

Workshop Title:

LED lights and Bio-Stimulants

Speakers:

Dorais, Martine, Ph.D. - Research Scientist

Executive Summary:

Martine Dorais presented on research that has been done over the past 5 years on the use of LED lighting and bio-stimulants in greenhouse production. LED's have shown yield increases in certain crops, though the presenter's opinion is that they are still too expensive to be cost effective. The uses of bio stimulants have shown increases in microbial life, plant health and vigour.

Main Notes:

LED Lights

Few producers who use LEDs right now, they are a recent technology. Cost for lights is 2.5 times traditional lighting but the cost is dropping.

Run on wavelengths of 400 to 700 nm

DLI: Daylight light interval.

Light requirements depends on the specific crops

Natural lighting is limited throughout the year.

Lighting advantages: year round products

Tomatoes, Cucumbers, sweet peppers: recommendations of lighting and the increased yield as a result. Not much increase for peppers

Higher increases in yields for organic vs. conventional

Influence of light intensity. Increase in light intensity increases compounds and flavours in fruits.

Quality of light. Different wavelengths lead to increased compounds in plants and fruits.

Intracanopy supplemental lighting - lights under the canopy to increase light for all the leaves.

HPS lamps give off heat and can damage leaves; they are not suitable for intracanopy use.

LED does not give off much light and doesn't have this problem.

24% increase in yields through doing this.

Presenter has done experiments with LED vertically beside plant. Different wavelengths of light.

LED gives off very specific wavelengths of light.

UV wavelengths decreased yields.

Decrease the DTM for fruits

UV has positive effects on the amount of flavour compounds even though yields are hurt

Increase in vitamin c

No magic bullet that increases all beneficial compounds in fruits.

Experiments in ripening of green tomatoes under different light spectrums.

Different results with different varieties.

Maturing on plant is always best for flavour.

Cucumbers

Experiments in different heights and light sources

Results: see slides

Skin firmness. Color

Vitamins: increases in vitamin C.

Intracanalopy lighting: more yields and better color.

Sweet pepper.

Increase in yields, plant growth, etc. * see slides

[Bio stimulants]

Bio stimulants are substances added to increase plant efficiency etc., see slides

They are not nutrients, pesticides or soil improvers.

Promotes growth and soil health

Humic substances.

Seaweed extracts.

Chitin & chitosan

Inorganic compounds

Cucumber trail with different bio stimulants to get real world results.

Soil application and foliar applications.

Growth of plants

Microbial activity. Increases in fungal count when use of bio stimulants.

Few increases in yields through experiments. Still early in process.

Phytonutrients

[Conclusion]

LED is a powerful tool. For various goals.

Species and cultivar dependant.

Higher price is the limiting factor at this time.

Bio stimulants

Increase plant resilience, growth and quality.

Working in organic systems which are already high in this, not sure if it has an effect significant.

[Questions and Answers]

Cucumbers (benefits from up to 20 hours) can absorb surplus lighting time. Tomatoes cannot and need a dark period.

Artificial lighting is useful for researchers, might not be as applicable to commercial production yet. Not fully developed yet.

LED allows to give intrac canopy lighting. New tool, which has arisen with LEDs.

Still need HPS light overhead. LED cannot replace at this point. More useful for intrac canopy lighting.

Lettuce could be feasible with only LED. Because they can function with less lighting.

LED can make shadows and you would need many fixtures to cover all plant needs.

HPS technology has gotten very efficient in regards to electricity to lumens.

Specific pests or disease based on light used.

Can have beneficial as well as detrimental effects.

There is a definite effect. Integration.

Has been show to reduce fungal diseases.

UVA and UVB has been show to control pests in come cases. To stop sporulation of fungal diseases.