

2014C021D - LED Lettuce Pilot Project



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Background: Growing food year round in Alberta is very challenging. Outdoor crops are limited to only a few months of the year. Indoor greenhouse crops can extend the growing season a few months longer. To produce food in the middle of the darkest, coldest days of an Alberta winter is a challenge to grow good quality lettuce week after week.

The climate that was created when using High Pressure Sodium (HPS) lighting is problematic. The heat coming of the HPS lights is beneficial to some crops (tomatoes, cucumbers), but it is not a good fit for the lettuce. The lights give off such a huge amount of heat that the growing area gets too warm too quickly. It causes the plants to activate too quickly, which causes tip burning on the outer edge of new leaves. The heat from the bulbs stops as soon as the lights are turned off. These swings in temperature are very hard to control.

Objective: The goal was to have the best quality of lettuce all year long. We knew that LED's use less energy but would it grow healthy lettuce plants?

What we did: Switched lights from HPS to LED to test difference on lettuce growth.

Key results: The installation of 64 LED light fixtures in one greenhouse resulted in

- Temperature control is easily managed
- Consistent production from week to week (speed on the growth was very predictable)
- Deeper colour green on the butter leaf lettuce (variety: Alexandria)
- Brighter red on the red oak variety lettuce (varieties: Livorno, Amandine, and Versailles)
- Less tip burning on the romaine (varieties: Counter)
- In this test the LED used 26% less electricity than the 1000w HPS lights in one year

Take home message for the industry: The reduced energy costs coupled with the improved lighting and plant productivity are a viable economic alternative to the traditional sodium lights for those crops that require cooler temperatures. There may well be application of LED to major vegetable crops like tomatoes, cucumbers, peppers in southern Alberta greenhouses where summer temperatures get too high with the use of sodium lighting.