



Plants, Light, and LEDs: Putting It All Together

Part 1 - Introduction



Topics

- Overview
- Concepts Covered

Overview

Plants are truly remarkable creatures. Like Rumpelstiltskin using his spinning wheel to turn straw into gold, plants harness the power of the sun to transform water, soil and air into the building blocks of life. Over thousands of years we have learned to use plants for our own purposes, growing them in specialized environments built just for them. We've even gone so far as to create our own light generators, such as metal halide lamps and fluorescent tubes, to free our plant growing efforts from the need for sunlight.

Does that mean we now have perfect plant growing environments? Unfortunately, the answer is no.

No matter how advanced our plant growing technology becomes, from soilless growing systems to greenhouses and automated plant tending, there are always issues whenever we try to replace sunlight with light

generated by man-made lamps. Lamps are expensive to operate and waste a lot of energy as heat. Lamps don't create all of the colors of light in sunlight, so which colors do plants use most, and can we leave out the others? How much light do plants really need for growing? How can we measure the amount of light to find out if we have enough? Can't I tell by just looking at a lamp whether it's bright enough to grow plants? If we use lamps instead of sunlight, and don't change anything else, will our plants grow the same?

Some of these questions may seem to have obvious answers, and others might be things you haven't really thought about. But in fact the answers to these types of questions are not obvious and in some cases science has yet to completely solve the riddle. In this paper we will try to provide the best available answers in a straightforward manner.

Concepts Covered

Part 2 – Plants and Light

- How do plants catch light, and what do they do with it?
- Why do some colors of light work better than others for growing plants?
- How many different colors of light do plants need?
- How bright does a light need to be to make plants grow?

Part 3 – Sunlight and Lamp Light: What's the difference?

- How do sunlight and lamp light differ?
- Are all lamps the same?
- What is "white light"?

Part 4 – Measuring Light

- When we measure light, what exactly are we measuring?
- What instruments are used to measure light?
- Why aren't all light measuring tools the same?
- Can we compare measurements of sunlight to those of lamp light?
- What you see may not be what you get.

Part 5 – Do Growing Systems Matter?

- What is a "growing system"?
- What kinds of growing systems are available?
- Aren't all growing systems different forms of the same thing?
- Does it matter which growing system I use?

Part 6 – Putting It All Together

- What does SOLAROASIS grow lighting offer?
- These lamps don't look bright enough.
- Comparing LED grow lamps to conventional lamps.
- Growing systems that work.

Each part has references to scholarly material which explains the topics in greater detail. We encourage you to read more about these and other issues related to using supplemental lighting for growing plants. Increasing your knowledge will lead to more successful results when adding man-made lamps to your growing system.

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