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Research

A quick internet search of horticulture lighting will reveal that many companies claim to have the “secret recipe” or perfect LED spectral distribution for explosive growth and increased yields. But it’s hard to tell what is real and what is marketing fluff. What is based on actual science and unbiased research that you can apply to your farm? Is there really a “perfect spectrum?” Are the claimed “impressive results” based on a now fully-optimized growing environment vs. one that was previously out of balance?

The main goal of our research was to uncover what is most important in designing a spectral distribution and fixture performance for healthy plant growth, what is not needed, and then design a light around these learnings.

We wanted to cut through the anecdotal swirl and get to the facts on indoor cannabis growth, so we provided our grow lights to Utah State University, a top academic institution in the field of plant physiology. They used the lights in a study designed to investigate how differences in spectra impacted cannabis growth and yield. We expected that the study would also provide insights into what was more important – fixture efficacy or spectral distribution. Our goal was to learn how to match HPS yields, frequently referred to as the gold standard in cannabis growth and out of reach of LED according to some popular sentiment.

Utah State University conducted three replicate studies in five identical growing chambers. These studies compared a top-selling LED horticulture fixture, 3 of our own designed spectra, and a double-ended HPS fixture. All environmental factors, including photosynthetic photon flux, were kept the same among chambers to isolate the effect of spectra on yield and quality of cannabis.

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Results

The findings from the study[1] suggested that yield didn't respond nearly as much as some would think to differences in the LED spectra, but there was a sweet spot of efficacy, and red and blue photon contribution. When it came to yield, the LED spectra we developed produced **27% more flower per dollar of electricity*** on average than HPS, and slightly higher flower yield per dollar of electricity than the results from a top selling LED fixture.

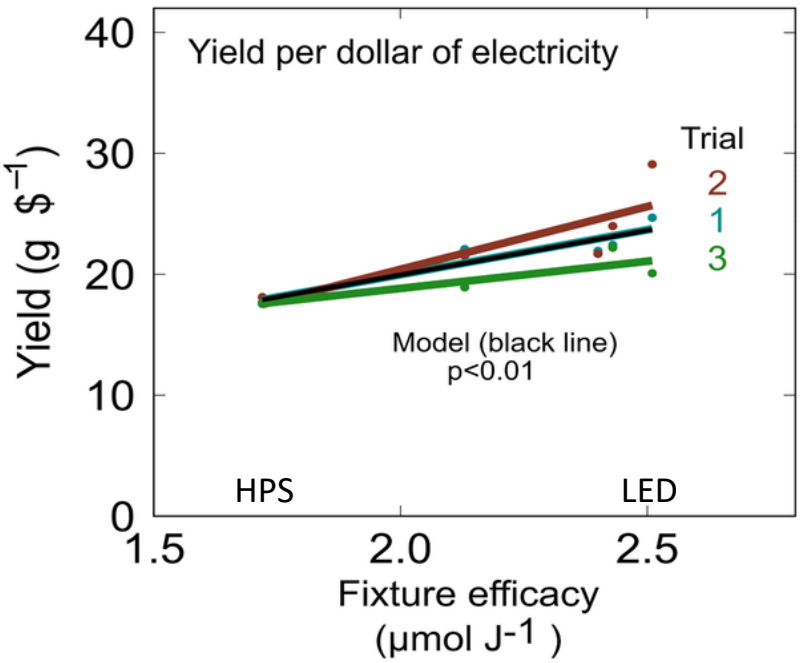
Equally as important, the study also showed that there was no statistical difference in potency and cannabinoid concentration between the different LED spectral distributions and HPS, so product quality was maintained in going to LED from HPS.

We applied these learnings and research in developing the Verjure™ Pro Series LED, so you can grow with confidence.

Key Takeaway 1:

The LED spectrum we developed and tested produced 27% more flower per dollar of electricity* on average than HPS.

*based on .10 kw/h



1 Westmoreland FM, Kusuma P, Bugbee B (2021) Cannabis lighting: Decreasing blue photon fraction increases yield but efficacy is more important for cost effective production of cannabinoids. PLoS ONE 16(3):

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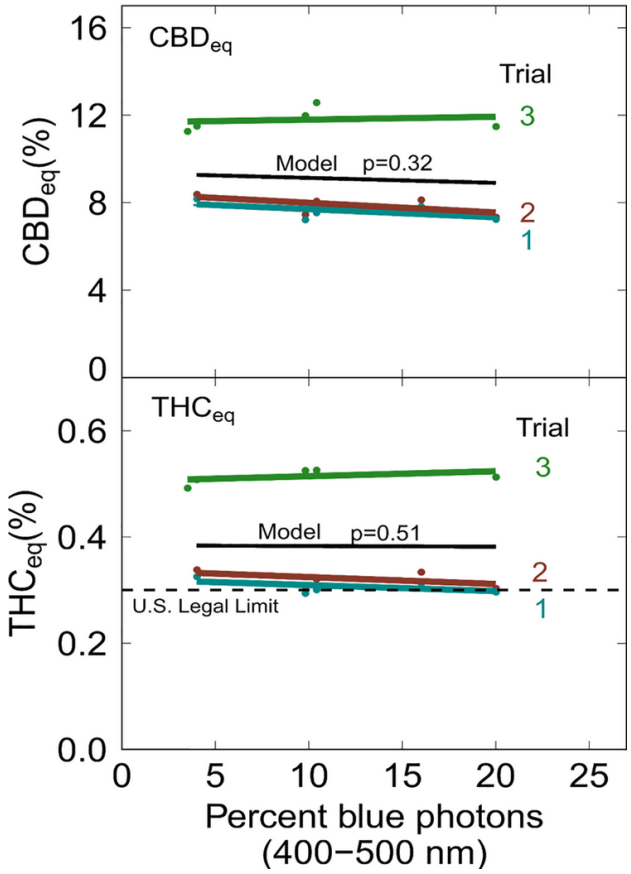
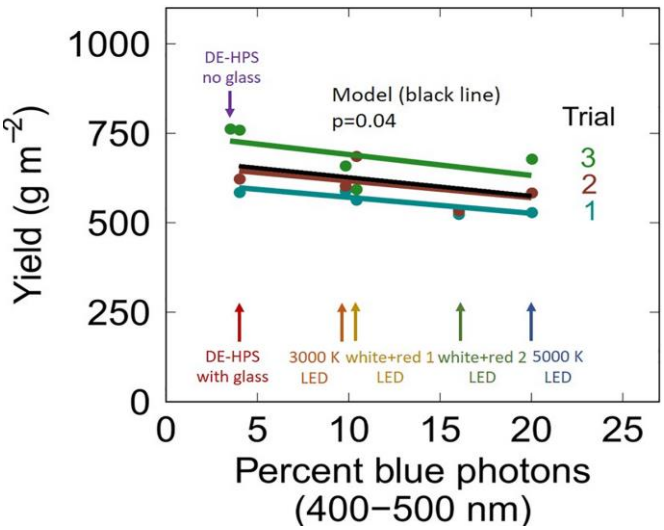
Key Takeaway 2:

The data indicated there was ***No statistical difference*** in potency, quality, or cannabinoid concentration between LED and HPS



Key Takeaway 3:

The data showed a slight linear reduction in raw yield as blue photons increased. That is why we have designed our LED spectrum to have lower blue photon contribution and more red than most of the competition. An interpretation of the data could support increased yields vs other LED fixtures with higher blue content and less red. Also, the fact that LED can be placed closer to the plants than HPS, and thus have corresponding higher light levels may help make up the difference created by blue photon contribution of LED vs HPS.



https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0248988