The Effects of Ionizing Radiation on Glycine max (Soybean) mRNA Accumulation in Radicle Tissue

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Due to the depletion of the ozone layer, many plants are exposed to high amounts of ionizing radiation. Glycine max (soybean) plants in particular have prominent industries around the world. This study investigates the effects of ionizing radiation on Glycine max mRNA accumulation in radicle tissue. It was hypothesized that if Glycine max seeds are exposed to higher doses of ionizing radiation, then the normalized gel-band intensities of Momilactone-A Synthase-like accumulation, myo-Inositol Oxygenase accumulation, and Metallothionein accumulation, respectively, in the radicle tissue after six days will all be greater. 360 soybean seeds were obtained and divided into three trial groups (120 seeds each) and subsequently into four study subgroups (30 seeds each) based on a radiation dose of 0 Gy, 0.5 Gy, 5 Gy, or 50 Gy. In each subgroup, four seeds were pooled, and RNA was extracted from the radicle tissue. The seeds then underwent 30 cycles of reverse transcription polymerase chain reaction (RT-PCR) so that their respective mRNA accumulation levels can be quantitated. Finally, the samples underwent gel electrophoresis in order to calculate gel-band intensities of the three target genes. The data fails to reject all three null hypotheses; there was no statistically significant difference among Momilactone-A Synthase-like accumulations, myo-Inositol Oxygenase accumulations, and Metallothionein accumulations of Glycine max radicles whose seeds were exposed to ionizing radiation and those not exposed to ionizing radiation. These results suggest that ionizing radiation at doses of 50 Gy or less does not affect mRNA accumulation in soybean radicle tissue.

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