

Embryos and haploid plants produced via Gamma irradiated pollen in Iranian melon

L. Bagheri*, M. Lotfi, R. Amiri Khah, M. Noori¹

Irradiated pollen is the most successful haploidization technique within Cucurbitaceae. The influence of gamma ray doses (250, 350, 450 and 550 Gy), genotypes, and stage of development of embryos obtained by irradiated pollen technique on the induction of haploid embryos were studied in several Iranian melon cultivars as well as their hybrids with alien cultivars. Female flowers were pollinated using pollen that had been irradiated with gamma rays. Different shapes and stages of embryos were excised 21 to 25 days after pollination and cultured on E20A medium. Direct culture, liquid culture and integrated culture methods were applied for detecting the induced embryos. Integrated and liquid cultures showed advantages in increasing the efficiency of haploid plants production in melon breeding programs. Results revealed that 550 Gy of gamma-irradiation was successful in inducing parthenogenesis and fruit development, whereas, lower irradiation doses were not effective in inducing haploid embryos. The amount of embryos per seeds were the highest in 'Samsoori' (1.2%) and 'Saveh' (1.1%) cultivars. Some of the heart- and cotyledon-shaped embryos developed to haploid plants. In total, 52 parthenogenic melon plantlet recovered from 274 obtained embryos via pollination with gamma-irradiated pollen. As a result of the present study, haploid embryos and haploid plants production strongly influenced by gamma ray doses, embryo stages and genotypes. Indirect method and chromosome counting performed on the roots of regenerated plants, showed the haploid level ($n = x = 12$).

Key Words: Gamma irradiation, Iranian melon, Irradiated pollen, Parthenogenesis.

1. Researcher of Nuclear Agricultural Research School, Nuclear Science and Technology Research Institute, Karaj, Associate Professor, Department of Horticulture, College of Aboureihan, University of Tehran, Tehran, Experts of Nuclear Agricultural Research School, Nuclear Science and Technology Research Institute, Karaj, Iran, respectively.

*Corresponding Author, Email: (lbagheri@nrcam.org)