PA199 Cathodic and Catalase Enzyme Protection in Coffee Seeds Uner Different Cryopreservation Protocols.

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Coffee seeds are sensitive to desiccation and sub-zero temperatures, and an alternative for safe storage of coffee genetic resources for an indefinite period is use of the cryopreservation technique. However, the different steps involved in this process may lead to formation of free radicals capable of disrupting normal biological functions of the cell and causing loss of seed viability. Thus, to minimize or repair the damage, catalase, an antioxidant enzyme, acts on decomposition of H_2O_2 into H_2O and is not easily saturated by substrates, and is an important redox agent. Another form of antioxidant protection is the use of cathodic water, an electrolyzed solution with considerable potential for improving responses to stress related to cryopreservation procedures in plant materials. The objective of this study was to analyze the changes in physiological quality and catalase enzyme expression in coffee seeds cryopreserved by different protocols and treated with cathodic water. Seeds of the *Coffea arabica* L. species were processed and cryopreserved under eight different cryopreservation protocols for assessment of the following factors: drying methods (in silica gel or in saturated salt solutions) and final water content (17 and 20% wb), cooling procedures before immersion in liquid nitrogen (programmed slow freezing and direct immersion), and period of reheating in a water bath at 40°C after cryopreservation (2, 4, and 6 min). After cryopreservation, part of the seeds was treated with cathodic water and the other part was evaluated without this treatment. The seeds underwent physiological assessment and analysis of catalase enzyme expression (CAT) in gel electrophoresis. Of the factors investigated, the combination which provided best physiological quality was drying in saturated salt solution or in silica gel to 17% moisture, direct immersion in liquid nitrogen, and reheating for 2 min. The highest activity of CAT enzymes occurred in seeds with 17% water content and, consequently, they showed better physiological quality, regardless of the protocol used and of immersion in cathodic water. In most protocols tested, activity of this enzyme decreased when the seeds were immersed in the electrolyzed antioxidant solution, indicating its protective function against drying stress.

Keywords: Coffea arabica L., drying, cooling, reheating, liquid nitrogen.

Reference

1. BERJAK, P.; SERSHEN, B. V.; PAMMENTER, N. W. Cathodic amelioration of the adverse effects of oxidative stress accompanying procedures necessary for cryopreservation of embryonic axes of recalcitrant-seeded species. **Seed Science Research**, Wageningen, v. 21, n. 3, p. 187-203, Sept. 2011.