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CYTOTOXIC EFFECT OF HEXANE AND WATER EXTRACTS OF MALAYSIAN MICROALGAE IN THE MCF-7 BREAST CANCER CELL LINE

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ABSTRACT

Many studies have reported that microalgae have the ability to treat breast cancer by several mechanisms due to the bioactive compounds existing in these species. However, studies on Malaysian microalgae is lacking. This study investigates the anticancer property of a Malaysian microalgae on the MCF-7 breast cancer cell line. The cytotoxic effect of hexane and water extracts of microalgae against MCF-7 cells were investigated using *in vitro* cytotoxicity assay which is 3-(4, 5-dimethyl-2-thiazolyl)-2, 5-diphenyl-2H-tetrazolium bromide (MTT) assay. The results demonstrated that both hexane and water extract of microalgae has anti-proliferative effect on the MCF-7 breast cancer cell line. However, the hexane extract (with IC_{50} value of 1.20 mg/mL) showed a greater potential compared to the water extract (with IC_{50} value of 1.65 mg/mL) after 24 hour incubation. Further studies on microalgae need to be performed to explore more on the cytotoxic effect, with the types of extract taken into considerations.

CHAPTER 1

INTRODUCTION

1.1 Background of Study

Cancer is a deadly disease that needs attention in treatment as it is causing more than six million deaths in a year (Sharida et al., 2011; Syahril et al., 2012; Varshney et al., 2013). In 2007, a total of 18,219 numbers of cancer incidence were reported in Malaysia and these include 8,123 (44.6%) males and 10,096 (55.4%) females recorded by National Cancer Registry of Malaysia (Abdullah et al., 2013).

Breast cancer is the second most typical non-cutaneous cancer after lung cancer and the fifth reason of death (Rocco et al., 2014). In 2008, there were about 1.4 million women detected with breast cancer and more than 450,000 women died from breast cancer disease among European (Hamelinck et al., 2014). In Malaysia, there were 31% of breast cancer from all female cancer reported by the National Cancer Registry, with 3,738 cases in 2003, which has reduced to 3,242 in 2007, but this constitute to 32.1% of all female cancer cases, which was more or less higher than the previous record. In 2008, Malaysian Health Ministry statistics reported that 8,600 women were diagnosed with breast cancer and 60% of them were too late for treatment (Subramanian et al., 2013).

The type of tumor, stage of disease and health status of the patient generally may affect the choice of treatment (Groheux et al., 2014). The preference of the patients for one treatment over the other will be based on the benefits and risks of the treatment (Hamelinck et al., 2014). The present treatment modalities for cancer diseases include surgery, chemotherapy, radiation, immunotherapy and monoclonal antibody therapy (Kim et al., 2013). However, these therapies may be unpleasant and life threatening because of the harmful side effects and toxicity (Sharida et al., 2011).