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Bioactivities of Sri Lankan bryophytes: screening of twenty nine bryophyte species for antibacterial and antifungal properties

L N S Liyanage[1], H S Kathriarachchi[1], P S Saputhanthri[1*] and G A S Premakumara[2]
[1]*Department of Plant Sciences, Faculty of Science, University of Colombo, Colombo 03*
[2]*Industrial Technology Institute, 363, Bauddhaloka Mawatha, Colombo 07*

Bryophytes are a taxonomically and chemically diverse group of plants that have shown various bioactive properties that may be beneficial to mankind. Research records on bioactivities of Sri Lankan bryophytes are rare. The objective of the reported study was to screen selected (on basis of abundant occurrence) species of bryophytes collected from Belihuloya, Kanneliya, Knuckles and Kadugannawa, from February to December 2013, for positive antibacterial and/or antifungal properties.A total of twenty nine (29) bryophyte species were collected and crude extracts were prepared using 1:1 mixture of methanol and dichloromethane. The initial extracts were concentrated by completely removing the solvents and were re-dissolved in 10% DMSO in distilled water to obtain a final concentration of 20 mg cm^{-3} for antimicrobial assays. Both antibacterial and antifungal activities were tested using a micro-dilution assay technique described previously. The extracts were tested against the bacterial strains, *Bacillus sphaericus* (MTCC511), *Staphylococcus aureus* (ATCC25923), *Klebsiella pneumonia* (ATCC700603) and *Pseudomonas aeroginosa* (ATCC27853) (inoculum strength 1 $x10^6$ cfu cm^{-3}), and the fungal strains, *Fusarium oxysporum* and *Curvularia lunata* (inoculum strength 1 $x10^5$ spores per cm^3).Ciprofloxacin and Fluconazole (both at 2.0 mg cm^3) in distilled water were used as positive controls for bacterial and fungal bioassays respectively while 10% DMSO in distilled water was used as the negative control. Mueller-Hinton broth was used as growth medium for bacteria and Sabouraud Dextrose broth for fungi. All the tests were done in triplicate. Twenty eight (28) extracts out of the total 29 showed different levels of antimicrobial activities. Only the extract of *Pogonatum marginatum* from Kanneliya did not positively respond against any of the test microorganisms. Of the 28 positive samples, all were active against test bacterial strains (both Gram positive and Gram negative). The highest antibacterial activities under the experimental conditions were shown by *Trichocolea pluma* from Knuckles(MIC = 833.3 ± 208.3 µg cm^{-3}),and a *Schistochila* sp. from Knuckles (MIC = 78.1 ± 0.0 µg cm^{-3}) against *S. aureus*. Of the 29 samples, only these three extracts showed antifungal activity against the test fungi.

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pradee@pts.cmb.ac.lk Tel:011 2585038