Abstract

16S rRNA Gene Sequence and Potential Antibacterial Product Profile of *Streptomyces sp.* Acidophilic Isolate of Kalimantan Tengah Peatland Againts ESBL Producing *Escherichia coli*

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Objective: To analyze the 16S rRNA gene sequence of *Streptomyces sp.* acidophilic isolate of Kalimantan Tengah peatland, to screen in vitro antibacterial activity of *Streptomyces sp.* products againts ESBL producing *Escherichia coli*, and to screen the compounds of *Streptomyces sp.* products.

Material and methods: *Streptomyces sp.* has been isolated from Kalimantan Tengah peat soil (Palangka Raya). The molecular methods to identify *Streptomyces sp.* are PCR, clone, and sequencing. The isolation and fermentation process to obtain antibaterial substances were performed in the International Streptomyces Projects (ISP)-4 media on rotary shaker at 150 rpm, 28°C for five days. In vitro antibacterial testing of one to five days free cell fermentation broth (FCFB) have been carried out by diffusion agar method, freeze dry of FCFB and buthanol extract of FCFB of *Streptomyces sp.* acidophilic isolate have been carried out by contact bioautography method. Antibacterial testing using the ESBL producing *Escherichia coli* isolated from Dr. Soetomo Hospital patients in Surabaya as test microorganisms. The compounds of freeze dry of FCFB and buthanol extract of FCFB examined using thin layer chromatography.

Results: Tabulation data from BLAST® results show the isolate belong to the genus *Streptomyces sp.* with the percentage of identity reaching 99,73% with *Streptomyces sp.* VEL 17, *gene for 16S ribosomal RNA, partial sequences*. The FCFB showed its activities againts ESBL producing *Escherichia coli* 6024 and 6110 with inhibition zone average 12,42 mm and 13,17 mm. The result of contact bioautography showed the inhibition zone arround the FCFB and buthanol extract area of chromatogram. The thin layer chromatography have showed the several ink and different result of chromatogram from Kanamycin and Streptomycin as control.

Conclusion: *Streptomyces sp.* acidophilic isolate of Kalimantan Tengah peatland was closed to *Streptomyces sp.* VEL 17 based on phylogenetic tree. Products of *Streptomyces sp.* acidophilic isolate of Kalimantan Tengah peatland were potent to againts ESBL producing *Escherichia coli* and have several compounds that different from Kanamycin and Streptomycin.

Keywords: *Streptomyces sp.*, 16S rRNA, ESBL producing *Escherichia coli*, antibacterial activity, contact bioautography, chromatography