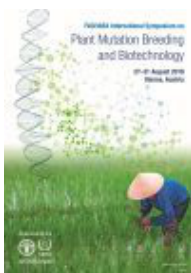


# FAO/IAEA International Symposium on Plant Mutation Breeding and Biotechnology



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## RADIATION INDUCED MUTAGENESIS FOR GENERATING USEFUL GENETIC VARIATION IN SUGARCANE

Induced mutation technology is a powerful means to introduce novel genetic variability. Sugarcane is an important commercial crop cultivated primarily for sugar and bioenergy. It is vegetatively propagated, has a complex genome, high polyploidy, long life cycle, poor fertility and a narrow genetic base, hence mutagenesis can be a good approach for the induction of genetic variation. A blend of radiation mutagenesis with in vitro culture technique can augment the induction of novel genetic variability through selection of new genotypes. At BARC, strategies of radiation mutagenesis, selection at the cellular level, followed by ex vitro evaluation and field testing have been successful in the isolation of sugarcane mutants for improved traits. Gamma irradiation has been used on embryogenic calli of commercial sugarcane cultivars, agronomically desirable mutations for morphological, quality and yield contributing traits have been detected and isolated. The mutant clones showed better performance under saline field condition, indicating that the agronomically superior mutants can be useful in sugarcane improvement. Molecular characterization of the mutants using de novo transcriptomics has provided interesting information on genome-wide effects. The physiological basis of salt tolerance was investigated in one of the high yielding salt tolerant mutants and the results showed that sodium exclusion, ROS homeostasis and consequent maintenance of photosynthesis and WUE were the key components of the mutant's salt tolerance trait. The study highlighted the application of radiation induced mutagenesis for the creation of novel genetic variability in sugarcane.

### Country or International Organization

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