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Uji aktivitas antibiotik senyawa novel analog antimycin A3 sebagai penghambat pertumbuhan staphylococcus aureus = Antibiotic susceptibility testing of antimycin A3 analogue novel compounds against the growth of staphylococcus aureus

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Abstrak

Staphylococcus aureus merupakan salah satu penyebab terbesar kematian akibat infeksi nosokomial dengan resistensi yang tinggi. Antimycin A3 memiliki efek antibakteri terhadap Staphylococcus aureus. Modifikasi dilakukan dengan membuka inti dilakton cincin sembilan dan menambahkan segmen aromatis sederhana pada 15 senyawa analog Antimycin A3. Metode uji menggunakan makrodilusi broth untuk melihat derajat kekeruhan yang dilaporkan sebagai Minimum Inhibitory Concentration (MIC). Senyawa uji dilarutkan oleh DMSO 1% (v/v), lalu dicampurkan dalam medium Brain Heart Infusion (BHI). Setiap senyawa dibagi menjadi konsentrasi 400, 200, 100 dan 50 g/mL. Ciprofloxacine dan co-amoxiclav dipakai sebagai kontrol positif. Kontaminasi dicegah dengan kontrol medium, kontrol senyawa, kontrol bakteri dan kontrol pelarut. Hasil pengamatan dikonfirmasi dengan menumbuhkan bakteri pada medium agar darah. Hasil uji menyatakan senyawa analog 6, 10, dan 12 memiliki MIC > 400 g/mL dan senyawa analog 9 memiliki MIC > 200 g/mL terhadap Staphylococcus aureus. Modifikasi pada senyawa analog 9 dengan menambahkan N-metil-3 formamido-2-metoksi pada cincin aromatis dan L-threonin-allyl ester terhidroksilasi dengan salah satu gugus hidroksil pada posisi bottom-facial stereochemistry, berkontribusi meningkatkan aktivitas antibakteri terhadap Staphylococcus aureus. Namun, hasil penelitian tidak bermakna secara klinis, karena standar MIC sebagai antibakteri adalah < 128 mg/mL.

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Staphylococcus aureus is one of the top nosocomial infection death causes. This bacteria had high resistance against various antibiotics. Antimycin A3 has antibacterial effect against Staphylococcus aureus. Modification was conducted by opened the 9-membered dilactone ring and added simple aromatics segment on 15 analogue compound Antimycin A3. Macrodilution broth method was used to observe the turbidity degree which was presented in Minimum Inhibitory Concentration (MIC). Test compounds were dissolved in DMSO 1% and mixed in Brain Heart Infusion (BHI) medium. Each compound was divided into 400, 200, 100 and 50 g/mL concentrations. Ciprofloxacine and co-amoxiclav were used as positive controls. The contamination was prevented by medium, compound, bacterial, and solvent controls.

The observation was confirmed by growing the bacteria on medium control. The test resulted with the MIC of analogue compounds 6, 10, and 12 against Staphylococcus aureus is > 400 g/mL. Analogue compound 9 with MIC > 200 g/mL had higher activity than Antimycin A3 against Staphylococcus aureus. Modifications of analogue compound 9 by adding N-methyl-3-methoxy formamido-2 on the aromatic ring and L-threonine-allyl ester hydroxylated with one hydroxyl group on bottom-facial stereochemistry position contributed to the increase in antibacterial activity against Staphylococcus aureus. However, the results aren’t clinically significant because the standard MIC as an antibacterial agent is < 128 g/mL.Staphylococcus Aureus.