

## **UJI DAYA SIMPAN BENIH MERAHAN (*Hopea odorata* Roxb.) DAN EVALUASI PENINGKATAN VIABILITASNYA MELALUI TEKNIK KRIOPRESERVASI**

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### **Abstrak**

*Hopea odorata* Roxb. merupakan tanaman hutan dari famili Dipterocarpaceae yang berstatus rentan terhadap kepunahan. Benih *H. odorata* bersifat rekalsitran sehingga daya simpannya menjadi lebih singkat. Salah satu upaya untuk meningkatkan daya simpannya adalah menggunakan perlakuan krioprotektan dan kriopreservasi. Penelitian ini terbagi menjadi tiga unit percobaan, pertama uji daya simpan benih pada suhu ruang ( $28 \pm 2^\circ\text{C}$ ) dengan 5 durasi penyimpanan (H0: benih segar, H1: 1 minggu, H2: 2 minggu, H3: 3 minggu dan H4: 4 minggu). Percobaan kedua, uji viabilitas pasca perendaman krioprotektan dan disimpan di suhu ruang. Percobaan ketiga, uji viabilitas pasca perendaman krioprotektan dan disimpan dalam nitrogen cair. Krioprotektan yang digunakan adalah PVS1 (*Plant Vitrifaction Solution 1* : manitol) dan PVS2 (DMSO 15%, etilen glikol 15% dan gliserol 30% dalam 0,4 M sukrosa), konsentrasi 25, 50, 75 dan 100% dan waktu perendaman 30, 60, 90 dan 120 menit. Benih disimpan selama 24 jam dan dikecambahkan setelahnya. Uji viabilitas terbagi menjadi variabel morfologi (perubahan warna, uji tetrazolium), fisiologis (bobot basah (BB), kadar air (KA), daya berkecambah (DB), kecepatan tumbuh (KCT), indeks vigor (IV), potensi tumbuh maksimal (PTM)), dan biokimia (jumlah elektrolit terlarut (ET), total malondialdehid (MDA), total fenol (FE), hormon). Hasil percobaan dianalisis menggunakan uji ANOVA, uji jarak berganda Duncan dan korelasi Pearson.

Benih *H. odorata* mengalami penurunan nilai BB, KA, DB, KCT, IV, PTM dan hormon asam absisat setelah 1 minggu penyimpanan di suhu ruang. Nilai ET, MDA dan FE meningkat seiring bertambahnya waktu penyimpanan dan menjadi indikator kemunduran viabilitas benih. Percobaan II menunjukkan jika PVS1 dan PVS2 menyebabkan penurunan KA serta meningkatkan MDA dan FE, sementara perlakuan PVS1 25% tidak mempengaruhi nilai DB, KCT, IV, dan PTM sehingga menjadi krioprotektan potensial dibandingkan PVS2. Percobaan III menunjukkan jika PVS1 menekan jumlah MDA dibandingkan PVS2, tetapi seluruh perlakuan krioprotektan belum optimal dalam mempertahankan viabilitas benih *H. odorata* pasca kriopreservasi, benih mengalami peningkatan ET, MDA dan FE yang menjadi indikator adanya kerusakan sel.

**Kata Kunci** : *Hopea odorata*, Kriopreservasi, Krioprotektan, Rekalsitran

## SEED LONGEVITY TEST OF MERAWAN (*Hopea odorata* Roxb.) AND EVALUATION THEIR VIABILITY THROUGH CRYOPRESERVATION TECHNIQUES

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### Abstract

*Hopea odorata* Roxb. is forest plant and vulnerable species from Dipterocarpaceae family. *H. odorata* seeds are recalcitrant or short-lived type of seed. The effort of improving of its shelf life is use cryoprotectant and cryopreservation techniques. This study was divided into three experimental units, the first is a test of the minimum storage of seeds at room temperature ( $28\pm 2^{\circ}\text{C}$ ), using 5 storage periods (H0 : fresh seeds, H1 : stored for one week, H2 : 2 weeks, H3 : 3 weeks and H4 : 4 weeks). The second experiment is viability test after cryopreservation treatment and stored at room temperature. The third experiment is viability test after cryopreservation treatment and stored in liquid nitrogen. The cryoprotectant compounds using PVS1 (Plant Vitrification Solution 1 : mannitol) and PVS2 (DMSO 15%, ethylene glycol 15% and glycerol 30%) with concentrations of 25, 50, 75 and 100%, and immersion times of 30, 60, 90 and 120 minutes. Seeds will be stored for 24 hours and germinated afterwards. Seed viability tests were divided into morphological observations (color change and tetrazolium test), physiological (fresh weight (FW), moisture content (MC), germination percentage (GP), germination rate (GR), vigor index (VI), maximum growth potential (MGP)), and biochemical (percentage of electrolyte leakage (EL), total malondialdehyde (MDA), total phenol (PH), hormone profile). The experimental results were analyzed using ANOVA, Duncan Multiple Range Test, and Pearson Correlation.

Value of FW, MC, GP, GR, VI, MGP and abscisic acid hormone of *H. odorata* seeds are decreased after 1 week of storage at room temperature. The amount of EL, MDA and PH increased during storage periods and as indicator decreasing of seed viability. Unit two experiments showed that PVS1 and PVS2 caused decrease of MC and increase of MDA and PH. The 25% PVS1 treatment did not affect the GP, GR, VI, and MGP of *H. odorata* seeds, therefore the PVS1 25% became a potential cryoprotectant compared to PVS2. Unit three experiments showed that PVS1 suppressed the amount of MDA compared to PVS2, but all cryoprotectant treatments were not effective increasing the viability after cryopreservations, increasing of EL, MDA and PH indicated of cell damage.

**Keywords :** *Hopea odorata*, Cryopreservation, Cryoprotectant, Recalcitrant