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Antimicrobial properties of bryophytes

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Bryophytes are the second largest group of plants, exceeded only by the flowering plants. Sri Lanka too, is blessed with a rich diversity of bryophytes. Despite being an essential component of our natural ecosystems, they have received little attention other than for taxonomical studies. Currently, biological compounds from bryophytes are being explored for their potential for pharmaceutically important chemicals. Although few have been developed for medicinal use, many compounds with antibiotic properties have been isolated from bryophytes. The aim of the present study was to identify bryophyte species found in the country that may have potential antimicrobial- and other bioactive properties, and to identify their bioactive compounds. This is a preliminary survey on antibacterial and antifungal activities of some bryophytes collected from different regions of the country. Methanolic extracts were prepared from whole plants and bioassays were done using disc diffusion method to screen for positive antibacterial and/ or antifungal properties. The extracts were tested against two gram positive bacteria, *Staphylococcus* sp and *Streptococcus* sp and gram negative *Escherichia coli* and on fungi *Penicillium* sp., *Aspergillus* sp. and *Mucor* sp., in order to see their potential broad spectrum antimicrobial properties. Methanol was used as the negative control, and as positive antibiotics gentamycin and clotrimazole were used for bacterial and fungal bioassays respectively. At 1 mg/disc strength, methanolic extracts of the liverworts *Riccia glauca*, *Pallavicinia lyellii* and *Dumortiera* sp. showed considerable inhibition of at least two bacteria. *R. glauca* and *Dumortiera* sp. extracts inhibited *Staphylococcus*. Extract of *P. lyellii* inhibited the growth of *Streptococcus* sp. The moss *Leucobryum javense* inhibited *Staphylococcus* sp. while *L. scabrum* inhibited *Streptococcus* sp. All the five extracts inhibited the growth of *E. coli*. None showed antifungal activities on the test organisms at 1 mg/disc strength. All these inhibitions were statistically significant (one way ANOVA; SPSS version 16.0). The Minimum Inhibitory Concentration (MIC) of the extracts and their comparable effectiveness against commercial antibiotics are being determined at present. Identification of the species is underway, with the help of the National Herbarium, Peradeniya. Our observations on the above five species and other samples indicated the potential of bryophytes to have antimicrobial properties.

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