Gamma irradiation effects on some biochemical mechanisms of two wheat genotypes (*Triticum aestivum* L.) under greenhouse conditions

A. Borzouei[1]*, M. Kafi[2] and A. Majdabadi[1]

(Received : 12 Jan 2011 ; Accepted : 23 April 2011)

Abstract

In order to study the effect of gamma irradiation on biochemical characteristics of two wheat genotypes, a greenhouse experiment was conducted in 2009 in Agricultural, Medical and Industrial Research Institute, Karaj, using factorial experiment based on complete randomized design with 3 replications. Two wheat genotypes (Roshan and T-65-58-8) were irradiated by 100, 200, 300 and 400 Gy. The non-irradiated seeds of each genotype were considered as control. Irradiated Seeds were immediately row-planted in the soil blocks. Samples for various assays and estimation were taken from flag leaves on the 7th day after anthesis. Results showed that Roshan seeds were unable to germinate at 300 and 400 Gy doses. The average MDA content was increased with various doses of gamma radiation in two genotypes. But in Roshan genotype, the MDA content was higher as compared to T-65-58-8. In both genotypes, the chlorophyll content was increased at 100 Gy and the highest amount of proline and soluble sugars were obtained at 200 Gy. Biochemical differentiation based on total soluble protein content revealed that T-65-58-8 and Roshan genotypes at irradiation dose of 200 Gy contained the lowest (28.91 Ug/gFw) and the highest (70.98 Ug/gFw) amount of total soluble protein, respectively. Severe increase in specific activity of peroxidase enzyme was observed as the gamma dosage increased. It seems that Roshan wheat cultivar was more sensitive to irradiation stress than T-65-58-8 line. Also, in irradiated treatments, the 100 and 200 Gy doses caused positive variations in the studied biochemical indices. It was concluded that protein and chlorophyll, soluble protein and MDA contents may be used in early assessment of effective radiation doses to induce mutations in wheat genotypes.

Keywords: MDA, Soluble proteins, Chlorophyll, Gamma radiation.

1. Assist. Prof., Dept. of Nuclear Sci. and Technol., Agric., Medic. and Industrial Instit., Karaj, Iran.
2. Prof., Dept. of Agron. and Plant Breed., College of Agric., Ferdowsi Univ., Mashhad, Iran.
*: Corresponding Author, Email: aborzouei@gmail.com