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Effect of High-coherent Light on Morphogenetic Parameters of *Stevia rebaudiana in vitro*

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Aim of the study: Studies on secondary metabolites of plants have an increasing interest because some of them are useful and helpful. The object of our study is *Stevia rebaudiana* Bertoni (*Asteraceae*). Its leaves are rich with sweet glycosides, the major and the most valuable substance of them is stevioside, which has a hypoglycemic effect – reduces blood sugar level. It has strong sweet taste, about 300 times sweeter than sucrose. Stevioside is widely used as low-caloric sugar substitute product. The purpose of our research is to study, how short-term coherent light treatment effects on morphogenetic parameters of *Stevia rebaudiana* plants *in vitro*.

Material and Methods: Secondary metabolites synthesis directly depends on the photosynthesis intensity and also on the growth rate. Therefore the morphogenetic changes of stevia were especially studied. One of the physical factors is high-coherence light. The maximum aligned stevia plants were cultivated under various light conditions. Different exposure duration of coherent light was used: 30, 60, 120 and 240 seconds as well as different periodicity of irradiation: once and weekly treatment. The wavelength was 650 nm, the oscillation frequency – 2000 Hz, the power of light beam – 2-4 W/m^2. According to this scheme, the experiment was carried out on hormone-free MS medium and on MS with the 0.1 ml/l Appin and 0.5 ml/l IAA. This hormonal combination had been selected in our previous studies as the best medium for clonal micropropagation *in vitro*.

Results: After three weeks of cultivation, such parameters as the height of newly formed shoots, the total number of leaves, the multiplication factor and the presence of the root system were analyzed.The positive effecton morphogenetic potential of *Stevia rebaudiana* explants under *in vitro* conditions of high coherence light treatment was found. Increased parameters such as shoot height and leaves number of weekly coherence light treatment compared with a single treatment was established. The difference in comparison with control also was found. The most striking instance of stimulating effect of high-coherence radiation on shoot height and leaves number was found on a hormonal medium. Once in a week treated explants were higher by 20-40%, compared with control variant (without any light treatment). The conclusion was made that the combination of the two factors (hormonal and physical) gave a synergistic effect and the effect of coherent light was intensified in the presence of hormones. In general, the effect of weekly treatment with high-coherence radiation was stronger in comparison with a single one. It is necessary that a more thorough study of effect of coherent light on secondary metabolites of *Stevia rebaudiana* should be performed.

Acknowledgements: The research was conducted at the department of agronomy, biotechnology, plant breeding and seed production in Russian State Agrarian University, Moscow, Russia. The study was entirely carried out by Alla Shulgina Andreevna, PhD student, under the supervision of scientific adviser – Kalashnikova Elena Anatol'evna, professor, PhD (Biology).

Keywords: *Stevia rebaudiana*, stevioside, *in vitro* cultivation, coherent light.