

## ABSTRAK

# ISOLASI BAKTERI SEDIMEN *MANGROVE* LAMPUNG SELATAN DAN PESAWARAN PENGHASIL SENYAWA METABOLIT SEKUNDER SEBAGAI ANTIBAKTERI TERHADAP *Pseudomonas aeruginosa*

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Resistensi antibiotik pada bakteri patogen seperti *Pseudomonas aeruginosa* menjadi ancaman kesehatan global yang serius, sehingga menuntut eksplorasi sumber daya hayati baru sebagai agen antimikroba. Penelitian ini bertujuan mengisolasi bakteri sedimen *mangrove* dari Lampung Selatan dan Pesawaran yang berpotensi menghasilkan senyawa metabolit sekunder antibakteri. Ekosistem *mangrove* dipilih karena karakteristik lingkungannya yang kompleks dan kaya nutrisi organik, sehingga mendukung keberagaman mikroba fungsional.

Metodologi penelitian meliputi isolasi bakteri melalui metode pengenceran bertingkat pada media *Zobell Marine*, dilanjutkan dengan skrining aktivitas antibakteri menggunakan metode difusi cakram. Isolat dengan penghambatan tertinggi dikarakterisasi morfologinya, kemudian dikultivasi dalam media *Nutrient Broth* (NB) untuk ekstraksi metabolit sekunder dengan pelarut etil asetat. Karakterisasi senyawa dilakukan menggunakan instrumen FTIR untuk identifikasi gugus fungsi dan LC-MS/MS untuk penentuan profil molekul senyawa aktif.

Hasil penelitian memperoleh 26 isolat bakteri, dimana isolat MP4-P7-B3 menunjukkan aktivitas paling signifikan dengan zona hambat 12 mm terhadap *P. aeruginosa*. Isolat ini secara morfologi memiliki kemiripan dengan genus *Bacillus*. Analisis FTIR dan KLT mengindikasikan keberadaan senyawa golongan siklik dipeptida. Hasil LC-MS/MS berhasil mengidentifikasi 25 profil senyawa, termasuk *Cyclo(L-Pro-L-Val)*, *Cyclo(Hpro-Leu)*, dan *Cyclo(L-Phe-L-Pro)* yang terindikasi kuat memiliki aktivitas antibakteri. Temuan ini menegaskan potensi bakteri sedimen *mangrove* lokal sebagai sumber antibiotik baru dalam mengatasi masalah resistensi bakteri.

**Kata Kunci:** Antibakteri, *Bacillus* sp., metabolit sekunder, *Pseudomonas aeruginosa*, sedimen *mangrove*.

## ABSTRACT

### ISOLATION OF BACTERIA FROM SEDIMENTS IN SOUTH LAMPUNG AND PESAWARAN MANGROVES THAT PRODUCE SECONDARY METABOLITE COMPOUNDS AS ANTIBACTERIAL AGENTS AGAINST *Pseudomonas aeruginosa*

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Antibiotic resistance in pathogenic bacteria such as *Pseudomonas aeruginosa* poses a serious global health threat, requiring the exploration of new biological resources as antimicrobial agents. This study aims to isolate mangrove sediment bacteria from South Lampung and Pesawaran that have the potential to produce antibacterial secondary metabolites. The mangrove ecosystem was chosen because of its complex environmental characteristics and rich organic nutrients, which support functional microbial diversity.

The research methodology included bacterial isolation through a stepwise dilution method on Zobell Marine medium, followed by antibacterial activity screening using the disc diffusion method. Isolates with the highest inhibition were characterized morphologically, then cultivated in Nutrient Broth (NB) medium for secondary metabolite extraction with ethyl acetate solvent. Compound characterization was performed using FTIR instruments for functional group identification and LC-MS/MS for determining the molecular profile of active compounds.

The study obtained 26 bacterial isolates, of which isolate MP4-P7-B3 showed the most significant activity with an inhibition zone of 12 mm against *P. aeruginosa*. Morphologically, this isolate is similar to the genus *Bacillus*. FTIR and KLT analyses indicated the presence of cyclic dipeptide compounds. LC-MS/MS analysis successfully identified 25 compound profiles, including Cyclo(L-Pro-L-Val), Cyclo(Hpro-Leu), and Cyclo(L-Phe-L-Pro), which are strongly indicated to have antibacterial activity. These findings confirm the potential of local mangrove sediment bacteria as a source of new antibiotics in overcoming bacterial resistance problems.

**Keywords:** Antibacterial, *Bacillus* sp., secondary metabolites, *Pseudomonas aeruginosa*, mangrove sediment.