B-I-27

Photonic regulation of secondary metabolite biosynthesis by binary spectral stress

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Secondary plant metabolites are unique sources for pharmaceuticals, food additives and industrially important biochemicals. The accumulation of these metabolites occurs in plants under stress. Here, we investigated the effect of abiotic stress caused by a binary change in the spectral composition of radiation generated by matrix LED light sources on the development and production of secondary metabolites using the example of *Eruca sativa* lettuce cultivated under fully controlled conditions. The dominant influence of the ratio of the intensities of the "blue" and "red" spectral ranges in binary switching light fluxes has been established. Regimes were found in which the accumulation of green biomass and the development of the root system of plants significantly exceed the control indicators. The presence of a compromise between the qualitative characteristics of the photon flux and abiotic stress, at which there is an increase in the wet weight of plants with a simultaneous increase in the synthesis of secondary metabolites, such as ascorbic acid and flavonoids, was revealed.

Thus, the results of the studies performed demonstrate the possibility of influencing the processes of primary and secondary plant metabolism by changing the quality of photon irradiation during plant development, which causes them to increase the accumulation of secondary metabolites.