



CALYX

cultivation technologies

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Calyx Facilities

MANUFACTURING | LED DEVELOPMENT | TESTING LABORATORY

MULTI-TIERED HYDROPONIC GROW ROOM FACILITY

Central facility in Houston | New plant species testing
Spectra research & intensity testing | Variable environment control



HOUSTON

Research & Development
plus
MANUFACTURING



Cleanroom research & development facilities located in Houston, TX
Commercial production of LED boards and fixtures since 2010

All proprietary Calyx chips are proudly manufactured exclusively in Houston, Texas

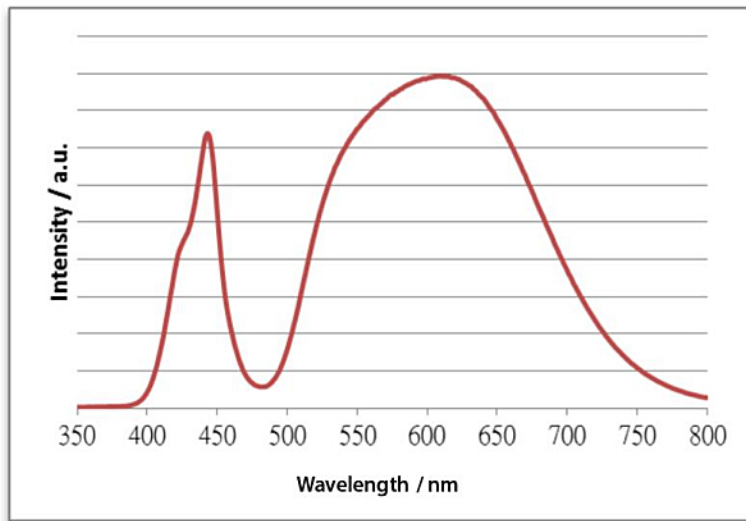


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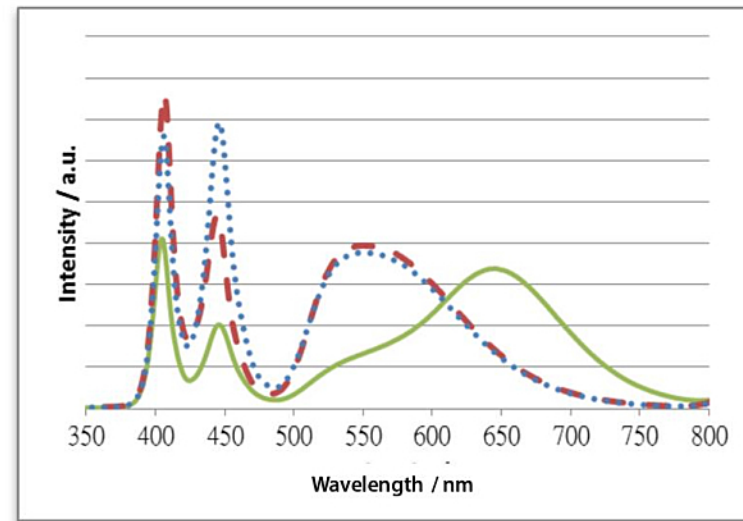
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Beyond Normal Spectra

Calyx Photosynthesis Spectrum



Calyx Germicidal Spectrum

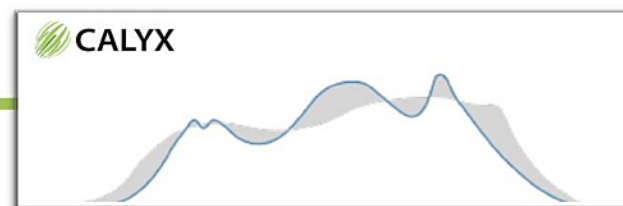
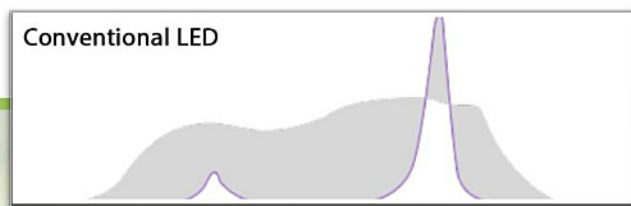
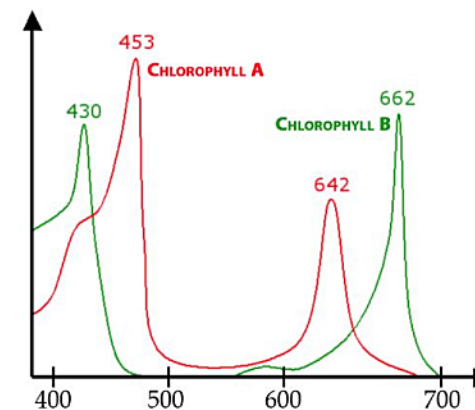


Light Spectra

How do we differentiate from other LEDs?

A plant comprises mainly two photo active components, e.g., Chlorophylls A and B associated to photosynthesis. ***B is only an accessory pigment and acts indirectly in photosynthesis by transferring the light it absorbs to chlorophyll A.*** Both chlorophylls A and B primarily absorb red and blue light, the colors most effective in photosynthesis. ***The ratio of chlorophyll A to chlorophyll B in the chloroplast is 3:1.***

Hence addressing 405-430nm (Chlorophyll A) absorption wavelength is most essential and makes Calyx's photosynthesis stimulation lamp more efficient in comparison to any other existing LED light on the market.



