UNIVERSITI TEKNOLOGI MARA

DIFFERENTIAL CYTOTOXITY OF ETHYL ACETATE EXTRACTS OF MALAYSIAN MARINE ENDOPHYTIC FUNGI (MKS 3.1 AND SW 2.3 PLATE 2) AGAINST HUMAN BREAST CANCER CELL LINES

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Dissertation submitted in partial fulfilment of the requirements for the Bachelor of Pharmacy (Hons.)

Faculty of Pharmacy

JULY 2016

ACKNOWLEDGEMENT

All praise and glory to Almighty Allah S.W.T who have blessed me with good health, patience and strength towards the successful completion of this project.

I would like to take this opportunity to express my heartiest gratitude and appreciation to the Faculty of Pharmacy, Universiti Teknologi MARA (UiTM) Puncak Alam Campus for the good co-ordination of Research II (PHC567). This subject allowed me to be exposed to new knowledge in research and development (R&D) of new drug. My gratitude also goes to UiTM for the well-equipped facilities which are essential for the completion of this study.

My special appreciation and countless thanks to my supervisor, Dr Lim Siong Meng for his continuous support, invaluable guidance, insightful advice, constructive comments and limitless patience throughout my project. I also would like to thank my co-supervisor, A/Prof Dr Kalavathy A/P Ramasamy for her encouragement, undivided support and great help.

I wish to personally mention the postgraduate students of the Collaborative Drug Discovery Research (CDDR) Laboratory, especially Ms Nur Syakila Binti Rohawi and Mr Zaki Bin Zakaria for their kind assistance and generosity in sharing their knowledge. I would like to thank Mr Shahrul Izan Bin Ibrahim for assisting me in ESEM.

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ABSTRACT

The limitations of chemotherapeutic agents have called for discovery of new drugs to fight against breast cancers. Endophytes, which are microorganisms that reside within plants without causing any visible manifestations of disease, have emerged as potential source of new drugs. They have the potential to synthesise various bioactive metabolites that can be used as therapeutic agents. The present study was undertaken to assess the differential cytotoxic effects of ethyl acetate extracts, MKS 3.1 (endophytic fungus isolated from marine plants *Terminalia* sp.) and SW 2.3 Plate 2 (marine fungus isolated from sea water) against human breast cancer cells. The fungal cultures were first examined using gross observation and ESEM. The cultures were then extracted using rotary evaporator. MCF 7 (ER positive) and MDA 468 (ER negative) were treated with the extracts (0.01 – 100 μg/mL) for 72h. Sulforhodamine B assay was performed and data generated were used to determine the IC_{50} (inhibitory concentration of 50% MCF 7/ MDA 468 cells). In general, MKS 3.1 and SW 2.3 (Plate 2), which were more selective towards ER negative breast cancer cells, exhibited weak to very weak cytotoxic effects against MCF 7 and MDA 468 (> 20 μg/mL). The present findings warrant further investigation in other cancer types.

CHAPTER 1

INTRODUCTION

1.1 Background Study

Breast cancer refers to tumour that arises from the breast tissue (Pandi et al., 2010). In 2012, nearly 1.7 million new breast cancer cases were diagnosed, representing 12% of all new cancer cases and 25% of all cancers reported (International, 2015). By 2025, the global incidence of cancer is expected to rise to an annual 19.3 million cases (Gomes et al., 2015). In the USA, breast cancer is the second most common cancer in women. There are about 230,000 new breast cancer cases amongst women annually (National Cancer Institute, 2015). In Malaysia, 24.5% women died of breast cancer in 2014 (World Health Organisation, 2015).

Chemotherapy is a systemic therapy in which drugs are administered either *per oral* or directly into the bloodstream to reach cancer cells (American Cancer Society, 2015). It is used to slow or destroy cancer cells (Pandi et al., 2010) and reduce the chance of relapse (National Cancer Institute, 2015). Generally, chemotherapeutic drugs work by attacking cells that are dividing quickly. Nevertheless, chemotherapy has its own limitations as it also attacks normal cells that divide quickly (American Cancer Society, 2015). Its poor selectivity between cancer and normal cells often leads to side effects (National Cancer Institute, 2015).