

Cryopreservation and Genetic Stability on Yams Species (*Dioscorea Spp.*)

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ABSTRACT

Cryopreservation is defined as conservation of biological material under a very low temperature of liquid nitrogen (-196°C) for indefinite time period without altering genetic consistency of the preserved materials. Recently, around 50.000 Accessions (orthodox seeds, shoots, and dormant buds) out of more than 60 plant species are collected in a number of gene banks around the world. Development of the right protocol is necessary to enable recovery of healthy and genetically faithful explants/accessions to serve the purposes for which the germplasm materials are cryopreserved. Yams (*Dioscorea spp*) is important for its role in supporting food security and production of secondary metabolite, diosgenin. Continuing erosion of yams genetic diversity, its future cultivation and future cultivar improvement necessitate the establishment of a base (long-term) collection or cryopreservation of its genetic resources. This study successfully improves cryopreservation protocol for three different species of yams, *D. bulbifera* L, *D. polystachya* Turczh., and *D. cayenensis* Lam., by combining droplet and vitrification methods. Protocol validation was accomplished through evaluation of *in-vitro* MR, morphological and agronomic characters. Comparison among cryopreservation, cryoprotectant treated and plain *in-vitro* cultivation derived shoots indicated similarity in the characters evaluated. In the case where MR of *in-vitro* cultivated shoots for *D. bulbifera* was significantly lower than the other two treatment variants, it was attributed to phenotypic plasticity of the character, means that the MR will recover in further cycles of sub-culture.

Keywords: Cryopreservation, *Dioscorea spp*, *In-vitro* MR, Droplet-vitrification, Genetic stability

Abbreviation: MR: Multiplication Rate

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