

## PHYTOTOXIC AND GENOTOXIC EFFECTS INDUCED BY GRAPE MARC EXTRACTS ON PLANT

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Lesser-known effects of grape marc extracts on plants were evaluated. For this purpose, the germination rate of wheat seeds and cytogenetic parameters of cells in the embryonic roots of germinated wheat seeds were determined. The study consisted of two experiments. For the first experiment were prepared 9 Petri dishes with 100 wheat seeds/dish, from which were established 3 experimental variants (in triplicate). Thus, 3 Petri dishes were control, for another 3 Petri dishes (GM1) seeds were irrigated with 5% Merlot grape marc extract, and another 3 Petri dishes (GM2) seeds were irrigated with 20% Merlot grape vine extract. For the second experiment were prepared 27 Petri dishes with 100 wheat seeds each, of which 3 represented the control (in triplicate), and the other 24 dishes represented 8 variants (in triplicates), for which grape marc extracts from two grape varieties: Merlot and Sauvignon blanc were used, in 4 concentrations: 0.025% (M1, SB1), 0.05% (M2, SB2), 0.1% (M3, SB3), 0.2% (M4, SB4). The control was irrigated with distilled water. Petri dishes with seeds were maintained under controlled conditions. After 5 days (in the first experiment) and after 2 days (in the second experiment), germinated seeds were harvested and subjected to determinations. The germination rate was assessed by relating germinated seeds to the total number of seeds/repetition/variant. For investigation of cytogenetic parameters, wheat germs were processed according to a standard protocol: fixation, hydrolysis, staining with basic fuchsin, making microscopic preparations and observing them under microscope. Cytogenetic parameters determined were: mitotic index, frequency of chromosomal aberrations, types of chromosomal aberrations and their frequency. The germination rate of seeds was markedly reduced in GM1, drastically reduced in GM2, moderately reduced in M1-M4 and SB1-SB4. Mitotic index (MI) was strongly suppressed in GM1, annihilated in GM2,  $\pm$  moderately reduced in M1-M4 and SB1-SB4. The chromosomal aberrations identified in both experiments were: bridges, fragments, multipolar anaphase, micronuclei. Of these, bridges and micronuclei predominated.

In conclusion, the germination rate of seeds and mitotic index decreases with increasing concentration of marc grape extracts in all cases, while the frequency of aberrations increases. We recommend that grape marc to be depleted of polyphenols in order not to create risks as a fertilizer in agriculture. It is also recommended that polyphenol-rich grape marc to be used as a bioherbicide.

**Keywords:** *chromosomal aberrations, cytogenetic parameters, mitotic index, rate of germination, seeds, Triticum aestivum*

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