

**ENHANCEMENT AND CRYOSTORAGE OF
LEONURUS SIBIRICUS L. SEEDS**

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**THESIS SUBMITTED IN FULFILLMENT FOR
THE DEGREE OF MASTER OF SCIENCE**

PERPUSTAKAAN
UNIVERSITI MALAYSIA SABAH

**INSTITUTE FOR TROPICAL BIOLOGY AND
CONSERVATION
UNIVERSITI MALAYSIA SABAH
2011**

ABSTRACT

ENHANCEMENT AND CRYOSTORAGE OF *LEONURUS SIBIRICUS* L. SEEDS.

Malaysian seed production face constraints due to high humidity and temperature which leads to the transmission of pests and diseases. Improvements in breeding programme is needed for a dynamic seed industry. This research investigate the storability of *Leonurus sibiricus* L. seeds in typical storage and the possibility of cryostorage. Other than that, it also look into priming treatments for better germination of the seeds. *Leonurus sibiricus* L. is a famous herb of Sarawak. Seeds were collected from the Agriculture Research Centre in Kuching, Sarawak. The effect of five different environments for the basic seed storage; ambient room (28 – 30°C), air-conditioned room (22-24°C), refrigerator (3-5°C), incubator (40°C) and freezer (0 - -4°C) and cryopreservation techniques were assessed on the storage life of *Leonurus sibiricus* L. seeds for better breeding programme. Cryopreservation techniques conducted were vitrification and dehydration. Enhancement treatments were also conducted to assess the response of the seeds to priming (osmopriming and hydropriming) and dehydration (silica gel and sucrose). Storage in refrigerator gave the highest germination percentage which is 32%. Vitrification technique has maintained about 44% germination at 10 minutes exposure to Plant Vitrification Solution 2 (PVS₂). But Linear Regression analysis showed that seeds exposed 50 minutes to PVS₂ solution can be kept longer. Dehydration has maintained about the 44% after 32 days in storage at below 10% seeds moisture content. Hydropriming at 30°C and 35°C resulting the highest germination, which is 55%. Osmoconditioning with 0.1M Polyethylene Glycol 6000 solution at 35°C for 10 hours produced more seedlings as compared to other concentrations. Sucrose dehydration has enhanced the seed germination percentage to 58% after 1 hour of exposure to 0.8M sucrose solution. Silica gel dehydration resulted in 25% germination and maintained at 3% moisture content by the end of 18th day of storage. Storing in refrigerator gave the highest percentage but cryopreservation is also promising for storage of *L. sibiricus* seeds.

Keywords : *Leonurus sibiricus*, storage, vitrification, dehydration, osmopriming, hydropriming.

ABSTRAK

*Pengeluaran biji benih di Malaysia sering menghadapi masalah serangga perosak dan penyakit akibat suhu dan kelembapan persekitaran yang tinggi. Oleh itu, penambahbaikan dalam program pembiakbakaan adalah amat penting untuk satu industri biji benih yang dinamik. Kajian ini menyelidiki tentang penyimpanan biji benih *Leonurus sibiricus* L. dalam persekitaran tipikal dan potensi dalam kriowetan. Selain itu, beberapa rawatan penyerapan (priming) juga dikaji bagi menghasilkan peratus percambahan yang tinggi. *Leonurus sibiricus* adalah herba terkenal di negeri Sarawak. Sampel biji benih yang digunakan di dalam kajian ini diperolehi daripada Agriculture Research Centre, Kuching, Sarawak. Kesan lima persekitaran berbeza berbeza; bilik bersuhu persekitaran ($28 - 30^{\circ}\text{C}$), bilik berhawa dingin ($22-24^{\circ}\text{C}$), peti sejuk ($3-5^{\circ}\text{C}$), inkubator (40°C) dan peti ais ($0 - -4^{\circ}\text{C}$) dan teknik penyimpanan kryo terhadap penyimpanan biji benih *Leonurus sibiricus* dikaji untuk program pembiakbakaan yang lebih baik. Teknik penyimpanan kryo yang digunakan ialah vitrifikasi dan penyahidratan. Beberapa rawatan bagi meningkatkan peratus percambahan biji benih *L. sibiricus* melalui penyerapan (priming) dan dehidrasi juga dijalankan. Penyimpanan di dalam peti sejuk memberikan peratus percambahan paling tinggi iaitu 32% selepas tempoh penyimpanan. Teknik vitrifikasi berjaya mengekalkan lebih kurang 44% percambahan bahan setelah didedahkan kepada larutan PVS_2 selama 10 minit. Namun analisis regrasi linear menunjukkan bahawa pendedahan selama 50 minit membolehkan biji benih disimpan dengan lebih lama. Teknik dehidrasi berjaya mengekalkan 44% percambahan setelah 32 hari penyimpanan dan kandungan lembapan pada biji benih diturunkan di bawah 10%. Rawatan penyerapan air yang dilakukan pada suhu 30°C dan 35°C menghasilkan peratus percambahan paling tinggi iaitu 55%. Rawatan penyerapan menggunakan larutan PEG 6000 berkepekatan 0.1M pada suhu 35°C selama 10 jam adalah yang terbaik berbanding kepekatan yang lain. Penyahidratan menggunakan larutan sukrosa pula meningkatkan peratus percambahan kepada 58% apabila didedahkan pada larutan berkepekatan 0.8M selama satu jam. Manakala, penyahidratan menggunakan gel silika menghasilkan 25% percambahan dan 3% kelembapan.*

*Kata kunci : *Leonurus sibiricus*, penyimpanan, vitrifikasi, penyahidratan, penyerapan air.*