of time without losing the seed viability. However, a sizeable number of medicinal and aromatic plants produce seeds that differ in their capacity to withstand water loss and are termed as recalcitrant or desiccation sensitive seeds. Recalcitrant seeds do not undergo maturation drying and cannot withstand water loss to the magnitude of that experienced by orthodox seeds. Hence, these seeds are shed at relatively high moisture content. In order to remain viable, they must not undergo any substantial change in moisture. Placing seeds with high moisture content at sub-zero temperature results in the lethal disruption of cells due to formation of ice crystals and therefore they are not storable under conditions suitable for orthodox seeds and even when stored under moist condition, their viability is brief ranging from a few weeks to months. In addition to above, a category intermediate between the orthodox and recalcitrant species is also recognized, in which the seed survives desiccation but cannot sustain dry storage at low temperature. There are standard methods for determining seed storage behavior and this is an active area of research in the field of seed science in view of growing awareness globally for conserving the plant biodiversity. Some important tropical medicinal and aromatic species exhibiting recalcitrant or intermediate seed storage behaviour are: Saraca asoka, Murraya koenigi, Murraya paniculata, Madhuca indica, Eugenia spp., Garcinia spp., Azadirachta indica, Nepanthes gracilis, Coffea spp., Santalum album, Litchi chinensis, Mimusops spp., Cola nitida, Theobroma cacao, Camellia sinensis, Flacourtia indica, etc. The paper gives an account of status of knowledge of post harvest seed physiology in important species of medicinal and aromatic plants of India and scope of seed banking in seeds exhibiting recalcitrant and intermediate seed storage behaviour.

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Studies on seed morphology, anatomy, dormancy and germination in Desmodium gangeticum

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Desmodium gangeticum (L.) DC. commonly known as Shalparni is a sub-tropical perennial spreading herb that grows in dry hilly areas, belongs to the family Fabaceae. This plant has unique medicinal value in Ayurveda. Information on various aspects of seed is lacking, as this information is vitally important for re-generation of plants as well as for ex-situ conservation of seeds in seed banks. Therefore, studies were conducted on seed morphology, anatomy, dormancy, germination and seed storage behaviour of the taxa with the aim to understand the above parameters for examining the feasibility of its ex-situ conservation in seed banks. Freshly harvested seed samples of D. gangeticum were procured from Zhandu Foundation, Gujrat. The seeds were examined for morphological and anatomical parameters. The seeds are bean shaped, smooth, creamish white in colour and measures 2.5 x 1.5 x 3.4 mm (length x width x thickness). Thousand seed weight is 1.5 gm. Seeds are non endospermic with small bent axile type embryo. Germination studies were conducted on top of the paper method by incubating the seeds in different temperatures. Preliminary germination studies revealed that most of the seeds remain ungerminated, due to physical dormancy as the seeds did not imbibe water. Therefore, several pre-treatments like hot water, dry heat, H₂SO₄ scarification for different duration were given prior to germination. Perusal of the data reveals that all the seed pre-treatments showed increase in percent germination compared to the control (with no treatment) and scarification by H₂SO₄ for 20 minutes was proved to be the best among all the treatments giving 92% of germination. Optimum temperature for germination was 25°C; time taken for germination was 8 days. Physical dormancy is the second most widely occurring seed dormancy in Angiosperms. Anatomical studies of the seed reveal that physical dormancy is associated with exotesta having palisade epidermal layer of thick walled Malpighian cells that prevent passage of water to embryo. For leguminous seeds with physical dormancy to germinate, water impermeable layer must be made permeable, thereby allowing passage of water to embryo. In D. gangeticum seeds became permeable after the strophiole was disrupted by acid or hot water. Water impermeable seed coat help to retain low moisture content in the seeds even against high external humidity and therefore maintain seed viability for much longer period of time. Seeds with 5-7% moisture content retain 80-90% viability under ambient storage condition and are ideal for ex-situ conservation in seed banks.