

INTISARI

Genus *Streptomyces* mencakup hampir sebagian besar bakteri Actinomycetes yang dikenal sebagai penghasil metabolit sekunder dengan peran beragam sebagai antibakteri, antijamur, insektisida, herbisida, dan perangsang pertumbuhan tanaman. Produksi metabolit sekunder dikendalikan oleh enzim – enzim yang dikodekan *biosynthetic gene clusters* (BGCs) yang dapat spesifik pada tingkat spesies hingga strain. *Streptomyces* sp. strain UGM_P-I2 diketahui menghasilkan senyawa antifungi dan insektisida. Kemampuan dalam menghasilkan senyawa tersebut berkaitan dengan regulasi fisiologisnya yang dipengaruhi oleh gen *housekeeping* seperti gen *rpoB* yang bersifat konservatif. Penelitian ini bertujuan merancang primer spesifik untuk mendeteksi gen *rpoB* pada isolat *Streptomyces* sp. strain UGM_P-I2 dan mengidentifikasi filogeni isolat tersebut. Desain primer spesifik gen *rpoB* dilakukan secara *in silico* menggunakan *Geneious Primer*, kemudian diverifikasi dengan *Polymerase Chain Reaction* (PCR), dan analisis filogenetik dilakukan menggunakan MEGA 12. Primer spesifik yang telah dirancang dapat mendeteksi gen *rpoB* pada isolat *Streptomyces* sp. strain UGM_P-I2 dengan ampikon berukuran 221 bp pada suhu *annealing* 63,2°C. Primer spesifik yang berhasil dirancang adalah Strep-*rpoBF* (5'-CTGAACGAGGAGATGCGGT-3') dan Strep-*rpoBR* (5'-GACTTGATCAGCGGTACG-3'). Analisis filogenetik menunjukkan bahwa *Streptomyces* sp. strain UGM_P-I2 memiliki kekerabatan dekat dengan *Streptomyces broussonetiae* strain T44.

Kata kunci: *Streptomyces* sp., gen *rpoB*, desain primer, PCR, *in silico*

ABSTRACT

The genus *Streptomyces* comprises most Actinomycete bacteria and is well known as a producer of secondary metabolites with diverse roles as antibacterial, antifungal agents, insecticides, herbicides, and plant growth promoters. The production of these secondary metabolites is controlled by enzymes encoded by biosynthetic gene clusters (BGCs), which can be specific at the species and even strain level. *Streptomyces* sp. strain UGM_P-I2 is known to produce antifungal and insecticidal compounds. The ability to produce these compounds is related to their physiological regulation, which is influenced by housekeeping genes such as the conserved *rpoB* gene. This study aimed to design specific primers to detect the *rpoB* gene in *Streptomyces* sp. strain UGM_P-I2 and identify the phylogeny of this isolate. Specific primers for the *rpoB* gene were designed in silico using Geneious Primer, then verified by Polymerase Chain Reaction (PCR), and phylogenetic analysis was performed using MEGA 12. The designed specific primers were able to detect the *rpoB* gene in *Streptomyces* sp. strain UGM_P-I2 with an amplicon size of 221 bp at an annealing temperature of 63.2 °C. The specific primers successfully designed were Strep-*rpoBF* (5'-CTGAACGAGGAGATGCGGT-3') and Strep-*rpoBR* (5'-GACTTGATCAGCGGTACG-3'). Phylogenetic analysis showed that *Streptomyces* sp. strain UGM_P-I2 is closely related to *Streptomyces broussonetiae* strain T44.

Keywords: *Streptomyces* sp., *rpoB* gene, primer design, PCR, *in silico*.