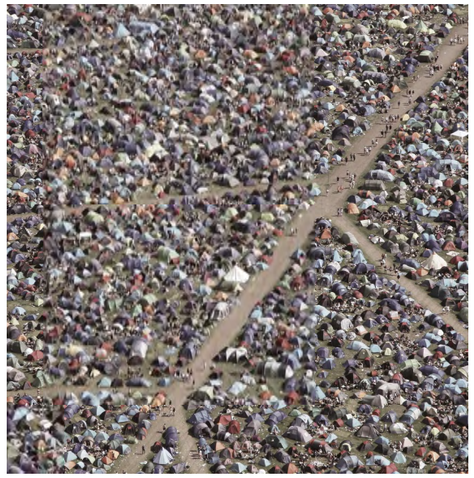
euluce
by lightenjin

lighting
HORTICULTURE



With the demographic growth ever more noticeable in the urban environment, in the near future a decrease in the number of people and vacant lots will occur in rural areas.

The consequence is obvious... It will not be possible to feed all these people and megacities using conventional agriculture!

In order to feed this growing population, we will need to double or even triple, our production output in the coming decades. Is this goal feasible or even reasonable, in our already challenged planet?

With this as the backdrop, there is urgency in increasing significantly our food production, in a sustainable, efficient and profitable way.

MAIN REASONS

World Population increased - over 83 thousand/year | about 10 billion inhabitants in 2050;

Food Production increased - 60-70% more in agricultural production, in particular vegetables and fruit (health awareness);

Business requirements - Increased shelf life | Uniformization of shape and size | Appealing colors;

Pharmaceutical industry - Promotion of artificial cannabis growth for medicinal purposes;

Climate change and natural disasters - Comes in to play the issue of quality and food viability;

Scarce natural resources - 80% of used land | 70% fresh water | +65% lost in evaporation | 30% of fossil fuels used by the food sector;

Transport - Economic impact | Environmental impact;

Incorporation of chemical agents - Transgenics | Fertilizers | Coatings (resins that ensure maturation delay).

It is necessary to find alternatives, and these involve speeding up the growth of food by optimizing its production both quantitatively and qualitatively.

This is where artificial LED lighting comes in, specially designed for horticulture.

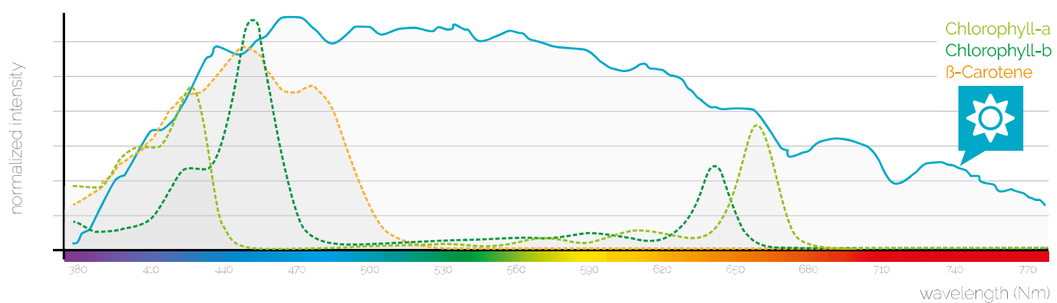
Energy Optimization
Artificial plant growth

Let us look at the main motivations that justify the implementation of lighting systems aimed at different growth needs.

The versatility and the targeted control of the different lighting profiles will allow to effectively ensure the energy needs of the plants, the efficiency of growth of vegetables, the reduction of costs associated with transport, and very importantly, to ensure nutrition regardless of the season, without subjecting ourselves to products that are harmful to human health.

With the optimization of growth conditions, the product can be obtained more quickly without jeopardizing its quality.

While the Sun provides wavelengths ranging from 250 to 2500nm, lighting provides only the lengths that are efficiently absorbed by the plant, in the blue (450nm) and red (660nm) region, as represented by the following spectra.



NEEDS
When to use artificial lighting?

Supplementary Lighting
To complement natural light, thereby increasing the time of exposure to light, thus promoting an increase in energy absorption and consequently an increase in plant growth.

Photoperiodic Lighting
To control the light period, thus controlling the growth cycles and the number of hours of exposure to the light source.

Growth in the absence of natural light
To completely replace daylight with artificial light.

TYPES OF APPLICATION

Which is the most suitable?

Given the diversity of existing vegetables and the required lighting requirements, we can consider different approaches from the point of view of positioning and light direction, in order to optimize its growth. Thus, we can consider three types: Top Lighting, Inter Lighting and Vertical Farming.

