*Environmental Engineering and Management Journal*

*March 2024, Vol. 23, No. 3, 631-645*
*http://www.eemj.icpm.tuiasi.ro/; http://www.eemj.eu*
http://doi.org/10.30638/eemj.2024.049

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# UNLEASHING THE POTENTIAL FOR HIGH-FREQUENCY GAMMA RAYS EFFECTS AND CHEMICAL MUTAGENS IN OKRA

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## Abstract

High-energy radiation plays an important role in the transitions of physiological activity of the plant parts. *Abelmoschus esculentus* is an important vegetable crop cultivated to a large extent in India, but due to the severe incidence of Yellow Vein Mosaic Virus (YVMV) and Enation Leaf Curl Virus (ELCV) diseases spread by white fly, it accounts for yield loss of about 50-94 percent. The presence of variability is an essential prerequisite for the implementation of any crop improvement program. In cases where such variability is lacking, induced mutations can serve as an appropriate way of generating useful variation in characters that are quantitatively inherited. Physical and chemical mutagenic agents induce mutations in genes at rates that exceed the spontaneous baseline, resulting in the emergence of a variety of new traits and an expansion of the genetic diversity of plants. It was observed from the results that all the biological damage (lethality, injury, and sterility) was positively correlated to mutagenic treatment. The Lethal Dose (LD50) dose for the BCO-1 and Japanese Jhar Bhendi corresponded to 844.04 and 798.49 Grays for (γ) radiation and 0.79 % and 0.78 % for ethyl methyl sulphonate (EMS) treatment, respectively. The effect of mutagen in the M1 generation was highly dependent on the type, dose, and concentration of mutagen and cultivar. The (γ) radiation treatment exhibited the highest total mutation frequency. The current study has observed a greater mutagenic efficacy at lower concentrations/doses of the mutagen. The most efficient and effective mutagen observed was gamma irradiation (100 and 300 Gy). Maximum macro-mutants were obtained from gamma irradiation in BCO-1 cultivars.

*Key words:* crop improvement, damage, environmental change, generation, high-frequency rays, lethal dose

*Received: September, 2023; Revised final: January, 2024; Accepted: January, 2024; Published in final edited form: March, 2024*

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