

About LED grow light

LED grow light is a new supplementary light for plant's growth. After test, the wavelength of LED grow light is very suitable for plant's growing, blossoming, fruiting. LED grow light adapts the international leading semiconductor lighting theory. It is a sophisticated technology product, which especially for the growth of flowers, fruits and vegetables. Typically, the flowers which raised in indoor will become more and more weak because lack of light exposure. But after using the suitable light spectrum of LED grow light, it will not only promote the flower's growth, but also extend it's flowering period, which will greatly enhance its quality. Basically, a 2-day lifetime's flower can extend to about 20 days after exploring in the LED grow light.

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The lack of light exposure of crops and vegetables in Northern greenhouses because of shade, rain, snow, fog and other bad weather in winter, and the lack of light exposure of crops and vegetables in Southern greenhouse because of rainy climates phenomenon, resulting in a normal crop cannot carry out photosynthesis. LED grow lights can supplement the light scientifically. It applies to all stages of plant's growth, and it can make the plant's leaves bigger, growing well, enhance the resistance and immunity, promote plant precocity, yield and improve fruit quality. Besides, it can restrain the bacteria and inhibit ovum's growth and reproduction and reduce the amount of pesticide. It can also reduce pollution of the environment and crops, which comply with the "green" trend.



LED light source known as a semiconductor light source, the narrow wavelength of this light source can control the light's color. If we apply it to plant's irradiation alone, it improve plant's natures. After test, the length of holly seedlings under purple light is the tallest, but the blade is very small and the root is shallow, like a malnourished. And the growth of holly seedlings under the mixture of red light and blue light is the best, it's not only strong, but also have well-developed root system. This LED light source's ratio of red light and blue light is 8: 1. The results prove, the ratio8: 1 red and blue light is the most suitable for plant growth. After exposure under such light, strawberries and tomatoes will become plumper, and the content of sugar and vitamin C increased significantly, and it does not appear hollow. Continuous exposure under that light for 10-14 hours a day, strawberry and tomato will be more delicious than ordinary greenhouse fruit. In addition, it can also applied to rainy weather of winter.

With the development of science and technology, LED Grow Light has slowly replaced the traditional high pressure sodium lights, plant trichromatic fluorescent lights and Energy-saving lights. Because these lamps contain hazardous substances, and if broken, it will pollute the environment. The LED grow light is green energy, Eco-friendly, and the LED chip cannot be broken.

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In a word, LED grow light will must replace high pressure sodium lights, fluorescent lights and energy saving lights. The LED grow light will lead the entire agricultural lighting market!



II The spectrum's impact on plant physiology

- 280 ~ 315nm: Low impact on nature and physiological cycle
- 315 ~ 400nm: Low absorption of chlorophyll, affect the efficient of light cycle, prevent stem elongation.
- 400 ~ 520nm (Blue): maximum absorption rate of chlorophyll and carotenoid, greatest impact on photosynthesis
- 520 ~ 610nm: Lower absorption rate of pigment absorption
- 610 ~ 720nm (red): Low absorption rate of chlorophyll, significant influence on photosynthesis and photoperiod effect
- 720 ~ 1000nm: Low absorption rate, stimulate cell elongation, affect flowering and seed germination
- >1000nm: Heat conversion

There is a different spectral sensitivity between plants and human. The most sensitive spectrum for human eyes is 555nm, ranging from yellow - green. And we have a less sensitive for blue-ray and the red-ray. But plants are different, they have the most sensitive for red light spectrum, and the less sensitive for green light spectrum, and their sensitivity was not so huge like the human eyes. Plants maximum sensitivity of light spectrum is 400 ~ 700nm. This zone is commonly referred to the most efficient for photosynthesis. Approximately 45% of the

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energy of sunlight spectrum is located in this section. Therefore, if supplement artificial light spectrum, the light source spectral distribution should be close to this range.

Photon energy emitted by the light source varies with the wavelength. E.g., a wavelength of 400nm (blue) is 1.75 times the energy of 700nm (red light) energy. But for photosynthesis, the effect results of the two wavelengths is the same. The additional energy of blue spectrum which cannot be used as photosynthesis will convert into heat. In other words, the rate of photosynthesis is determined by the number of absorption rate of photons 400 ~ 700nm, and is not relevant to the number of photons sent by each spectrum. But most people agree that the Liberal light color affects the rate of photosynthesis. All spectra for plants, have different sensitivity. This is because the special absorption of pigments in leaves. The chlorophyll dawn is best known. But chlorophyll is not the only one that is useful for photosynthesis pigment. Other pigments are also involved in photosynthesis, therefore we cannot just consider the absorption spectrum of chlorophyll in photosynthesis.

The diversity of Photosynthesis is also not related to color. Light energy is absorbed by the chlorophyll and carotenoids of leaves and the energy converted into glucose and oxygen by the help of two kinds of photosynthetic energy system and moisture. This process use all visible light spectrum, so all kinds of different colors of light almost have no impact photosynthesis.

Some researchers believe that most of the orange light has the greatest efficiency of photosynthesize. But this does not mean that the plant should be cultivated in such a monochromatic light source. The plants should receive the balance of the various light sources as for as the development of plants and the color of leaves.

Blue light (400 ~ 500nm) is very important for plant's differentiation and stomata's regulation. If the blue light is insufficient, the rate of far-red light is too much, the stems will grow over, and easily cause leaf yellowing. The rate of red spectrum (655 ~ 665nm) energy and far-red spectrum (725 ~ 735nm) energy is from 1.0 to 1.2, the development of plants will be normal. However, different plants have different spectral sensitivity for these light rate.

Typically, we use LED grow light as artificial light in greenhouse. As far as Philips Master SON-TPIA light source is concerned, it has the most energy in orange-red spectral region. However, the energy is not so high in the far-infrared light region, so the red and far-red energy ratio is greater than 2.0. However, due to there still have some natural sunlight, it did not cause plant shorter. (If you use this source in the growth chamber, it may have an impact.)

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In terms of natural sunlight, blue energy occupies 20%. For artificial light, it does not need such a high proportion. For normal development of plants, the majority of the plant only need 6% blue light energy of 400 ~ 700nm. In natural sunlight, they have enough blue energy. Therefore, there is no need to add additional artificial light spectrum. However, when it is insufficient for natural light (such as winter), artificial light blue energy needs increase, otherwise blue light source will be the limiting factor for plant growth.

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