

**KARAKTERISASI DAN UJI AKTIVITAS AKTINOMISETES  
PENGHASIL ANTIBIOTIK TERHADAP *MULTI-DRUG RESISTANT*  
*BACTERIA STRAINS***

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**INTISARI**

Peningkatan resistensi bakteri patogen terhadap berbagai jenis antibiotik menjadi salah satu permasalahan dalam dunia kesehatan. Penelitian ini bertujuan untuk mengetahui kemelimpahan dan keragaman aktinomisetes yang ada di hutan mangrove, Baros, DIY, mengetahui aktivitas antibiotik, identifikasi isolat penghasil antibiotik berdasarkan karakterisasi kultural, morfologis, fisiologis, biokimiawi, dan molekuler serta mendeteksi keberadaan gen pengkode antibiotik. Beberapa tahapan dalam penelitian ini meliputi: 1) Sampling rizosfer mangrove dan pengukuran parameter lingkungan; 2) Isolasi dan purifikasi aktinomisetes; 3) Skrining isolat penghasil antibiotik; 4) Karakterisasi kultural, morfologis, fisiologis, dan biokimiawi; 5) Karakterisasi molekuler gen 16S rRNA 6) Produksi dan ekstraksi antibiotik isolat terpilih dan 7) Uji MIC terhadap lima strain bakteri MDR. Hasil penelitian menunjukkan, kemelimpahan paling tinggi ditemukan pada rizosfer tipe lumpur terendam yaitu  $2,16 \times 10^4$  cfu/g. Isolat yang dimurnikan sebanyak 15 isolat yang memiliki keragaman tinggi dari warna miselium aerial, miselium substrat dan pigmen yang diproduksi. Lima isolat diantaranya mampu menghasilkan antibiotik. Isolat terpilih yang memiliki rata-rata zona hambat tertinggi, 42,5 mm yaitu isolat ACSAN21-05. Isolat ACSAN21-05 memiliki tipe rantai spora *polysporus* dengan tipe percabangan hifa aerial *rectiflexibiles*, tumbuh optimum pada suhu 30°C, salinitas 1%, pH 7, mampu menghidrolisis pati, menguraikan H<sub>2</sub>O<sub>2</sub>, serta menggumpalkan susu dan menguraikannya menjadi kasein. Berdasarkan gen 16S rRNA, isolat ACSAN21-05 tergolong ke dalam genus *Streptomyces*. *Crude extract* isolat ACSAN21-05 mampu menghambat *E. coli* dan *E. cloacae* dengan nilai MIC masing-masing 25 dan 50 mg/mL.

**Kata kunci :** Aktinomisetes, rizosfer, mangrove, antibiotik, MDR

## **CHARACTERIZATION AND ACTIVITY TEST OF ACTINOMYCETES PRODUCING ANTIBIOTICS AGAINST MULTI-DRUG RESISTANT BACTERIA STRAINS**

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### **ABSTRACT**

Increasing the resistance of pathogenic bacteria to various types of antibiotics is one of the problems in the world of health. This study aims to determine the abundance and diversity of actinomycetes in mangrove forests, Baros, DIY, to determine antibiotic activity, to identify antibiotic-producing isolates based on cultural, morphological, physiological, biochemical, and molecular characteristics and to detect the presence of antibiotic coding genes. Several stages in this study include: 1) Sampling the mangrove rhizosphere and measuring environmental parameters; 2) Isolation and purification of actinomycetes; 3) Screening of isolates producing antibiotics; 4) Cultural, morphological, physiological, and biochemical characterization; 5) Molecular characterization of the 16S rRNA gene 6) Production and extraction of selected isolate antibiotics and 7) MIC test on five strains of MDR bacteria. The results showed that the highest abundance was found in the submerged mud-type rhizosphere, namely  $2.16 \times 10^4$  cfu/g. There were 15 purified isolates that had high diversity in the color of aerial mycelium, substrate mycelium, and the pigments produced. Five isolates of them could produce antibiotics. The selected isolate with the highest average inhibition zone, 42.5 mm, is isolated ACSAN21-05. ACSAN21-05 isolate has polysporus spore chain type with aerial rectiflexibles hyphae branching type, optimum growth at 30°C, 1% salinity, pH 7, able to hydrolyze starch, decompose H<sub>2</sub>O<sub>2</sub>, and coagulate milk and decompose it into caseine. Based on the 16S rRNA gene, isolate ACSAN21-05 belongs to the genus *Streptomyces*. Crude extract isolate ACSAN21-05 was able to inhibit *E. coli* and *E. cloacae* with MIC values of 25 and 50 mg/mL, respectively.

**Keywords:** Actinomycetes, rhizosphere, mangrove, antibiotics, MDR