

Effects of spectral quality, intensity of LEDs

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In horticultural operations, light-emitting diode (LED) lamps are becoming recognized as an important advance in artificial lighting. Among other benefits, LED lighting systems can offer durability, long operating lifetimes, and high energy efficiency. Researchers published a study in the March 2016 issue of *HortScience* that shows that continuous spectrum LEDs made specifically for horticultural can be superior to conventional white LEDs in terms of plant response and energy efficiency.

Experiments were performed on two types of young lettuce, tomato, and bell pepper plants grown in a controlled environment chamber and subjected to treatments using a conventional white LED tube [light](#) or an LED light with a good spectral fit to the maximum photosynthetic response at two intensities. Either four or six lamps/square meter were used to achieve high and low intensities. The researchers measured the lighting parameters illuminance (lux) and photosynthetic photon flux intensity of each treatment. All plants were evaluated for their dry and fresh weight, leaf area, and growth, and photosynthetic activity and [energy efficiency](#) were recorded for each species over the 60 days of cultivation.

According to principal investigator Dr. Miquel Urrestarazu, the results clearly demonstrated that, compared with other conventional LED lamps, the LED lamps specifically designed for horticultural use were more beneficial to the evaluated vegetables and had 26% higher energy efficiency.

In all cases (with the exception of the roots of the lettuce cultivars) analyses revealed significant or highly significant increases in vegetative growth when light intensity was increased. "The spectrum of the LED lamps caused an important and significant effect on the majority of the growth parameters of the four species: the light treatment with a closer spectral fit to the highest photosynthetic response was more conducive to growth," the researchers stated.

The authors recommended that a specific, detailed spectral distribution study be conducted to predict the effect of the specific quantity and quality of light used in the study on a single parameter of plant growth.

More information: *HortScience*, hortsci.ashspublications.org/content/51/3/268.abstract

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