

Evaluation of Irradiated Okra based on Agronomical Traits and RAPD Markers

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Abstract

This study was conducted on three inbred lines of okra *Abelmoschus esculents* (C8, C9 and Cr) obtained from the Horticultural Research Institute, Agricultural Research Center. Seeds were irradiated with gamma rays at doses 10, 20 and 30 Kr. This study aimed to evaluate the effect of ionizing radiation on molecular and phenotypic levels, using RAPD six out of 19 RAPD primers were succeeded in generating reproducible polymorphic amplicons among all irradiated plants and their control on each inbred line. All irradiated plants of soaked seeds showed the highest unique markers (21) compared with irradiated dry seeds which showed 11 unique markers. This indicated that gamma irradiation was effective for inducing higher rate of mutations in the soaked seeds. On the other hand, C8 gave the highest number of unique markers (10 negative and 4 positive). While, C9 displayed the highest percent of polymorphic amplicons (81.4%) and it was the only genotype which increased in number of complementary sites with RAPD primers by irradiation treatments. Furthermore, other genotypes decreased in number of complementary sites with RAPD primers by treatments. Moreover, the correlation between molecular and phenotypic distances was positive and highly significant ($r= 0.645$) in Cr only, which may be explained that 73.3% for Cr of amplicons were polymorphic from the genome areas which coded for studied traits. So, it is possible to reliance on the unique markers for this inbred line as markers assisted selection for the improved traits due to irradiation. In addition, Cr was the best in response to genetic improvement % by irradiation, especially 20/S treatment which led to significant improvement of yield and some of it's component traits. The improvement percent, ranged from 21.4 to 152.0 % for number of leaves per plant (Nl/p), number of fruits/plant (Nf/p), number of seeds per pod (Ns/pod) and fruit yield per plant (FY/p) traits, was highly expected to be associated with four molecular markers. These markers were three negative and one positive (485bp targeted by OP-A02 primer), which could be used as markers assisted selection to improve yield and its components in breeding programs and improvement of okra.

Keywords: Okra, gamma radiation, RAPD, Molecular Distance, Phenotypic Distance

Introduction

Okra, *Abelmoschus esculentus* L is a member of the family *Malvaceae* order *Malvales* Kaur *et al.* (2013) and is considered as one of the most im-

portant vegetable crops in Egypt. Okra chromosome numbers is a varied and wide-ranging, where $2n = 72, 108, 120, 132$ and 144 in regular series of polyploidy with $n = 12$ kumar