

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



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## APPLICATION OF CHEMICALLY INDUCED MUTATIONS USING EMBRYOGENIC CELL SUSPENSIONS AND SEEDS FOR CROP PROTECTION OF COFFEE (*COFFEA ARABICA* L.) VARIETIES IN COSTA RICA

Coffee represents the most important non-alcoholic beverage in the world economy. Nevertheless, coffee is threatened by several biotic and abiotic stresses. Crop improvement via mutagenesis represents a powerful alternative to increase genetic variability and accelerate breeding programs. In this sense, coffee embryogenic suspension cultures (ESC) and seeds were incubated with sodium azide (NaN<sub>3</sub>) and ethyl methane sulfonate (EMS). With increasing concentrations of NaN<sub>3</sub> and EMS, the survival of ESC and the germination, seedling height and root length decreased compared to the non-treated controls. In case of ESC the LD<sub>50</sub> was determined for NaN<sub>3</sub> (5 mM for 15 minutes) and for EMS (185.2 mM for 120 minutes). The LD<sub>50</sub> values for the treatment of seeds with NaN<sub>3</sub> and EMS were between 50-75 mM and 2-3% v/v, respectively. Embryogenic suspension cultures treated with NaN<sub>3</sub> and EMS were cultured on selective media supplemented with NaCl. The results showed that 150 mM NaCl could be used as a selection pressure. Leaves of Caturra and Catuaí and the resistant coffee cultivar CR-95 were inoculated with uredospores of *H. vastatrix*. Preliminary results, demonstrated that Caturra is more susceptible than Catuaí; whereas CR-95 did not any symptom of the disease. Finally, the induction of genetic variability in coffee seeds in response to the different NaN<sub>3</sub> and EMS treatments was assessed by AFLP analysis. The amplification of six AFLP primer combinations using a pool of plants obtained after mutagenic treatment with sodium azide allowed the identification of four polymorphism. Coffee breeding programs could use mutagenesis combined with screening methods and molecular markers as an additional tool to induce novel traits, such as resistance to coffee leaf rust and produce new and improved coffee cultivars.

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