

# Improving Abiotic Stress Tolerance of Sweet Marjoram Through Polyploidy Induction

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## Abstract

Sweet marjoram (*Origanum majorana* L.) is a valuable aromatic plant with pharmacologically active compounds which are beneficial for human and animal health. Abiotic stressors, such as heat, cold, drought and salt, have been reported to result in significant reductions in plant development, yield, and bioactive compounds. Induced polyploidy is a genetic mutation approach that has been used to improve abiotic stress tolerance and agronomic traits of economically important plants. The aim of this study was to induce polyploidy in *O. majorana* and screen for abiotic stress tolerance in polyploid plants. The seeds were treated with different concentrations of colchicine [0, 0.05, 0.1, 0.2, 0.4 and 0.8% (w/v)] for 24 hours. The survival rate was determined 2 weeks after colchicine treatment. The overall survival rate ranged between 26% and 46%, with the highest survival rate of 49% and 46% recorded with the 0% (control) and 0.05% colchicine treatments, and the lowest survival rate of 26% with 0.8% colchicine. In future studies, the ploidy levels of the treated plants will be determined by flow cytometry analysis and chromosome counting. The polyploid plants will also be examined for different growth parameters, essential oil content, and antioxidant enzyme activities in response to heat, drought, and salinity stress.

**Keywords:** Abiotic Stress, Bioactive Compound, Colchicine, *Origanum majorana*, Polyploidy

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