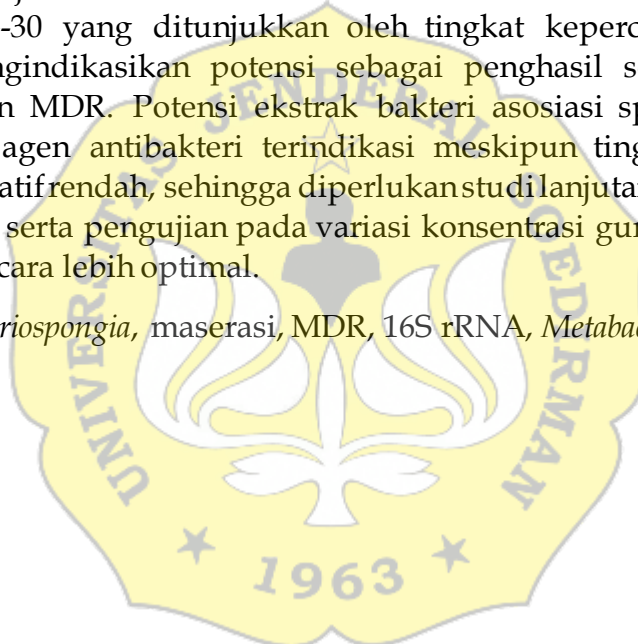


ABSTRAK

Meningkatnya kasus resistensi antibiotik terhadap bakteri *Multi-Drug Resistant* (MDR) mendorong pencarian agen antibakteri baru, salah satunya melalui eksplorasi bakteri asosiasi spons laut. Penelitian ini bertujuan untuk mengevaluasi aktivitas antibakteri dari ekstrak metabolit sekunder bakteri asosiasi spons *Carteriospongia* yang diisolasi dari Perairan Batu Ringgit, Tulamben, Bali. Ekstrak metabolit sekunder bakteri asosiasi spons diperoleh melalui metode maserasi dan diuji terhadap empat bakteri MDR: *Metichilin Resistant Staphylococcus Aureus*, *Escherichia coli*, *Klebsiella pneumoniae*, dan *Bacillus subtilis* menggunakan metode difusi kertas cakram. Lebih dari 70% hasil pengujian menunjukkan aktivitas antibakteri lemah terhadap keempat bakteri patogen (zona hambat ≤ 5 mm), sementara $<11\%$ menunjukkan aktivitas sedang terhadap *B. subtilis*, dan sisanya tidak memiliki aktivitas zona hambat. Isolat RI.NA.65 dipilih untuk identifikasi molekuler berdasarkan konsistensi aktivitasnya. Analisis gen 16S rRNA dan pohon filogenetik menunjukkan bahwa RI.NA.65 berkerabat dekat dengan *Metabacillus indicus* strain JG-30 yang ditunjukkan oleh tingkat kepercayaan percabangan sebesar 86, mengindikasikan potensi sebagai penghasil senyawa antibakteri terhadap patogen MDR. Potensi ekstrak bakteri asosiasi spons *Carteriospongia* sebagai sumber agen antibakteri terindikasi meskipun tingkat aktivitas yang diamati masih relatif rendah, sehingga diperlukan studi lanjutan berupa pemurnian senyawa bioaktif serta pengujian pada variasi konsentrasi guna menggali potensi antibakterinya secara lebih optimal.

Kata kunci: *Carteriospongia*, maserasi, MDR, 16S rRNA, *Metabacillus indicus*



ABSTRACT

The increasing incidence of antibiotic resistance in *Multi-Drug Resistant* (MDR) bacteria drives the search for new antibacterial agents, one of which involves exploring sponge-associated bacteria. This study aimed to evaluate the antibacterial activity of secondary metabolite extracts from sponge-associated bacteria of *Carteriospongia* isolated from Batu Ringgit Waters, Tulamben, Bali. The secondary metabolite extracts were obtained through maceration and tested against four MDR bacteria: *Methicillin Resistant Staphylococcus aureus*, *Escherichia coli*, *Klebsiella pneumoniae*, and *Bacillus subtilis* using the paper disc diffusion method. More than 70% of the tests showed weak antibacterial activity against the four pathogenic bacteria (inhibition zones ≤ 5 mm), while less than 11% showed moderate activity against *B. subtilis*, and the remaining isolates did not exhibit inhibition zones. The RI.NA.65 isolate was selected for molecular identification based on its consistent activity. Analysis of the 16S rRNA gene and phylogenetic tree revealed that RI.NA.65 is closely related to *Metabacillus indicus* strain JG-30, indicated by a branching similarity level of 86%, suggesting its potential as a producer of antibacterial compounds against MDR pathogens. Although the antibacterial activity observed was relatively low, the potential of *Carteriospongia*-associated bacterial extracts as a source of antibacterial agents is indicated, thus further studies such as bioactive compound purification and testing at various concentrations are needed to explore their antibacterial potential more optimally.

Keywords: *Carteriospongia*, maceration, MDR, 16S rRNA, *Metabacillus indicus*

