

Antimicrobial, antiviral and cytotoxic activities of selected marine organisms collected from the coastal areas of Malaysia

ABSTRACT

Many marine organisms have developed the capability of producing unique metabolites and thus are highly likely to contain anti-infective agents. This study was conducted to investigate extracts of three seaweeds (*Caulerpa racemosa*, *Caulerpa sertularioides*, *Kappaphycus alvarezii*), two soft corals (*Lobophytum microlobulatum*, *Sarcophyton auritum*) and a marine sponge (*Spheciospongia vagabunda*) collected from Malaysian coast for antibacterial, antifungal, antiviral and cytotoxic activities. The samples were subjected to sequential solvent extraction in order to obtain hexane, chloroform, ethyl acetate, ethanol, methanol and water extracts. The antibacterial and antifungal activities were studied using a colorimetric broth microdilution method. The hexane extract of *L. microlobulatum* had the strongest antibacterial activity and exhibited the lowest minimum inhibitory concentration (0.04 mg/mL) and minimum bactericidal concentration (0.08 mg/mL) against *Staphylococcus aureus* and *Bacillus cereus*, respectively. For antifungal activity, the lowest MIC and minimum fungicidal concentration values were produced by the hexane extract of *S. auritum* against the dimorphic yeast *Cryptococcus neoformans*, both with 0.04 mg/mL. None of the extracts were active against the filamentous fungus *Aspergillus fumigatus*. Only the hexane and ethanol extracts of *L. microlobulatum* and the ethyl acetate extract of *S. auritum* exhibited strong inhibition on the cytopathic effect induced by the Chikungunya virus (a re-emerging mosquito-borne virus) with 50% effective concentrations of 14.3 ± 0.2 , 124.3 ± 1.9 and 176.6 ± 9.7 $\mu\text{g/mL}$, respectively. Extracts from the two soft corals, *L. microlobulatum* and *S. auritum* possessed stronger antibacterial, antifungal and antiviral activities compared to the seaweeds and the sponge.