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THE INFLUENCE OF SALICYLIC ACID ON THE CARBOHYDRATES CONTENT IN THE PLANTS OF WHEAT AND CORN UNDER DROUGHT CONDITIONS

M. Kobyletska

Ivan Franko National University of Lviv
4, Hrushevskyi St., Lviv 79005, Ukraine
e-mail: kobyletskam@gmail.com

The interactive effect of salicylic acid and drought on plants of wheat and corn is the subject of this study.The interaction effects of drought stress with salicylic acid (SA) on sugar content in maize and wheat plants were investigated. There was observed the increase in the amount of sugar content in the corn leaves both under short-term and long-term drought conditions. Prestress treatment of the corn seeds salicylic acid caused the increase in the total amount of sugar. Salicylic acid caused increase of the total carbohydrates in wheat plants, which were grown under optimal water supply (60% of full moisture capacity).

Drought is a major environmental problem, which hampers a number of physiological and metabolic processes in plants and may lead to suppressed plant growth and development, reduced crop yield, or even plant death. Across plant species drought imposes various physiological and biochemical limitations and adverse effects (Pirasteh Anosheh et al., 2012). One of the mechanisms utilized by the plants to overcome water stress effects might be the accumulation of compatible osmolytes, such as soluble sugars, free amino acids, proline and etc. (Sadizadeh, 2009). SA plays an important role in abiotic stress tolerance, and more interests have been focused on SA due to its ability to induce a protective effect on plants under adverse environmental conditions. The aim of the present work was to study the relationship between sugar content and water status during the development of water stress and after rewatering in the plants of wheat and corn.

The objects of our study were maize plants (*Zea mays L.)* of Govta Zubovidna variety and wheat (*Triticum aestivum L.*) of Podolyanka variety. Pre-seed soaked in a solution of SA (50 mM) for 3 h. First seeds germinated in an incubator, and on the 3rd day of growth were transplanted into plastic pots (d = 14 cm). Plants were grown on soil substrate, whose humidity was maintained at 60% of full moisture capacity - optimal water supply. The model of drought was created by the simultaneous cessation of irrigation (30% of soil moisture capacity) during 12 days. Upon termination of drought, soil moisture in the pots was adjusted to 60% of full capacity. The control plants were grown from the seeds not treated with salicylic acid under conditions of optimal water supply (60%). For our investigation samples were taken from the leaves of wheat and corn on 7, 9 and 12-days of drought period and on the first day 1 h after the resumption of irrigation. The total sugar concentration was determinated by (DuBois, 1956).

In course of the research there has been observed the increase in the amount of carbohydrates in the corn leaves both under short-term and long-term drought conditions. We have studied sugar content in wheat seedlings under water stress conditions. The content of the carbohydrates in shoots of the plants increases significantly in the seeds not treated with SA. Thus, pretreatment with SA has caused a significant increase in sugar content in wheat plants on 7, 9, 12 and 14th days of growth under drought conditions. The alleviation of sugar can be a result of photosynthesis reduction, because reduction of water causes alleviating of turgor and losing turgor pressure causes clothing stoma and finally decreasing photosynthesis. Treatment with salicylic acid enhances resistance of the plants to stress and as a result sugar approaches its norm. The maize plants showed a slightly different effect of salicylic acid under drought conditions. The concentration of total soluble sugars in shoots was significantly affected by drought. For example, on the 7, 9 and 12-day of water deficit we observed increase in sugar content in plants that were grown under drought conditions. However, under short- and long-term drought conditions there was observed the increase in the total amount of soluble sugars in the tissues of corn that were pretreated with a solution of salicylic acid. Thus, the protective effect of SA on the impact of drought is closely linked to changes in metabolism of plants.