PENGARUH PENAMBAHAN EKSTRAK PISANG RAJA DAN AIR KELAPA TERHADAP PERTUMBUHAN EMBRIO ANGGREK *Vanda limbata* Blume SECARA *IN VITRO*

Inayah Budi Cahyani

21/483134/BI/10894

Dosen Pembimbing: Prof. Dr. Endang Semiarti, M.S., M.Sc.

INTISARI

Eksploitasi berlebihan, alih fungsi lahan, dan kebakaran hutan menyebabkan populasi anggrek *Vanda limbata* di alam mengalami penurunan signifikan. Perbanyakan konvensional yang sulit menjadikan kultur *in vitro* sebagai alternatif yang potensial untuk konservasi. Penelitian ini bertujuan mengevaluasi pengaruh kombinasi ekstrak pisang raja dan air kelapa dalam media VW terhadap pertumbuhan dan perkembangan awal embrio *V. limbata*. Perlakuan yang diuji meliputi kombinasi pisang raja (0, 50, 100, 150 g/L) dan air kelapa (0, 50, 100, 150 mL/L). Parameter pengamatan meliputi persentase perkembangan fase embrio, panjang, lebar, dan warna protokorm, serta dianalisis secara statistik menggunakan RAL, ANOVA, dan DMRT. Hasil penelitian menunjukkan bahwa media VW dengan penambahan 100 g/L pisang raja dan 100 mL/L air kelapa merupakan kombinasi optimal dalam mendukung pertumbuhan protokorm dengan meningkatkan persentase keberhasilan perkecambahan hingga 86.25%. Protokorm yang dihasilkan menunjukkan perkembangan struktur khas seperti SAM (S*hoot Apical Meristem*) dan AH (*absorbing hair)*. Analisis molekuler memperkuat penelitian dengan teridentifikasinya ekspresi gen *HOMEOBOX KNOX1*, yang diketahui berperan dalam pembentukan meristem dan perkembangan embrio. Spesies *Phalaenopsis equestris* memiliki similaritas paling tinggi terhadap *V. limbata* yakni 91.57%. Penelitian ini membuktikan bahwa sumber fitohormon alami seperti pisang raja dan air kelapa tidak hanya mendukung pertumbuhan secara morfologis, tetapi juga merangsang dalam tahapan awal perkembangan anggrek *V. limbata*.

KATA KUNCI: air kelapa, ekstrak pisang, gen *HOMEOBOX*, kultur *in vitro*, *Vanda limbata*

THE EFFECT OF "PISANG RAJA" BANANA EXTRACT AND COCONUT WATER ADDITION ON THE *IN VITRO* GROWTH OF *Vanda limbata* Blume ORCHID EMBRYOS

Inayah Budi Cahyani

21/483134/BI/10894

Supervisor: Prof. Dr. Endang Semiarti, M.S., M.Sc.

ABSTRACT

Overexploitation, land-use change, and forest fires have significantly reduced the natural population of *Vanda limbata* in the wild. Due to the difficulty of conventional propagation, *in vitro* culture has emerged as a promising alternative for conservation efforts. This study aims to evaluate the effect of combining "pisang raja" banana extract and coconut water in VW (Vacin & Went) medium on the early growth and development of *V. limbata* embryos. The treatments tested included combinations of "pisang raja" banana extract (0, 50, 100, 150 g/L) and coconut water (0, 50, 100, 150 mL/L). Observational parameters included the percentage of embryo developmental phases, protocorm length, width, and color. Data were statistically analyzed using a Completely Randomized Design (CRD), ANOVA, and Duncan's Multiple Range Test (DMRT). The results showed that VW medium supplemented with 100 g/L of "pisang raja" banana and 100 mL/L of coconut water was the most effective combination, supporting optimal protocorm development and increasing the germination success rate to 86.25%. The resulting protocorms displayed characteristic structures such as the Shoot Apical Meristem (SAM) and absorbing hairs (AH). Molecular analysis further supported the findings, with the identification of *KNOX1 HOMEOBOX* gene expression, which is known to play a crucial role in meristem formation and embryo development. The species *Phalaenopsis equestris* showed the highest similarity to *V. limbata*, with a sequence similarity of 91.57%. This study demonstrates that natural phytohormone sources, such as banana "pisang raja" and coconut water, not only support morphological growth but also stimulate early developmental stages in *V. limbata* orchids.

Keywords: coconut water, banana extract, homebox gene, *in vitro* culture, *Vanda limbata*