PH-31 PHOTOSYNTHETIC ACTIVITY OF IN VITRO CULTURED GENTIANA KURROO ON MEDIUM WITH DIFFERENT SUCROSE CONCENTRATIONS

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Introduction: Somatic embryogenesis is the system of plant regeneration without any limitation in the production of plantlets. However, the plantlets should be hardened to the \textit{ex vitro} conditions, what involves manipulation of culture conditions and sucrose concentrations, specific for particular stage of culture. Low photosynthesis of \textit{in vitro} cultures appears to be specifically linked to too high sucrose concentration added to the medium. The aim of this work was to study, the effects of sucrose concentrations on function of the photosystem of \textit{Gentiana kurroo} Royle plantlets ready for \textit{ex vitro} culture.

Material and Methods: Experiments were carried out on the four-month-old plantlets of \textit{G. kurroo} Royle, derived from somatic embryos, regenerated from leaf blade explant cultures. Plantlets were cultured on MS medium supplemented with sucrose at seven concentrations (0.0-10.0 g/dcm³ and 30.0 g/dcm³ as control). The activity of photochemical processes was determined by chlorophyll fluorescence (F/Fₘₙ, Yield, quenching analysis) and net photosynthesis as CO₂ absorption. Additionally transpiration rate, stomata resistance were measured and plantlets fresh weights were recorded.

Results and Conclusions: This work provides a multi-parameter approach to studies on the photosynthetic activity of \textit{G. kurroo} Royle plantlets. The efficiency of the photosynthetic apparatus as measured by the ratio F/Fₘₙ, Yield and qP (light phase of photosynthesis) was highest when the medium was supplemented with 3.0 g/dcm³ sucrose. At this concentration also the CO₂ absorption (dark phase) and transpiration rates were highest, and were associated with low leaf diffusive resistance. Although at highest concentration efficiency of the photosynthetic apparatus was lower, the CO₂ absorption was comparable to 3.0g/dcm³ sucrose. Also plantlets and their fresh weights were greater at higher concentrations however, these were accompanied with higher diffuse leaf resistance and lower transpiration. Therefore, the better plantlets appearance and greater fresh weights might be due to higher water content. These results showed that (i) there is no direct link between CO₂ absorption and sucrose concentration in the medium (in used in this study range) and (ii) that the medium supplemented with 3.0g/dcm³ appeared to be the most suitable for good development and functioning of photosynthetic apparatus of \textit{Gentiana} plantlets.