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Lycopene as Cartenoid

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Commentary

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Description

Carotenoids conjointly referred to as tetraterpenoids, are yellow, orange, and red organic pigments that are made by plants and protoctist, also as many bacterium, and fungi. Carotenoids offer the characteristic color to pumpkins, carrots, corn, tomatoes, canaries, flamingos, salmon, lobster, shrimp, and daffodils. Carotenoids will be made from fats and different basic organic metabolic building blocks by of these organisms. The sole land home arthropods far-famed to supply carotenoids are aphids, and spider mites, that nonheritable the power and genes from fungi. It's conjointly made by endosymbiotic bacterium in whiteflies. Carotenoids from the diet are keeping within the fatty tissues of animals, and solely carnivorous animals acquire the compounds from fat. Within the human diet, absorption of carotenoids is improved once consumed with fat in an exceedingly meal. Preparation pigment-containing vegetables in oil and shredding the vegetable each increase carotenoid bioavailability. There are over 100 far-famed carotenoids which might be additional categorised into 2 categories, xanthophylls (which contain oxygen) and carotenes (which are strictly hydrocarbons and contain no oxygen). All are derivatives of tetraterpenes, which means that they're made from eight isoprene molecules and contain forty carbon atoms. In general, carotenoids absorb wavelengths starting from four hundred to 550 nanometers (violet to inexperienced light). This causes the compounds to be deeply coloured yellow, orange, or red. Carotenoids are the dominant pigment in fall leaf coloration of concerning 15-30% of tree species; however several plant colours, particularly reds and purples,

are because of polyphenols. Carotenoids serve 2 key roles in plants and algae: they absorb light-weight energy to be used in chemical process, and that they give photoprotection via non-photochemical conclusion. Carotenoids that contain unsubstituted beta-ionone rings (including provitamin A, alpha-carotene, beta-cryptoxanthin, and gamma-carotene) have antiophthalmic factor activity (meaning that they'll be born-again to retinol).

Structure

The structure of carotenoids permits for biological talents, together with chemical process, photoprotection, plant coloration, and cell sign. Double bonds and presumably terminating in rings. This structure of conjugated double bonds ends up in a high reducing potential, or the power to transfer electrons throughout the molecule. Carotenoids will transfer excitation energy in one among 2 ways.

1) singlet-singlet energy transfer from pigment to chlorophyl, and

2) triplet-triplet energy transfer from chlorophyl to pigment.

The singlet energy transfer may be a lower energy level transfer and is employed throughout chemical process. The length of the polyene tail permits light-weight absorbance within the chemical change range; once it absorbs energy it becomes excited, and then transfers the excited electrons to the chlorophyl for chemical process. The triplet-triplet transfer may be a higher energy level and is crucial in photoprotection.Light-weight produces damaging species throughout chemical process, with the foremost damaging being reactive chemical element species (ROS). As these high energy ROS are made within the chlorophyl the energy is transferred to the pigment's polyene tail and undergoes a series of reactions within which electrons are moved between the pigment bonds so as realize the foremost balanced state (lowest energy state) for the carotenoid. The length of carotenoids conjointly includes a role in plant coloration, because the length of the polyene tail determines that wavelengths of sunshine the plant can absorb. Wavelengths that don't seem to be absorbed are mirrored and are what we tend to see because the color of a plant. So, differing species can contain carotenoids with differing tail lengths permitting them to soak up and mirror totally different colours. Carotenoids conjointly participate in several styles of cell sign. They're able to signal the assembly of absicisic acid that regulates plant growth, seed dormancy, embryo maturation and germination, organic process and elongation, floral growth, and stress responses