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STARCH MOBILIZATION FROM RESERVE SUBSTANCES OF CORN SEEDS DURING GERMINATION

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It is well known that during corn seed germination, some reserve substances are used for root and seedling development, while others are used for respiration and energy required for physiological processes. The ratio of reserve substances used for root/seedling growth to the amount expended on respiration/energy is an important index of metabolic efficiency. Starch, a reserve substance contained in the endosperm of corn seeds, is the primary energy reserve for these processes and the intensity of starch mobilization can influence germination efficiency. Therefore, **the aim of this study** was to evaluate the changes in starch content of corn seeds during germination under different conditions.

Materials and methods: Corn seeds of four parental lines of hybrids Porumbeni 402 (P402) and Porumbeni 465 (P465) were exposed two abiotic factors – non-optimal temperatures and treatment with the natural bioregulator JS, dry extract obtained from *Juniperus sabina* and diluted to a concentration of 0.0001%. Seeds were soaked for 24 hours in solutions of JS bioregulator and water (control) before germination under optimal conditions and under the influence of non-optimal temperatures. In cold-test the seeds germination was carried out at 10°C for 7 days plus 4 days at 25°C; and in thermo-test the seeds were exposed for 30 min at 50°C, after which germination was carried out at 25°C for 7 days. Biomass of seeds, roots and seedlings, as well as content of starch in seeds were determined. The metabolic efficiency and its relationship with mobilized starch was calculated. Starch content in intact and post-germinated seeds was determined using the Ewers-Grossfeld polarimetric method. Each variant was carried out in four repetitions, 25 corn seeds each.

Results: The starch content in the corn seeds of female lines was 63.45±0.55% and 72.08±0.47%, while in male lines it was 72.85±0.50 and 77.55±0.55%, respectively for hybrids P465 and P402. Under optimal germination conditions, approximately 21.93-36.82% of starch was mobilized from the seeds of female lines and 42.30-47.00% from the seeds of male lines. The most variable data on metabolic efficiency and starch consumption (from 4.70 to 60.32%) of seeds germinated under non-optimal temperatures and treated with JS were found in the parental lines of the P402 hybrid. Whereas the metabolic efficiency of parental lines of the P465 hybrid and the amount of mobilized starch varied within a narrow range, the differences were approximatively 0.8-7.8%. This fact confirmed that the parental lines of the P465hybrid are more resistant to abiotic factors than the parental lines of the P402. Statistical analyses of the relationship between metabolic efficiency and consumed starch showed their correlation with a Pearson coefficient of 0.7468.

Conclusions: Evaluation of starch content mobilized from corn seeds of parental lines germinated under different conditions and treated with bioregulator JS demonstrated that the metabolic efficiency of seeds is directly dependent on the starch consumed during germination.

Keywords: corn seed, parental lines, germination, bioregulator JS, starch,

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