ISOLATION AND STRUCTURAL CHARACTERIZATION OF SECONDARY METABOLITES FROM *Actinophytocola* sp. K4-08 RARE ACTINOMYCETE WITH POTENTIAL BIOSYNTHETIC CAPABILITY

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ABSTRACT

Thousands of antibiotics have been found from different actinomycetes, but there was less study recorded on isolation, characterisation and antimicrobial properties of rare actinomycete, especially *Actinophytocola* sp. K4-08, making it a prominent source of novel bioactive compounds. Therefore, the present study was carried out to isolate, characterise and identify the antimicrobial activity of rare actinomycete, *Actinophytocola* sp. K4-08. *Actinophytocola* sp. K4-08 was successfully isolated from Kuantan mangrove sediment and growth on starch-yeast extract agar (SYE) medium. Abundant cream coloured substrate mycelium was formed on SYE, and no obvious diffusible pigment was produced within 21 days of incubation. Partial 16S rRNA gene sequence revealed that *Actinophytocola* sp. K4-08 possessed 99% similarity to *Actinophytocola sediminis* YIM 75636. Moreover, both PKS-I and NRPS genes, both of which usually related to secondary metabolite potential were detected in this isolate through PCR amplification. Preliminary screening using cross streak test showed that *Actinophytocola* sp. K4-08 displayed antibacterial activity against *B. subtilis* and *S. aureus.* Its crude ethyl acetate extracts also displayed inhibitory activity against *B. subtilis*, further confirming the antimicrobial properties of this isolate. *Actinophytocola* sp. K4-08 was cultured in SYE broth followed by centrifugation to separate the cells and the supernatant. Crude ethyl acetate (EA) extract from the supernatant was also prepared, and cells of *Actinophytocola* sp. was extracted with methanol (ME) extract. All extracts (supernatant and cells) produced dark orange solid and yellow coloured crude. Disc diffusion assay against B. *subtilis* with a concentration of 20, 40, 60, 80 and 100 µg/disc was conducted to check on the antibacterial capabilities of the extracts. All extracts displayed weak inhibition activity against B. *subtilis.* Although the extracts produced weak antibacterial activity, nevertheless, the potential of *Actinophytocola* sp. indicated potential as a bioactive compound producer that is worth exploring. Purification of crudes using TLC shows a few purified compounds can be separated from EA and ME crude each using highly polar mobile phase. FTIR spectrum of EA and ME crude shows the presence of alcohol, alkyl, esters and aromatic functional groups. Further investigation is needed in an attempt to purify further and elucidate potential bioactive compounds produced by *Actinophytocola* sp. K4-08 using HPLC, LCMS and NMR.

Keywords: *Actinophytocola*, antibacterial activity, disc diffusion, TLC and FTIR

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