

**FAKULTAS KEDOKTERAN DAN ILMU KESEHATAN
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**UJI AKTIVITAS ANTIBAKTERI ANTIBIOTIK MEROPENEM
TERHADAP BAKTERI *PSEUDOMONAS AERUGINOSA* SECARA *IN VITRO*
ABSTRAK**

Latar Belakang : *Pseudomonas aeruginosa* merupakan patogen oportunistik utama penyebab infeksi nosokomial dan dikenal memiliki tingkat resistensi antibiotik yang tinggi. Meropenem sebagai antibiotik golongan karbapenem masih digunakan sebagai terapi lini pertama pada infeksi berat, namun peningkatan resistensi terhadap meropenem terus dilaporkan sehingga diperlukan evaluasi berkala terhadap aktivitas antibakterinya. **Tujuan Penelitian :** Mengetahui aktivitas antibakteri meropenem terhadap *Pseudomonas aeruginosa* secara *in vitro* berdasarkan nilai effective concentration 50 (EC₅₀). **Metode :** Penelitian eksperimental *in vitro* menggunakan metode checkerboard assay. Isolat *Pseudomonas aeruginosa* diperoleh dari koleksi Laboratorium Mikrobiologi Fakultas Kedokteran Universitas Hasanuddin. Pengujian dilakukan pada tiga kondisi pelarut, yaitu nonpolar, polar, dan semipolar, dengan delapan variasi konsentrasi meropenem (0–32 µg/mL). Data dianalisis menggunakan perangkat lunak Combenefit untuk memperoleh hubungan dosis–respon dan nilai EC₅₀. **Hasil :** Hasil penelitian menunjukkan bahwa nilai EC₅₀ meropenem terhadap *Pseudomonas aeruginosa* pada pelarut nonpolar (n-heksana) sebesar 0,502 µg/mL, pada pelarut polar (etanol) sebesar 0,695 µg/mL, dan pada pelarut semipolar (etil asetat) sebesar 1,04 µg/mL. Seluruh nilai EC₅₀ berada di bawah ambang batas

sensitivitas yang ditetapkan. **Kesimpulan** : Disimpulkan bahwa meropenem memiliki aktivitas antibakteri yang tinggi dan stabil terhadap *Pseudomonas aeruginosa* pada berbagai kondisi pelarut, serta dapat digunakan sebagai data dasar untuk penelitian uji sinergisme selanjutnya sebagai upaya perlindungan kesehatan manusia sesuai prinsip hifz al-nafs.

Kata Kunci: Meropenem, *Pseudomonas aeruginosa*, EC_{50} , Checkerboard, *In Vitro*.



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**ANTIMICROBA ACTIVITY TEST OF MEROPENEM AGAINST
PSEUDOMONAS AERUGINOSA BACTERIA
IN VITRO**

ABSTRACT

Background: *Pseudomonas aeruginosa* is a major opportunistic pathogen responsible for many nosocomial infection and is characterized by high levels of antibiotic resistance.. Meropenem, a carbapenem antibiotic, serves as a first-line therapy for severe infections; however, increasing resistance of this bacterium to meropenem has been reported both globally and locally. Therefore, periodic evaluation of its effectiveness is essential. **Objective:** This study aims to determine the *in vitro* antibacterial activity of meropenem against *Pseudomonas aeruginosa* by determining the *Effective Concentration 50* (EC₅₀) value. **Methods:** This research is an experimental *In vitro* study using the checkerboard assay method. Clinical isolates of *Pseudomonas aeruginosa* were obtained from the Microbiology Laboratory collection, Faculty of Medicine, Universitas Hasanuddin. Testing was conducted under three solvent conditions (nonpolar, polar, and semipolar) with eight concentration of meropenem (0 to 32 µg/mL). Dose-response relationship and EC₅₀ values were analyzed using Combenefit Software.. **Results:** The results showed that the EC₅₀ of meropenem in nonpolar solvent (n-hexane) was 0.502 µg/mL, in polar solvent (ethanol) was 0.695 µg/mL, and in semipolar solvent (ethyl-acetate) was 1.04 µg/mL. All three values are below the sensitivity threshold (breakpoint) set by the Clinical and Laboratory Standards Institute (CLSI), which

is ≤ 2 $\mu\text{g/mL}$. **Conclusion:** Meropenem demonstrates high antibacterial activity against the tested *Pseudomonas aeruginosa* isolates. This activity remains stable across various solvent conditions, allowing it to be used as baseline data for future synergistic testing research. This study also aligns with the Islamic principle of *hifz al-nafs* (protection of life) through scientific efforts to safeguard human health.

Keywords: Meropenem, *Pseudomonas aeruginosa*, EC_{50} , Checkerboard, In Vitro.

