent	2.9 b	442 a	2.8 a	7.1



Light-emitting diode lighting setup

## Conclusion

Moving lettuce plants from initial fluorescent lighting to later LED lighting may enhance certain attributes of hydroponically grown compact lettuce.

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