

**EFEK PAPARAN ULTRAVIOLET-B TERHADAP PERTUMBUHAN DAN
AKUMULASI METABOLIT SEKUNDER TANAMAN KELADI PENTUL
MERAH (*Homalomena pendula*) PADA LINGKUNGAN TERKONTROL**

SKRIPSI SARJANA BIOLOGI

OLEH :



GHINAA ZAHRAH

B.P. 2010421008

PEMBIMBING:

DR. M. IDRIS

SUWIRMEN, MS

DEPARTEMEN BIOLOGI

FAKULTAS MATEMATIKA DAN ILMU PENGETAHUAN ALAM

UNIVERSITAS ANDALAS

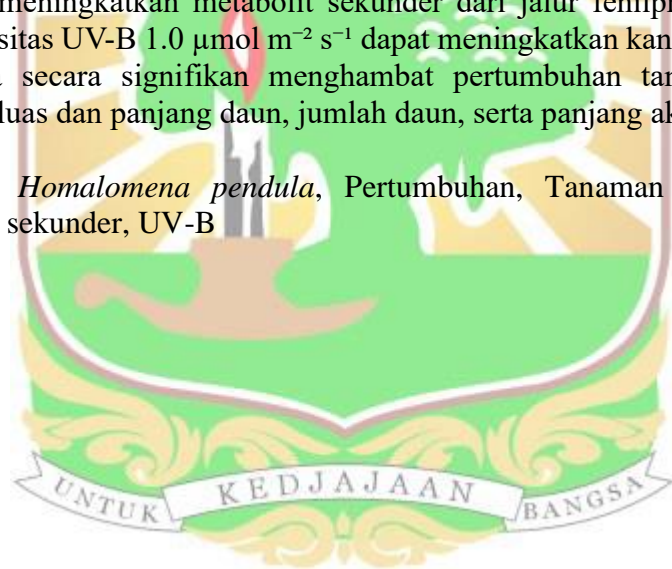
PADANG

2024

ABSTRAK

Homalomena pendula merupakan tanaman yang hidup di bawah naungan dan memiliki peran penting dalam pengobatan tradisional karena aktivitas farmakologisnya, seperti antikolinesterase, anti-inflamasi, dan anti-osteoporosis. Tantangan utama pada tanaman ini adalah rendahnya kandungan metabolit sekunder. Untuk meningkatkan produksi metabolit sekunder tanpa menghambat pertumbuhan, paparan UV-B menjadi salah satu solusi potensial. Penelitian ini bertujuan mengevaluasi efek radiasi UV-B pada *Homalomena pendula* dan menentukan intensitas UV-B yang paling efektif dalam meningkatkan akumulasi metabolit sekunder tanpa menghambat pertumbuhan tanaman. Analisis data menggunakan uji independent T-test dengan membandingkan parameter fisiologis dan kandungan metabolit sekunder pada tanaman yang terpapar UV-B (0.3 , 1.0 , dan $3.0 \mu\text{mol m}^{-2} \text{s}^{-1}$) dengan tanaman kontrol. Hasil penelitian menunjukkan bahwa intensitas $1.0 \mu\text{mol m}^{-2} \text{s}^{-1}$ secara signifikan meningkatkan kandungan klorofil dibandingkan kontrol, meskipun menurunkan jumlah akar dan lebar daun. Intensitas UV-B tinggi ($\geq 1.0 \mu\text{mol m}^{-2} \text{s}^{-1}$) dapat meningkatkan metabolit sekunder dari jalur fenilpropanoid, dengan demikian, intensitas UV-B $1.0 \mu\text{mol m}^{-2} \text{s}^{-1}$ dapat meningkatkan kandungan metabolit sekunder tanpa secara signifikan menghambat pertumbuhan tanaman, termasuk panjang petiol, luas dan panjang daun, jumlah daun, serta panjang akar.

Kata kunci : *Homalomena pendula*, Pertumbuhan, Tanaman obat, Metabolit sekunder, UV-B



ABSTRACT

Homalomena pendula is a shade-grown plant renowned for its traditional medicinal properties, *i.e.*, anticholinesterase, anti-inflammatory, and anti-osteoporosis effects. However, the accumulation of its secondary metabolites is challenging due to its low concentration, a result of its shade-grown nature. To address this issue, alternative methods are needed to enhance production of secondary metabolites without hindering plant growth. One promising approach is UV-B exposure, which may boost secondary metabolite biosynthesis. This study aims to evaluate the effects of different UV-B intensities on the growth of *H. pendula* and identify the UV-B intensities that were more effective in increasing secondary metabolite accumulation without compromising plant growth. An experimental method was used in a light-controlled environment supplemented with intensity of UV-B at 0, 0.3, 1.0, and 3.0 $\mu\text{mol m}^{-2} \text{s}^{-1}$. An unpaired-two-tailed student T-test was employed to analyze the response between UV-B-exposed plants and control (non-UV-B-exposed plants). The results showed that plants exposed to 1.0 $\mu\text{mol m}^{-2} \text{s}^{-1}$ UV-B significantly increased chlorophyll content, while reducing root number and leaf width when compared to control. Other growth parameters, *i.e.*, petiole length, leaf length, leaf number, leaf area, and root length, were not affected by UV-B treatment. UV-B intensities of 1.0 $\mu\text{mol m}^{-2} \text{s}^{-1}$ or higher enhanced accumulation of secondary metabolites, particularly from the phenylpropanoid pathway. Thus, UV-B exposure at 1.0 $\mu\text{mol m}^{-2} \text{s}^{-1}$ tend to increase secondary metabolite content without significantly impairing plant growth. The results of LC-MS data were presented to provide an overview of UV-B effect on secondary metabolite accumulation in *H. pendula*.

Keywords: Growth, *Homalomena pendula*, Medicinal plant, Secondary metabolites, UV-B