IPRC/24/163 Science, Technology, Mathematics & Medicine

Growth inhibition of three fungal pathogens by marine macroalgal extracts: An *in vitro* study

A.H.D. Alahakoon[1], B.K.D.M. Rodrigo[1], B.M.C.M. Balasooriya[2], H.M. Herath[1], P. Edirisinghe[1], and R.P. Wanigatunge[1*]

[1]Department of Plant and Molecular Biology, Faculty of Science, University of Kelaniya
[2]Department of Biosystems Technology, Faculty of Technology, Sabaragamuwa University of Sri Lanka

Increased reliance on synthetic fungicides to control crop fungal diseases has led to numerous environmental and health issues. Thus, this study aimed to investigate the antifungal activity of marine macroalgal species of *Ulva*, *Gracilaria*, and *Sargassum* from Thalpe reef against fungal pathogens, *Colletotrichum* sp., *Fusarium* sp., and *Sclerotinia sclerotiorum*. Algal extracts were obtained using ethyl acetate, chloroform and methanol. Antifungal activity was tested *in vitro* at four concentrations using poisoned plate method. Captan and dimethylsulfoxide were used as positive and negative controls, respectively and all treatments were triplicated. Fungal growth inhibitory percentages were calculated, and their significance was assessed by Kruskal-Wallis test followed by Dunn's post hoc test for comparison. Results revealed that most of the extracts were effective at 2000 ppm concentrations. However, the highest inhibition (75%) was exhibited by *Gracilaria*–chloroform extract at 1000 ppm against *S. scleritiorum,* which was significantly different from all other macroalgal x solvent x concentration (MxSxC) combinations except for 2000 ppm *Sargassum*–chloroform extract (72%). Similarly, *Gracilaria*–ethyl acetate extract at 2000 ppm demonstrated significantly higher inhibition (71.5%) against *Colletotrichum* sp. compared to all other MxSxC interactions ($P<0.05$). None of the MxSxC combinations inhibited the growth of *Fusarium* sp. more than 50%, with 2000 ppm *Ulva*-methanol extract showing the highest inhibition of 49.4%. Methanol extracts were most effective against *Fusarium* sp. *Ulva* extracts consistently increased the inhibition against tested pathogens with concentration increments. Altogether, 15 MxSxC combinations exhibited more than 50% inhibition. Overall, *Gracilaria* and *Ulva* extracts could be identified to have a significantly higher antifungal potential compared to *Sargassum.* Thus, 2000 ppm *Ulva*–methanol and *Gracilaria*–chloroform extracts can be concluded to possess the highest antifungal potential, though the bioactive compounds in these have to be identified. Further, the efficacy and feasibility of these extracts in field applications need to be investigated.

Keywords: Antifungal activity, Crude extracts, Inhibitory percentage, Marine macroalgae, Poisoned food technique

[*]rasikaw@kln.ac.lk
Orcid ID: https://orcid.org/0000-0003-4070-0100