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HIR ANTHOCYANIN SYNTHESIS IN TOMATO SEEDLINGS

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The most effective spectral region for anthocyanin synthesis in tomato seedlings exposed to continuous irradiation is the blue one. Anthocyanin production in tomato seedlings exposed to continuous FR is quite low and shows characteristics that are different from those reported for other systems. HIR anthocyanin synthesis is usually irradiance dependent. But, HIR anthocyanin synthesis in tomato seedlings exposed to continuous FR depends upon the reciprocal of irradiance. An explanation for this particular result could be based on the following points: (A) the level of phytochrome (Ptot) of tomato seedlings is quite low; (B) anthocyanin production is a function of the levels of Ptot and Pfr; (C) the photostationary level of Ptot is a function of the reciprocal of irradiance. Under high FR irradiances, the levels of Ptot and Pfr would be lower than under low irradiances. As a consequence, anthocyanin production in tomato seedlings exposed to high FR irradiances would be lower than in seedlings exposed to low irradiances.

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THE STATE OF PHYTOCHROME IN LETTUCE SEEDS DEVELOPED IN TOTAL DARKNESS

By

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Flowering plants of lettuce (Grand-Rapids, line A) were placed in darkness one day after anthesis. Mature seeds were collected under a green safety light. Germination tests were started 4 months later. The seeds were sown in darkness throughout or received 10 m Red or 15-30 min. FR irradiations after 2 hr of imbibition. Seeds developed in darkness germinated 90% after 4 days in darkness with or without FR irradiations. Red irradiations caused faster germination. Comparable seeds which mature in 8 hr days (sunlight), germinated 50% in darkness. This germination being reduced to 2% by 15 min FR, and raised to 90% by 10 min Red.

We suggest that germinacion in darkness in seeds which matured in total darkness was independent of phytochrome, which was probably all present in the P_r state. Maturation in light induced a certain dormancy which could be partly overcome by the P_{fr} present in the mature seeds.

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BLUE LIGHT INDUCED ABSORPTION CHANGES IN INTACT CELLS OF EUGLENA GRACILIS VAR. BACILLARIS MUTANT W_3BUL.

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Absorption changes at about 430 nm formerly seen in blue light minus dark difference spectra of cell-free extracts from Euglena W_3BUL (Plant Physiol. 56:5-33 (1975)) have now been demonstrated in intact cells by computer-assisted spectrophotometry. Intact cells of W_3BUL, which lack detectable plastid DNA and protochlorophyll(ide), show blue light minus dark absorption changes at about 430 nm which are complete after 5-8 min. of irradiation and are undetectable in the absence of 0_2. The wavelength of the absorption change and its 0_2 dependence recall the action spectrum and 0_2 requirements for the preillumination required to eliminate the lag in chlorophyll synthesis in Euglena cells.

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LIGHT DEPENDENT REGULATION OF RIBOSOMAL AND TRANSFER RNA SYNTHESIS.

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Effect of blue and red light on rRNA and tRNA synthesis in autotrophic synchronous cultures of Chlorella pyrenoidosa was studied by short time incorporation with tritiated guanosine and uridine. The nucleic acids were separated by electrophoresis on polyacrylamide gels. Both light qualities stimulate incorporation into rRNA and tRNA. Blue light (457 nm) is more effective than red light (679 nm; 5 x 10^{-10} Einstein $cm^{-2}sec$ There are three differences in the effect of blue and red li :Blue light dependent stimulation of rRNA and tRNA synthesis is completely insensitive to DCMU (10^{-5}M); whereas the red light effect is not. Only blue light stimulated RNA synthesi persists in the dark. Weak blue light (5 x 10^{-11} Einstein $cm^{-2}sec^{-1}$) has a high stimulatory effect on rRNA and tRNA synthesis; red light of equal quantum flux is ineffective. The blu light effect can be observed in the cytoplasmic rRNA after 5 min; stimulation of chloroplast rRNA synthesis appears later. The blue light effect on tRNA and cytoplasmic rRNA is not inhibited by rifampicin or lincomycin. Cycloheximide inhibits the blue light effect. In Chlorella blue light regulates rRNA and tRNA synthesis in the nucleus independent of photosynthesis.