In vitro SCREENING OF ANTIBACTERIAL AND ANTIOXIDANT PROPERTIES OF FRESHWATER CYANOBACTERIUM *Lyngbya* sp.

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Cyanobacteria is a group of prokaryotic organisms originally found in the world and are recognized as a potent source of biologically active compounds with antiviral, antibacterial, antifungal, and anticancer properties. In the present study cyanobacterium *Lyngbya* sp. was isolated from a freshwater reservoir in Sri Lanka and pure monocultures and mass cultures were prepared. Following growth curve of the cyanobacterium *Lyngbya* sp. cells were harvested after 15 days of incubation at exponential growth. Extraction was carried out by hexane, methanol and dichloromethane respectively following standard methods. Antioxidant activity of three solvent extracts were determined using DPPH (1,1-Diphenyl- 2- picrylhydrazyl) assay, ABTS assay, phosphomolybdenum assay. The total phenolic and flavonoid content in the hexane, methanol and dichloromethane extracts were determined using Folin-Ciocalteu reagent and aluminum chloride (AlCl3) respectively where antibacterial activity of different concentration (40 mg/mL, 1mg/mL and 0.5mg/mL) of crude extract was carried out by disc diffusion methods against gram positive bacteria Methicillin-resistant *Staphylococcus aureus* (MRSA) ATCC 25923 and gram negative bacteria, *Pseudomonas aeruginosa* ATCC 25853, *Salmonella typhii* and *Escherichia coli* ATCC 25922 respectively. Minimum inhibition concentration (MIC) was determined by TTC bio assay. The highest total phenolic (238.48 ± 0.01mg GAE/g extract) and flavonoid content (TFC) (202.53± 0.01 mg qua (quercetin) /g) was recorded in the methanol crude extract and the concentrations were significantly high compared with the n-hexane ($p > 0.05$) and ($p > 0.05$) dichloromethane extract. The total antioxidant property of methanolic extract in phosphomolybdinum assay was 67.24 ± 0.01 mg GAE/g at 1000 mg/L. The highest free radical scavenging activity was detected in the methanol extract (IC50= 0.053 mg/ml) whereas 0.200 mg/mL and 0.320 mg/mL in hexane and dichloromethane extract were detected. The results of the ABST antioxidant assay showed that the highest antioxidant activity in methanol extract (IC50 0.031 mg/ml) and, in hexane and dichloromethane the antioxidant activities were 0.100 mg/mL and 0.105 mg/mL respectively. The antibacterial activity of methanol extract against only *S. typhii* was detected in disc diffusion method and the mean diameter of inhibition zone was around 18 ± 2 mm in 40 mg/mL and 15 ± 2 mm in 1 mg/ml and 10 ± 2 mm for 0.5 mg/mL respectively within 24 hrs. MIC in the methanol crude extract was 150 mg/L against *S. aureus*. Thus, the result of the study showed that the *Lyngbya* sp. contained compounds which are potential for pharmaceutical invention and isolation of active ingredients from the crude extracts are being to progress.

Keywords: *Oscillatoria sp., Antibacterial compounds, well diffusion, disc diffusion*