

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



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## MUTAGENESIS OF IN VITRO EXPLANTS OF COFFEA ARABICA TO INDUCE FUNGAL RESISTANCE

Coffee is one of the most valuable commodity tree crops worldwide. However, it suffers from several devastating diseases and pests, e.g. coffee leaf rust and coffee berries borer, whose impact is being amplified by the changing climatic conditions. Development of new adapted varieties remains a laborious effort by conventional breeding due the long juvenile period in tree crop. Plant cell culture represents the ultimate method to produce large amount of true-to type healthy explants and of explants for mutation breeding. In fact, mutation induction combined with in vitro cell/ tissue culture techniques has proven to be effective for developing improved cultivars of perennial crops. Prior to mutation breeding, cell and tissue radiosensitivity tests to mutagens need to be performed, so that optimal treatments can be determined for large population development. Thus different in vitro explants (plantlets, leaves, callus, embryogenic callus, globular and torpedo stage embryos) of *Coffea arabica* and *Coffea canephora* were exposed to different gamma-ray doses: 0, 10, 15, 20, 40 and 60 Gy. Eight weeks after irradiation, a radiosensitivity test was conducted on the different explants and the LD50 doses corresponding to 50% of viability or survival of callus, embryogenic callus, globular and torpedo stage embryos and 50% growth reduction of plantlets was also determined. In general, the embryogenic calli showed a relatively higher radio-resistance (LD50 >40Gy) in comparison to entire plantlets. In irradiated plantlets the development of the leaf area was more severely affected by irradiation than the root growth, whereas the shoot growth, number of new nodes and roots formed were less affected.

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