

Studi Taksonomi Rare Actinobacteria Termofilik dan Penapisan Metabolit Sekunder Baru = Taxonomic Study of Rare Thermophilic Actinobacteria and Screening for Novel Secondary Metabolites

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Abstrak

The aims of this study are to provide data regarding the taxonomic study of thermophilic Actinobacteria based on 16S rRNA gene sequences, description, and assessment for secondary metabolite biosynthetic gene clusters (BGCs) in the genome of novel taxa, and its antibacterial activity. Thirty-one isolates of thermophilic Actinobacteria were isolated from soil samples in Cisolok geothermal area, West Java. The 16S rRNA gene sequence-similarity search against all related species was performed using EzTaxon-e database. The sequences of 31 isolates showed similarity to member of family Micromonosporaceae, Nocardiaceae, Pseudonocardiaceae, Streptomyetaceae, Streptosporangiaceae, and Thermomonosporaceae. Six isolates displayed high similarity to genera in the family Pseudonocardiaceae, and most closely related to the genus *Thermotunica*, *T. guangxiensis* AG2-7T with similarity values from 94.6 to 95.2%. Phenotypic features and phylogenetic data differentiated strain SL3-2-4T from members of the family Pseudonocardiaceae. Therefore, the strain SL3-2-4T is proposed as a representative of a novel species in a novel genus, *Gandjariella thermophila* gen. nov., sp. nov. The genome of SL3-2-4T contained 21 antiSMASH-identified secondary metabolite regions harboring BGCs. These BGCs were for polyketide synthase, non-ribosomal peptide synthase, and ribosomally synthesized and post-translationally modified peptide family clusters. Thirteen and five regions displayed low (4–35%) and no similarity with known BGCs for secondary metabolites, respectively. Screening for antibacterial activity showed that strains SL3-2-4T and SL3-2-7 on MM 2 medium solidified with gellan gum at 45°C for 14 days demonstrated inhibitory activity against all Gram-positive, but not Gram-negative bacteria. Strain SL3-2-10 on ISP 3 gellan gum medium incubated for seven-days only active against *K. rhizophila* NBRC 12078. The results indicated that novel taxa have the potential for the discovery of active secondary metabolites.