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Preliminary results of mutagenesis by irradiation in *E. globulus* and *E. nitens* seeds

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Although ionizing radiation is a tool widely used in plant genetic improvement, generating genetic diversity and improving yields and traits in crops throughout the world with 3,275 mutant cultivars. Climatic change affects native forest ecosystems and plantations leading to significant reductions in tree production. In 2020, INFOR and CCHEN initiated the CHI5052 project for mutagenesis of forest species affected by climate change in Chile with funding from International Atomic Energy Agency (IAEA), and recently received a Grant from Government of Biobio, Innovation Fund for Competitiveness (FIC-R). Seed irradiation treatments were carried out in a self-shielded Gamma Cell 220R irradiator equipped with CO60 and an irradiation rate of 8.9 Gy|min established by the Fricke dosimetric system. It involved the effects of gamma irradiation treatments (0, 10, 20, 30, 40, 50 Gy) on seed germination and initial growth of *Eucalyptus nitens* at 8 months-old. It also included determination of gamma radiation dosimetry for LD30 and LD50 doses for *Eucalyptus globulus.* The results obtained on gamma radiation seeds on *Eucalyptus nitens* confirm the positive effect on germination and initial growth of seedlings in the field in doses of 10 Gy at 8-months-old. The preliminary LD30 radiations dosimetry of *E. globulus* have generated seedlings with leaf aberration, pleiocotyly, that possible correspond to knock-out mutation of a dominant allele at a heterozygous locus or a dominant mutation that needs to be confirmed by molecular markers. The preliminary results provide guidance regarding the magnitude of gamma radiation to be used and confirm that relatively low doses would be the most effective to improve germination and initial seedling growth for *Eucalyptus nitens*; but considering the differences between species and the diversity of existing results in the bibliography, the doses to test must be defined for each particular species.

Keywords: gamma radiation, hormesis, mutagenesis, tree mutation breeding

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