

# **ADVANCED LIGHTING TECHNOLOGY IN CONTROLLED ENVIRONMENT AGRICULTURE**

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## **Abstract**

Light is a requirement for plant growth and it is an important component in plant growth facilities whether they are used to grow food, medicine, vaccine production or beauty. In addition, the incorporation of plant cultivation into urban areas has increased the interest in the light regulation of plants. Light emitting diodes (LEDs) are quickly replacing traditional light sources in human applications and currently there is both academic and industrial effort being put into tailoring these technology platforms for the plant community. The intrinsic properties of narrow band LEDs such as their ability to be controlled at varying frequencies offers new potential for plant lighting control systems. The merging of electrical and control engineering with plant biology has begun. Plants have evolved under fluctuating, geographically different and sometimes damaging light environments for millions of years and survival has been dependent on their large array of dynamic light sensors and signaling systems. Understanding the spectral regulation of plant growth, development and biochemistry is fundamental for light optimization in controlled environment agriculture. Light capture and the subsequent utilization of light energy by plant systems will be discussed at both cellular and whole plant levels. Examples of the spectral effects on the growth and pigmentation of health promoting leafy greens will be presented. Which plant processes are controlled by light; are they reversible and how are they regulated? The aim of this talk is to demystify the relationship between light and plants.