

OPTIMIZING SEED DRYING PERIODS FOR MOISTURE REDUCTION IN SELECTED CROP SPECIES FOR LONG-TERM CONSERVATION

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Maintaining the low seed moisture content is essential for extending seed longevity in gene banks. The conserved seeds at the National Genebank in Sri Lanka must be reduced to 5% before long-term storage in accordance with international standards. This study aimed to determine the optimal drying period to achieve the 5% moisture level of several selected crop species. The research was conducted at the Seed Conservation Unit of the Plant Genetic Resources Centre (PGRC), using four traditional rice (*Oryza sativa*) varieties (Dik Wee, Kuruluthuda, Masuran, Sudu Heenati), foxtail millet (*Setaria italica*), proso millet (*Panicum miliaceum*), groundnut (*Arachis hypogaea*), common bean (*Phaseolus vulgaris*), mustard (*Brassica nigra*), and sesame (*Sesamum indicum*). The initial seed moisture content of all species was measured before drying. Seeds were first transferred to a drying room (16°C, 25% RH) to reach approximately 7% moisture content and then placed in a drying cabinet (17°C, 20% RH) to achieve 5% moisture content. Subsequently, seeds were stored under medium-term storage conditions (5°C, 25% RH) to verify their readiness for conservation. Germination, viability, and vigor assessments were conducted throughout the drying and storage phases. Tested seeds exhibited a rapid decline in moisture content to 7%, followed by a slower reduction to 5%. Drying behaviors were highly variable among crop species, in both drying phases. Qualitative aspects of seeds; germination, viability and seedling vigor, remained stable throughout the drying and storage period, while common beans illustrated a rapid loss of germination. Results indicated that reducing the moisture content to 5% was effective for the long-term conservation of studied species. The identified drying periods can be effectively applied to reduce moisture to 5% in future conservation efforts at the National Genebank of Sri Lanka.

Keywords: Drying behavior, Genetic resources, Germination, Seed conservation, Seed moisture content