

## COLOR RATIO TECHNOLOGY

### Optimizing Color Ratio Technology

LED Smart Inc., October 2021

A full-spectrum LED grow light is simply a marketing term implying that your grow light resembles sunlight. This marketing term comes from the concept of "full-spectrum light," which in recent years has been used to refer to electromagnetic radiation from the UVA to infrared wavebands.



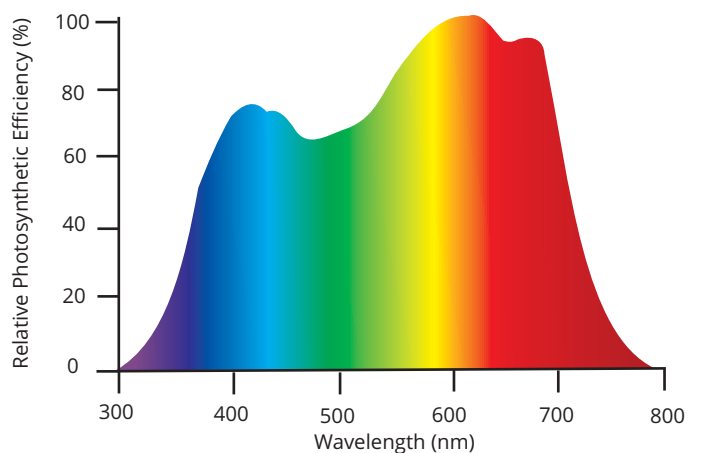
Full spectrum typically refers to the completeness of a light source's spectral energy, particularly when compared to natural light sources such as natural daylight.

A significant problem with many full-spectrum LED grow lights is that they are designed to give the appearance of daylight without being custom-tailored for vigorous plant growth.

Not all wavelengths of light are optimal for photosynthesis. Plants photosynthesize electromagnetic radiation well using light within

the 400 to 700-nanometer range, known as Photosynthetically Active Radiation or PAR. Plants do not care how bright a light appears to our eyes; plants are 'programmed' to discern the quality and quantity of light. As a general rule, plants do best with light of all wavelengths, but they do not need equal amounts of each type of light.

Full-spectrum grow lights try to copy all the colors of the white light spectrum from the sun, which refers to the visible spectrum of light. As a result, different wavelengths of light appear to humans as different colors. The visible spectrum ranges from long wavelengths (reds) to shorter wavelengths (blues).



McCree Curve, Example of full spectrum light

The thinking behind many full-spectrum LED grow lights on the market is that your plants will grow well by creating a spectral distribution like



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sunlight. That is a decent theory, except that full-spectrum grow lights are not like the sun.

Over millions of years of growth and development, the biochemistry in leaves has evolved to use different parts of the color spectrum for various purposes. Therefore, it is not necessary to deconstruct all of the natural sunlight spectra to make plants grow. A cultivator will generate better quality crops with larger yields by matching the color spectrum of a grow lighting system with the specific color ratio needs of the plants. This particular delivery of light is easily achieved with LED technology.

In contrast, the adjustable color ratio technology is designed to improve the lighting characteristics most important for plant growth; this means getting enough PAR light and the right mix of light spectra.



### **Recipes - Customized Light Spectra**

As plants mature and go through their growth cycle from seedling to adult and then flowering and fruiting, they use different color ratios (Recipes), so the ideal LED color ratio is different for each growth stage.



The best color spectrum or recipe also depends on the type of plant you are trying to grow. Designing a color ratio can get very complicated and is essential for commercial growers who want to maximize results. Photomorphogenic responses by plants are co-regulated, which means that certain plant features are controlled with the type of light within one waveband relative to another.

The adjustable color ratio technology allows for precision control of your plants. Adjusting your light color ratios can speed up flowering times, improve your plant's biochemistry, or even customize your plants' structure to root better,

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produce longer or shorter stems, increase flavor, or shorten harvest times.

The color ratio technology helps growers customize wavelengths and colors to provide the exact colors plants need to grow in different stages and leave out the colors they don't.

Choosing the proper color ratios for your plant is essential. Light needs will change for the phase of growth your plants are in; with color ratio technology, you do not need to switch lights or greenhouses as they enter the vegetation stage or flowering stage. A cultivator can adjust your color ratio based on the growth stages with Color Ratio technology.

The modern LED light with color ratio technology offers more than just the standard PAR range. Cultivators can adjust the specific color ratio to use targeted light colors in the

greenhouse, vertical farming, or CEA environments. You also can tailor the spectrum to the plant's growth phase (propagation, vegetative, flowering, or finishing) to manipulate the plant characteristics.

Optimizing the color ratio of light for horticulture plants use different color spectrum components during their growth cycles improves plant health and shelf life after harvest. Thanks to the color ratio technology in GROW3™, cultivators can easily adjust spectrum based on the plants needs through the wireless control system, and the SmarTune™ APP.

To find out how the GROW3™ system can benefit you with more profitable growing, contact our team.



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