With the perfect balance of all variables (which can be determined with a management system), you will be able to have complete vegetative and reproductive control over your plants, that will enable even a production throughout the year.

Top Lighting

Lighting directed from the top in a similar way to natural lighting. Since this lighting solution has a high luminous power, it is suitable for bigger distances between the source of light and the plant.

Taking into account the life stage and needs of the plant, this light can provide the ideal complement of both light spectrum as well as intensity for optimized, yet natural growth of the plants.
In addition, LED lighting also facilitates the management of heat levels (thermal load).

Inter Lighting

Sideways illumination that allows covering the shadow region caused by the leaves on the plant.
Some species that develop in a more vertical way, such as cucumber or tomato, are a typical example of how the light level in the middle and the base of the plant is sharply reduced.

This "interlighting" option fills the lack of light where it is insufficient, keeping the lower and inner leaves remain active, thus contributing to the growth and optimizing production.

It also allows production to have a higher density of plants.

Vertical Farming

Top or vertical lighting in which the plant and lamp are at a distance between 30-50 cm. Vertical Agriculture consists of a multi-layer solution in which production is set on shelves, some stacked over one another, for space optimization.

Due to the proximity of the light, only sources of cold lighting like LEDs can ensure that plants are not burned. The compact layered mode of this method may completely forgoe any natural light, allowing complete and effective control of all stages of the process.

Business Models
Product Features

TOP LIGHTING

Development of PCBs (55x280 mm)

- LEDs (RED, BLUE, WHITE, FAR RED)
- Color control
- Spectrum customized according to needs

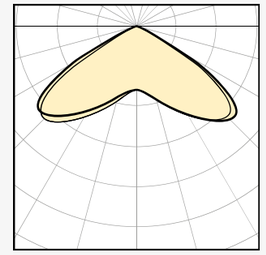
Lighting: Tunluce, Cithara Evo or Arena

- Class I
- IP65
- High power lighting
- Uniform light scattering
- Easily adaptable to different temperature variations
- Possibility of surface treatments (anti-corrosion)
- Uniform light scattering
- Easily adaptable to different temperature variations

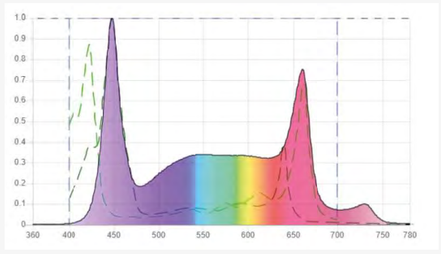
Tunluce

Cithara Evo

Arena



lens



VERTICAL FARMING AND INTERLIGHTING

Shelf or vertical lighting

Development of PCBs (13,5x560 mm)

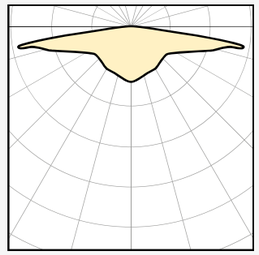
- LEDs (RED, BLUE, WHITE, FAR RED)
- Spectrum customized to specific needs

Lighting: Frigus and Tuled 20

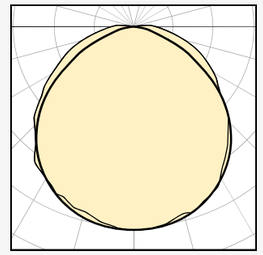
- Class III
- IP54
- Medium power lighting
- Uniform light scattering
- Easily adaptable to different temperature variations

Tuled 20

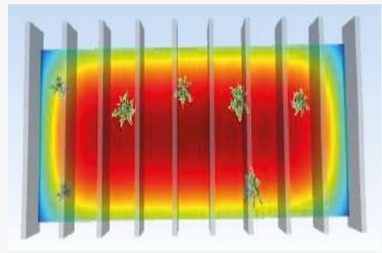
Frigus



Frigus



Tuled 20



Control Systems
Functionalities

Since Lightenjin's strategy is to provide lighting as a service, the incorporation of a control system that will allow to monitor and act according to needs is a fundamental part of the lighting system.

Allows you to Customize appropriate Solutions

Monitoring and Control of:

- Temperature
- Humidity
- Lighting
- Fluorescence

Remote Management:

- Consumption monitoring
- Fault reports
- Possibility of interaction with integrated data
- 4 relay outputs for irrigation control
- Access through WEB devices
- Georeferencing

For more information please request the technical sheet.

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