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Antibacterial Activity of Isolated Cyanobacteria Species *Oscillatoria* sp.

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Abstract

Cyanobacteria are a highly diverse group of prokaryotes recognised as a potent source of biologically active compounds with antiviral, antibacterial, antifungal, and anticancer properties. In the present study cyanobacterium *Oscillatoria* sp. was isolated from Senanayaka Samudra Reservoir in Sri Lanka and pure monocultures and mass cultures were prepared. *Oscillatoria* sp. was harvested after 24 days of incubation at exponential growth to extract compounds using methanol and hexane. Gas chromatography-mass spectrometry (GC-MS) was used to identify compounds present in the crude extract. Antibacterial activity of crude extract was determined by agar well diffusion and disk diffusion methods against gram positive bacteria of Methicillin-resistant *Staphylococcus aureus* (MRSA) ATCCm25923 and gram negative bacteria of *Pseudomonas aeruginosa* ATCC 25853, *Salmonella typhi* and *Escherichia coli* ATCC 25922. The results showed that the solvents with different polarities had effects on dry biomass of extracted residue. 10% biomass was extracted by hexane extraction protocol where 60% of biomass was extracted by methanol extraction. The highest antibacterial activity in methanol extract was detected against *S. typhi* in disk diffusion method and the mean diameter of inhibition zone was around 22 mm and mean diameter of inhibition zones of *S. aureus*, *P. aeruginosa* and *E. coli* were recorded as 17, 17 and 15 mm respectively within 24 hours. In agar well diffusion method, methanol extract showed the highest antibacterial activity against *S. typhi* and mean diameter of inhibition was around 54 mm and mean diameter of inhibition zones of *S. aureus*, *P. aeruginosa* and *E. coli* were recorded as 52, 50 and 52 mm respectively within 24 hours. In the hexane extract, antibacterial activities was detected only for *S. aureus* in both methods and mean inhibition zones were recorded in 22 and 11 mm for agar well diffusion method and disk diffusion method respectively within 24 hours. GC-MS analysis revealed that the crude extract of *Oscillatoria* contains important fatty acid compounds such as hexadecanoic acid (palmitic acid methyl ester), methyl tetradecanoate (myristic acid methyl ester) and 13-Tetradecanoic acid (methyl ester) which possesses antibacterial and antifungal properties. Thus, the result of the study showed that the *Oscillatoria* contained compounds which are potential for pharmaceutical invention.

Keywords: *Oscillatoria* sp. Antibacterial compounds, Well diffusion, Disk diffusion