Calyx Product Line

LOW POWER | HIGH POWER | ULTRA-HIGH POWER

7 products currently available; 4 additional products are being finalized.

We achieve contiguous 9 band spectrum and continuous color output with no color mixing or banding.
Calyx technology features a full cycle broad spectrum which is finely tuned for rapid growth and comprehensive plant development.



Product	AGRO 480W	AGRO 240W	AGRO LINEAR	AGRO PAR 38	AGRO PAR 60	AGRO PAR 95	AGRO TUBE
Consumption	480W	240W	215W	20W \pm 10%	60W \pm 10%	90W \pm 10%	32W
Efficacy	1.7	1.7	1.7	1.7	1.7	1.7	1.7
PF	≥ 0.9	≥ 0.9	≥ 0.9	≥ 0.9	≥ 0.9	≥ 0.9	≥ 0.9
Spectrums Available	3F 420	3F 420	3F 420	3F 420	3F 420	3F 420	3F 420
Certifications	UL, CE, IP65, Made in USA	UL, CE, IP65, Made in USA	UL, IP65, Made in USA	UL, RoHS, Made in USA	UL, IP50, Made in USA	UL, IP50, Made in USA	RoHS, ETL, Made in USA
Ideal Applications	Vertical Farming, Indoor Commercial & Residential Growing	Vertical Farming, Indoor Commercial & Residential Growing	Vertical Farming, Indoor Commercial & Residential Growing	Indoor Commercial & Residential Growing	Indoor Commercial & Residential Growing	Indoor Commercial & Residential Growing	Vertical Farming, Indoor Commercial & Residential Growing

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Applications

Calyx Technology is used to create individual light spectra tuned for use with specific crops.

Light spectra have been developed and tested with over 7 years of research and development to suppress and emphasize differentiate areas of light depending on the absorption curves of individual plants, thus effectively coding the light spectrum according to a plants' individual needs.

Initial spectra were developed to:

> > > >

Further research produced light spectra that can alter crop growth characteristics:



Increase
Crop Yields



Reduce
Growth Time



Increasing
Biomass



Plant
Sustainability



Increasing
Pollination Rates



Altering Plant's
Chemical Substance



Promote & Control
of Flowering

LED Spectra for All Plant Types



Lettuce



Leafy Greens



Cucumber / Tomato



Herbs



Flowers



Tree Seedlings



Citrus Fruits



Wheat

End User Applications

THREE PRIMARY USES OF HORTICULTURE LIGHTS



COMMERCIAL GREENHOUSES

- Most common traditional use
- Used in conjunction with natural sunlight to increase intensity or to increase growing hours during winter period



SEEDLING RESEARCH

- Used in research laboratories for plant growth
- Used for seedling incubation in commercial growers

End User Applications

THREE PRIMARY USES OF HORTICULTURE LIGHTS



PLANT FACTORIES

- Emerging Industry
- Enclosed buildings with no natural light
- Suitable for any climate, including urban areas, allowing for production close to market
- Enclosed environment removes need for pesticides and is sealed from external pollution or contaminants
- Hydroponic systems ensure that all water is used or recycled, requiring far less water than conventional farming
- Consistent Yield: 100% controlled and predictable crop yield operating 24/7/365 at a predictable cost regardless of weather
- Independent; Calyx's systems are built and in operation

Pilot Plant Factory Installations

A number of small-scale grow factories have already been installed for Commercial and Research Purposes.

A diverse number of crops are currently grown in these installations, including:



- Butterhead Lettuce (Boston)
- Red Flame Lettuce
- Lolla Rosa Lettuce
- Baby Arugula (Rocket)
- Red Oak Lettuce
- Mizuna (Water Greens)
- Romaine Lettuce
- Perilla (Zisu)
- Strawberries

(Not an exhaustive list)

Market Size and Drivers

*The agritech lighting market will experience a disruption within the next 2-3 years.
Very high growth is expected for coming years.*

DRIVERS

Supply side/technology

Technology disruption based on LEDs
Increased energy efficiency
Technology enabling vertical farming
Yield/productivity improvement

Demand side

Population growth and limited farming area
Climate change forces to efficient use of water resources
Food security
Locally produced food
Vertical farming taking off

OUTCOME

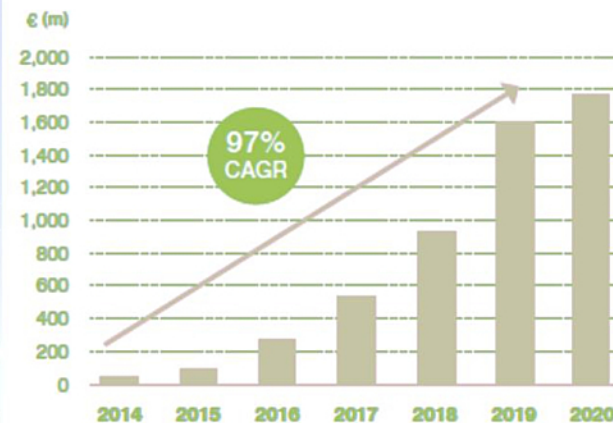
Improved efficiency/lower cost increases addressable market

Old lighting technology is being replaced by LEDs enabling "rewriting the rules" for light for plants

There is a massive need to develop lighting for agricultural needs

OPPORTUNITY

Plant lighting LED equipment market size, 2014-2020



Source: Information compiled from several sources including Eurostat, Statistics Canada, US Dept. of Agriculture, Wageningen University (The Netherlands), University of California and Rabobank