ABSTRACT

Photodynamic therapy (PDT) involves the intravenous administration of a photosensitiser that preferentially localises in cancerous tissues more than the surrounding normal tissues. Subsequent illumination of photosensitiser generates reactive oxygen species that cause irreversible photo-damage to the cancer cells. To date, most photosensitisers that have been approved for clinical use or are currently in clinical trials are cyclic tetrapyrroles which are derived or inspired by naturally occurring chlorophyll and its degradation products. Some non-tetrapyrrolic photosensitisers have also been found in nature suggesting that there are potential photosensitisers with interesting structures in nature. To this end, this thesis outlines the collection of fourteen species of seaweeds from Cape Rachado, Port Dickson, where their methanolic extracts were screened for cytotoxicity at 20 μg/mL with promyelocytic leukemia cell-line, HL60 in dark and light-treated conditions. Five of these extracts showed varying degrees of cytotoxicity in light-treated condition. A Pheophyta (brown), namely *Turbinaria conoides* and a Chlorophyta (green), namely *Cladophora patentiramea* were selected for further chromatographic separation guided by MTT-bioassay due to the availability of raw materials. The isolation process yielded a total of nine compounds with > 50% photo-cytotoxicity at 5 and 10 μg/mL. Pheophorbide-*a* methyl ester **(1)**, 13^2-hydroxypheophorbide-*a* methyl ester **(2)** and pheophorbide-*a* **(3)** were among the major products isolated. Furthermore, several other minor compounds were also identified in the study, including purpurin-18 methyl ester **(4)** and 13^2-methoxyl pheophorbide-*a* methyl ester **(5)** from *Turbinaria conoides*; as well as 15^1-methoxypurpurin-7-lactone methyl diester **(6)**, isomers of 13^2-hydroxypheophorbide-*b* methyl ester **(7** and **8)** and 7-formyl-15^1-methoxy-7-lactone methyl diester **(9)** from *Cladophora patentiramea*. There are also a number of

potentially novel compounds with mass values and UV-Vis profiles that are not similar to known compounds. To conclude, seaweeds are good sources of photosensitisers.