

Assessment of Selected Marine Organisms from Malaysian Coastal Areas for Inhibitory Activity against the Chikungunya Virus

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Abstract : Chikungunya fever is an arboviral disease transmitted by the Aedes mosquitoes. It has resulted in epidemics of the disease in tropical countries in the Indian Ocean and South East Asian regions. The recent spread of this disease to the temperate countries such as France and Italy, coupled with the absence of vaccines and effective antiviral drugs make chikungunya fever a worldwide health threat. This study aims to investigate the anti-chikungunya virus activity of selected marine organism samples collected from Malaysian coastal areas, including seaweeds (*Caulerpa racemosa*, *Caulerpa sertularioides* and *Kappaphycus alvarezii*), a soft coral (*Lobophytum microlobulatum*) and a sponge (*Sphēciospongia vagabunda*). Following lyophilization (oven drying at 40°C for *K. alvarezii*) and grinding to powder form, each sample was subjected to sequential solvent extraction using hexane, chloroform, ethyl acetate, ethanol, methanol and distilled water in order to extract bioactive compounds. The antiviral activity was evaluated using monkey kidney epithelial (Vero) cells infected with the virus (multiplicity of infection=1). The cell viability was determined by Neutral Red uptake assay. 70% of the 30 extracts showed weak inhibitory activity with cell viability $\leq 30\%$. Seven of the extracts exhibited moderate inhibitory activity (cell viability: 31%-69%). These were the chloroform, ethyl acetate, ethanol and methanol extracts of *C. racemosa*; chloroform and ethyl acetate extracts of *L. microlobulatum*; and the chloroform extract of *C. sertularioides*. Only the hexane and ethanol extracts of *L. microlobulatum* showed strong inhibitory activity against the virus, resulting in cell viabilities (mean \pm SD; n=3) of 73.3 \pm 2.6% and 79.2 \pm 0.9%, respectively. The corresponding mean 50% effective concentrations (EC50) for the extracts were 14.2 \pm 0.2 and 115.3 \pm 1.2 μ g/mL, respectively. The ethanol extract of the soft coral *L. microlobulatum* appears to hold the most promise for further characterization of active principles as it possessed greater selectivity index (SI>5.6) compared to the hexane extract (SI=2.1).

Keywords : antiviral, seaweed, sponge, soft coral, vero cell

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