



QUANTIFICATION OF SUGAR CONTENT IN THREE BRYOPHYTE SPECIES DURING SALT STRESS

Három lombosmohafaj szénhidrát tartalmának mennyiségi meghatározása sóstressz alatt

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Sugars are known to be involved in desiccation tolerance in bryophytes. However, a few studies discussed their function in other types of abiotic stresses such as salt stress. The aim of this research was to identify and quantify sugars which participate in the response to exogenous NaCl of three bryophyte species, namely model moss *Physcomitrella patens* and bryo-halophytes *Entosthodon hungaricus* and *Hennediella heimii*. Besides quantification of sugar content by HPLC-PAD analysis, the aim was to reveal localization of complex sugars in the protonema and phylloid cells using histochemical staining method. Among 23 sugars and sugar alcohols tested, monosaccharides glucose and fructose and disaccharides sucrose were present in the highest concentrations in each tested species. During the exposure to NaCl, concentrations of sugars change in a *species*-specific manner. There are certain similarities between model moss and bryo-halophyte *H. heimii* such as increase of galactose, maltose, trehalose and galactitol, suggesting similarities in the mechanisms of salt resistance. Bryo-halophytes seem to use different strategies to cope with salt stress: *Entosthodon hungaricus* increases sugar concentrations in extreme salt conditions (250 mM NaCl concentration), such as isomaltose, galactose and sucrose. On the contrary, *H. heimii* maintain high concentration of sugars either during mild or extreme stress conditions (50 mM and 250 mM NaCl concentrations), although increase of trehalose is present when 50 mM NaCl was applied. Both bryo-halophytes accumulated sorbitol in high concentration. According to a specific histochemical staining method, starch was detected in the cytoplasm of protonemal cells, as well as soluble forms of sugars. The greatest intensity of specific color was documented for *P. patens* and *H. heimii* protonema exposed to 250 mM NaCl, different from *E. hungaricus*, suggesting those species may use starch as energy depot in extreme conditions. However, fluctuations of specific sugars are of interest since it can point out differences in sugar's role in salt stress tolerance.