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Cytogenetic changes and genomic DNA assay of Sudani and Masri Roselle varieties affected by different gamma irradiation doses

Al-Ansary A.M.F., Nagwa R. Abd-El Hamied, A.M. Abd-El-Hamid and M.E.S. Ottai

Department of Genetics and Cytology, National Research Centre, Dokki, Cairo, Egypt.

Abstract: Roselle, *Hibiscus sabdariffa* L. is an important nutrimental, medicinal and pharmaceutical plant. Roselle is a tetraploid species and its flowers are cleistogamous. Therefore it is difficult to improve through conventional hybridization. Cytogenetic investigation and RAPD-PCR technique can identify the genotypes and be used as genetic markers. Seeds of Masri and Sudani Roselle varieties exposed to gamma rays doses zero, 40 and 80 Gray for the soaked seed category and zero, 160 and 320 Gray for the dry seed category were used in the present investigation. The treated seeds were sown for three summer seasons. Seeds of the last season were grown in Petri dishes for the determination of mitotic index and chromosomal abnormalities. All gamma doses reduced the mitotic activity. Different types of chromosomal abnormalities were occurred and increased with the gamma doses increasing. On the other hand, RAPD-PCR technique was used to detect the DNA profile changes affected by gamma doses. Eight out of fifteen random primers successfully amplified Roselle DNA fragments. The primers amplified different number of fragments, 30 monomorphic and 26 polymorphic amplicons. Sudani characterized by higher number of unique markers. The dose of 160 Gray was the more effective dose showing 3 positive and one negative marker. Primer OPD-18 exhibited both positive and negative markers and presented the highest number of unique markers. Finally, cytogenetic investigation and RAPD analysis proved that Sudani was more affected by gamma rays than Masri variety.

Key Words : Roselle, *Hibiscus sabdariffa,* gamma irradiation, mitotic index, chromosomal abnormalities, RAPD-PCR technique.

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