UNIVERSITI TEKNOLOGI MARA

EFFECTS OF SUGAR ALCOHOLS AS WATER ACTIVITY REDUCING AGENTS ON SECONDARY METABOLITES OF POLAR FUNGI

MOHAMMAD HAFIZ BIN MOHD ISA

Dissertation submitted in partial fulfilment of the requirements for the degree of Bachelor of Pharmacy (Honours)

Faculty of Pharmacy

JULY 2016

ACKNOWLEDGEMENT

Firstly, I would like to express my sincere gratitude to my advisor Prof. Dr Jean-Frédéric Faizal Weber for the continuous support of my research study and related research, for his patience, motivation, and immense knowledge. His guidance helped me in all the time of research and writing of this thesis. I could not have imagined having a better advisor and mentor for my research study.

Besides my advisor, I would like to thank the rest of my thesis committee:Madam Siti Hajar and Madam Fatimah for their insightful comments and encouragement, but also for the hard question which incented me to widen my research from various perspectives. Without they precious support it would not be possible to conduct this research. I thank my fellow labmates in for the stimulating discussions, for the sleepless nights we were working together before deadlines, and for all the fun we have had for a year. I would like to thank my family: my parents and to my brothers and sister for supporting me spiritually throughout writing this thesis and my life in general.

TABLE OF CONTENT

ABSTRACT

This dissertation investigates the effects of sugar alcohols either alone or in combinations on secondary metabolite productions of polar fungi. Those sugar alcohol solutions which are Glycerol, Xylitol, Sorbitol, and Erythritol that have an ability to reduce water activity were chose due to non-toxic property and commonly used in food manufacturing process. 24 combinations of sugar alcohol with different concentrations which are 3%, 10%, 15% as low, medium and high respectively were prepared in MTP to study their effects on secondary metabolite productions of E4SB, E1LB, E1PB and E6PA. The height of peaks which indicate the secondary metabolite productions level as well as the existence of additional secondary metabolites productions were analysed from chromatograms obtained. Most of the sugar alcohol combinations tend to cause reduction of secondary metabolite productions level of cultured fungi as compared to control except Xylitol at low concentration.

CHAPTER 1

INTRODUCTION

1.1 Background of study

New development of safe bioactive compounds is proportional to the emergence number of new diseases which are ever increasing, for instance infectious disease. According to Morse (1995), infections commonly appear due to pathogens which are already in the environment as the pathogens have an advantage as well as opportunity to infect new host populations. Today, increase in populations of microorganisms which are highly resistant to drug as well as appearance of life threatening virus, for instance HIV tend to trigger scientists and pharmacists to analyze different natural sources for purpose of create and develop safe and potent agents in order to meet large number of new upcoming diseases.

Fungi are one of natural sources that have been widely investigated for the purpose of new agent development. Best known therapeutic agents that have been discovered are Penicillin from *Penicillium notatum* by Alexander Fleming, Professor of Bacteriology at St. Mary's Hospital in London in 1928 (Cragg, 2013) which basically act as antibiotic to treat infectious diseases, for instance ear and skin infection (Yaylı, 2011).

Fungi have different lifestyle as they live in different environment such as mutualistic, antagonistic or neural symbiosis together with many kind of autotrophic organism. Production of fungi metabolites for growth protections purposes is due to the