

BIOLOGICAL EFFECTS OF MERLOT GRAPE MARC ON GERMINATION AND GROWTH OF *TRITICUM AESTIVUM* SPROUTS

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Introduction. In the present study, biological reactions of wheat's seeds and sprouts are exposed to the impact of grape marc aqueous extracts (5% and 20%). The research objectives consisted in the study of the influence of grape marc on the germination capacity of wheat seeds and the cytogenetic parameters.

Material and methods. 9 Petri dishes, each containing 100 wheat seeds were prepared. 3 Petri dishes represented the control (3 repetitions) irrigated with distilled water; 3 Petri dishes represented the variant GM I irrigated with 5% grape marc extract; 3 Petri dishes represented the variant GM II irrigated with 20% grape marc extract. The 9 Petri dishes with seeds were kept in the germinating room for 4 days, being monitored every day. After the first two days, the germination capacity was determined and embryonic roots were collected for cytogenetic investigations. Germination capacity was expressed percent (%) and determined by counting the germinated seeds from the total seeds in the Petri dish. It was determined in dynamics: after two days, after three days, after four days since the beginning of the experiment. For cytogenetic investigations, the standard protocol was applied: fixation, hydrolysis, staining, performing microscopic preparations.

Results. Germination capacity of wheat seeds in the control sample was 90.67% the second day, 95% the third day and 95.67% the fourth day. In the variant GM I, germination capacity was: 75% the second day, 78% the third day and 79.67% the fourth day. In variant GM II, the germination capacity was 19.67% the second day and stagnated until the fourth day. Cytogenetic investigations focused on: mitotic index, % of chromosomal mutations and type of chromosomal mutations. Values of mitotic index were: 25.67% for control, 14.72% for GM I and 0.0% for GM II. The percent of cells in which chromosomal mutations were identified was 0.08% for control and 1.37% for GM I. In case of variant GM II, in which growth of wheat germ was stopped from the second day of experiment, it was not possible to determine this parameter. Types of chromosomal mutations identified in root meristems of the control samples were: chromosomal bridges and micronuclei, while in the GM I samples chromosomal bridges, bridges associated with chromosomal fragments, multipolar ana-telophases and micronuclei were identified.

Conclusions. The negative effects of red grape marc on the wheat germination and development were clearly identified through the values of germination capacity, changes of mitotic index and induction of chromosomal mutations. The 5% Merlot grape marc extract significantly decreases germination of wheat seeds, and 20% grape marc inhibits it. Mitotic index is quite low after the treatment with 5% grape marc extract, and with 20% grape marc extract it is totally inhibited. The 5% grape marc extract induces chromosomal mutations in over unitary proportions. The obtained results highlighted also from cytogenetic point of view, the negative impact on plants of the red grape marc stored on soil. However, the Merlot grape marc aqueous extracts equal and over 20% may be recommended as totally bioherbicides, but further studies are needed.

Keywords: *chromosomal mutations, red grape marc extract, germination capacity, mitotic index, Triticum aestivum*

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