

Identification of Photosensitisers From Green and Brown Algae at Port Dickson for Photodynamic Therapy of Cancers

Y.V.Tang², S.M. Phang¹, W.L. Chu³, A.S.H. Ho^{2,4} and H.B. Lee²

¹ Institute of Biological Sciences, Faculty of Science, University of Malaya,
50603 Kuala Lumpur, Malaysia

²Cancer Research Initiatives Foundation (CARIF), 2nd floor, Outpatient Centre,
Subang Jaya Medical Centre, 47500 Subang Jaya, Selangor

³International Medical University, Plaza Komanwel, Bukit Jalil 57000, Kuala Lumpur

⁴Faculty of Engineering and Science, University Tunku Abdul Rahman,
53300 Setapak, Selangor.

Photodynamic therapy (PDT) is an emerging treatment modality for cancers. It involves activation of an otherwise non- or lowly-toxic photosensitiser by light in the presence of oxygen. PDT is more selective than the conventional chemotherapy because of (1) selective accumulation of the photosensitiser in cancerous tissues at higher concentration as compared to the surrounding tissues, and (2) targeted delivery of light at the site of tumor to active the photosensitiser. Once activated, the photosensitiser produces highly reactive oxygen species which cause damage to the tissues via necrotic or apoptotic cell death.

With over 50% of US FDA-approved anticancer drugs originating from the natural resources, natural products continue to be important sources of potential chemotherapeutic agents. As interests in natural product research slowly move to marine organisms, we initiated a program to screen the seaweeds of Malaysian waters for potential photosensitisers for PDT. At Cape Rachado Port Dickson, fourteen species of seaweeds were collected and their methanol extracts evaluated with an acute MTT assay for photo cytotoxicity. A promyelocytic leukemia cell-line, HL60 incubated with 20 µg/ml of extracts was irradiated with 9.6 J/cm² of a broad spectrum light in triplicate. Unirradiated cultures served as dark control. Six of these extracts showed varying degrees of photo cytotoxicity at 20 µg/ml. A brown alga and a green alga were selected for further separation and isolation of compounds. Details of collection, bioassay, compound isolation and compound characterization are outlined in this paper.