

ISOLASI DAN KARAKTERISASI *PLANT GROWTH PROMOTING RHIZOBACTERIA* PELARUT FOSFAT TANAMAN GULMA *Mikania micrantha* Kunth. UNTUK PENGEMBANGAN BIOFERTILIZER

Zahra Tihta Amalia

21/478931/BI/10781

Dosen Pembimbing: Prof. Dr. Endah Retnaningrum, M. Eng

INTISARI

Tingkat produksi kopi di Indonesia dinilai masih belum optimal. Beragam faktor diduga menjadi penyebab termasuk ketersediaan fosfor (P) di tanah yang sangat rendah sehingga menghambat pertumbuhan tanaman. Keberadaan gulma *Mikania micrantha* Kunth. yang melimpah di area perkebunan kopi dapat digunakan sebagai biofertilizer melalui isolasi dan karakterisasi *Plant Growth Promoting Rhizobacteria* (PGPR) pada daerah perakaran gulma. Penelitian ini bertujuan untuk isolasi dan karakterisasi PGPR pada *Mikania micrantha* yang dapat melarutkan fosfat sebagai biofertilizer. Tujuan dari penelitian ini adalah untuk isolasi dan karakterisasi terhadap bakteri pelarut fosfat yang termasuk dalam *Plant Growth Promoting Rhizobacteria* (PGPR) dari tanaman gulma *Mikania micrantha* sebagai biofertilizer. Sebanyak lima isolat berhasil diperoleh dari daerah perakaran (*rhizosfer*) *Mikania micrantha*, kemudian diuji kemampuannya dalam melarutkan fosfat pada media Pikovskaya. Seluruh isolat menunjukkan aktivitas pelarutan fosfat, dengan nilai indeks kelarutan fosfat (IKF) tertinggi sebesar 1,8 yang diperoleh dari isolat MCF 3. Karakterisasi dilakukan melalui pengamatan morfologi koloni, pewarnaan gram, serta serangkaian uji biokimia (amilase, katalase, nitrat, dan indol), termasuk pula uji motilitas. Berdasarkan hasil identifikasi, seluruh isolat diklasifikasikan ke dalam genus *Bacillus*, mencakup spesies *Bacillus subtilis*, *Bacillus cereus*, *Bacillus pumilus*, dan *Bacillus licheniformis*. Temuan ini mengindikasikan bahwa *Mikania micrantha*, meskipun merupakan gulma invasif, memiliki potensi sebagai sumber isolat PGPR pelarut fosfat.

KATA KUNCI: Rhizosfer, Fosfatase, Siderofor, Asam organik

ISOLATION AND CHARACTERIZATION OF PLANT GROWTH PROMOTING RHIZOBACTERIA PHOSPHATE SOLUBILIZING WEED *Mikania micrantha* Kunth FOR BIOFERTILIZER DEVELOPMENT

Zahra Tihta Amalia

21/478931/BI/10781

Supervisor: Prof. Dr. Endah Retnaningrum, M. Eng

Abstract

The coffee production level in Indonesia is considered to be suboptimal. Various factors are suspected to contribute to this issue, including the very low availability of phosphorus (P) in the soil, which hinders plant growth. The abundant presence of the weed *Mikania micrantha* Kunth. in coffee plantation areas presents a potential alternative as a source of biofertilizer through the isolation and characterization of phosphate-solubilizing Plant Growth Promoting Rhizobacteria (PGPR) from its rhizosphere. This study aimed to isolate and characterize PGPR associated with *Mikania micrantha* that are capable of solubilizing phosphate as a potential biofertilizer. A total of five bacterial isolates were successfully obtained from the rhizosphere of *Mikania micrantha* and tested for their phosphate-solubilizing ability using Pikovskaya's medium. All isolates demonstrated phosphate-solubilizing activity, with the highest phosphate solubilization index (PSI) value of 1.8 observed in isolate MCF 3. Characterization of the isolates was carried out based on colony morphology, Gram staining, and a series of biochemical tests (amylase, catalase, nitrate, and indole), as well as motility testing. Based on the identification results, all isolates were classified within the genus *Bacillus*, including the species *Bacillus subtilis*, *Bacillus cereus*, *Bacillus pumilus*, and *Bacillus licheniformis*. These findings indicate that *Mikania micrantha*, despite being an invasive weed, possesses potential as a source of phosphate-solubilizing PGPR isolates.

KEYWORDS: Rhizosphere, Phosphatase, Siderophore, Organic acids