The Potential Role of Knittex Shade Netting in Favourably Modyfying the Growth Environment©

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Some of the theoretical principles of light absorption by plants are discussed. Special attention is paid to the Stark Einstein Law, i.e., that any molecule can absorb only one photon at a time and this photon causes the excitation of only one electron. The process of excitation, energy transfer to the reaction center, and or loss of excitation energy are discussed, specifically as it relates to the differential excitation by blue and red photons. The implications on plant growth and development, of understanding the absorption and action spectra, are stressed. The leaves of most species absorb more than 90% of the violet and blue wavelengths that strike them and almost as high a percentage of orange and red wavelengths.

Chlorophylls a and b absorb very little green and yellow light between 500 and 600 nm but strongly absorb the violet and blue as well as the orange and red wavelengths. Some of the carotenoids in the thylakoids also transfer their excitation energy to the same reaction centers as the do the chlorophylls. These pigments only adsorb the violet and blue wavelengths, and reflect the green, yellow, orange, and red wavelengths, and this combination appears yellow. However, in terms of their action spectrum most plants show a major peak in the red region and a distinct lower peak or at least a shoulder in the blue region, both of which result mainly from light absorption by the chlorophylls.

The practical implications of how differential shade net construction percentages and shade net colors can and should be utilized to influence both the production (via enhanced photosynthetic rates and lowered light stress levels) and quality (via photomorphogenic responses) of the crop produced are discussed. The underlying theme is: cover to produce don't cover simply to protect.