

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



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## EMS INDUCED IN VITRO MUTAGENESIS FOR ABIOTIC AND BIOTIC STRESS TOLERANCE, AND ISOLATION OF MORPHOLOGICALLY AND BIOCHEMICALLY DISTINCT PHENOTYPES IN SUGARCANE

Chemical mutagenesis was applied in sugarcane to improve desirable characters. In this study, young inflorescence explants of Indian sugarcane cultivar CoC 671 were exposed to Ethyl Methyl Sulphonate (EMS) along with 0.1% polyethylene glycol used in callus induction media. Three hundred shoots were regenerated and transplanted in the field for selecting desired mutants. Eleven mutants were selected and evaluated for smut disease resistance and drought tolerance along with early maturity, high sucrose, higher cane yield and for quality. The PCR based early detection assay for smut resistance with Inter-transcribed region sequence (ITS) indicated smut resistance in the selections. Smut resistance was also confirmed by artificial smut inoculation. The mutants were found superior for juice and sugar quality parameters such as higher Brix %, Sucrose %, Purity % as well as for commercial Sugar cane. Screening of mutants with stress tolerance indicators indicated higher proline, malondialdehyde and electrolyte leakage in TC 2819 and TC 2813 indicating their improved drought tolerance capacity as compared to CoC 671. Mutant TC 2819 was found significantly superior for sucrose content (20.33 %) than parent CoC 671 (17.67%) at early maturity (10th month), while mutant TC 2826 was smut resistant, and was significantly superior for sucrose content (23.97 %) than parent CoC 671 (21.39 %) at maturity (12th month). The morphological characterization also showed the distinct variation in their stem colour, bud shape, root bands and other characters. The study highlights potential application of EMS-induced genetic variability which can be utilized for direct cultivation or as better parents in sugarcane improvement.

### Country or International Organization

India/ Bhabha Atomic Research Centre Mumbai

**Author:** Dr DALVI, Sunil (Scientific Officer)

**Co-authors:** Prof. THEERTHAPRASAD, D (Ex-Professor); Prof. DIXIT, Ghanshyam (ExProfessor, Botany Dept. Shivaji Univ. Kolhapur); Prof. SUPRASANNA, P (Head, FB&SP, NABTD, BARC, Mumbai); Mr TAWAR, Pralhad (Sr. Scientist & Head, Tissue Culture Section, Vasantdada Sugar Institute, Pune)

**Presenter:** Dr DALVI, Sunil (Scientific Officer)

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