

UNIVERSITI TEKNOLOGI MARA

**INHIBITORY EFFECT OF ETHANOLIC EXTRACT OF THE
GERMINATED BROWN RICE IN 3T3-L1 ADIPOCYTE
DIFFERENTIATION**

NABILAH BINTI ABDUL WAHAB

BACHELOR OF PHARMACY (Hons.)

**Dissertation submitted in partial fulfilment of the requirement for the Degree in
Bachelor of Pharmacy**

JUNE 2016

ACKNOWLEDGEMENT

It is a genuine pleasure to express my deep sense of thanks and gratitude to my supervisor, Dr Zolkapli Eshak who had given his effort in guiding my team and me to achieve the goal of the research as well as his encouragement until this project has settled. Numerous thanks also goes to Mrs Anis Syamimi for all her guidance and help along conducted the research and always push the team to maintain our progress until it was done.

A special thanks goes to my team mates as well, Athirah Azlan and Umami Hani Maruan who help me along the study was conducted and in comparing the data.

Not to be forget, appreciation also to all the staffs of Cell Culture Laboratory, who gave the permission to use all the materials and equipment in order to complete the research.

Lastly, I would also like to acknowledge UiTM for giving me opportunity to conduct the research and special thanks to the Coordinator of Research Project, Dr Gurmeet Kaur for helping me to coordinate me especially in writing the thesis.

Table of Contents

ACKNOWLEDGEMENT	i
LIST OF FIGURES	iv
LIST OF TABLES	v
LIST OF ABBREVIATIONS	vi
ABSTRACT	vii
CHAPTER 1	
INTRODUCTION	1
1.1 BACKGROUND OF THE STUDY	1
1.2 SIGNIFICANCE OF THE STUDY	3
1.3 OBJECTIVES	3
1.4 PROBLEM STATEMENT	3
1.5 SCOPE AND LIMITATION	3
1.6 HYPOTHESIS	4
CHAPTER 2	
LITERATURE REVIEW	5
2.1 OBESITY	5
2.1.1 DEFINITION OF OBESITY	5
2.1.2 THERAPEUTIC APPROACH	5
2.2 BROWN RICE	6
2.2.1 BACKGROUND	6
2.2.2 GERMINATED OF BROWN RICE	7
2.2.3 BIOCHEMICAL COMPONENTS OF GERMINATED BROWN RICE	8
2.3 3T3-L1	9
2.3.1 3T3-L1 MODEL FOR OBESITY	9
2.3.2 ADVANTAGE S OF IN VITRO MODEL VS IN VIVO(OBESITY)	10
2.4 WRL 68 CELLS	11
CHAPTER 3	
METHODS	12
3.1 MATERIALS	12

ABSTRACT

Background: Obesity has becoming an alarming issues to the worldwide concerns as this issues keep on increasing (Yun et al., 2010). Germinated brown rice (GBR) that has been reported to be good for digestion (Seung et al., 2015) and contain more nutritional value (Patil et al., 2011) which is good in controlling certain metabolic diseases.

Objective: To study the effects of ethanolic extract of the germinated brown rice in 3T3-L1 adipocyte cell differentiation and to determine the optimal concentration of ethanolic extract of the germinated brown rice in decreasing the differentiation of 3T3-L1 adipocyte cell

Materials and methods: GBR was extracted with ethanol and tested towards 3T3-L1 cells and WRL 68 cells. The viability of both cells were undergo MTS assay and the absorbance was analysed by using microplate reader. 3T3-L1 cells also undergo Oil Red O staining and the lipid contents was undergo MTS assay while lipid accumulation were observed under microscopic observation. All results were analyzed using one-way ANOVA.

Results: MTS assay revealed that the inhibitory concentration of 3T3-L1 cells ($IC_{50} = 62.5$ ug/ml), whereas for WRL 68 cell (hepatic cell) the IC_{50} was at 250 ug/ml. Lipid accumulation was higher at adipocyte cell when compare to the adipocyte cell treated with ethanol extract and preadipocyte cell.

Conclusion: This study demonstrated the suppression of the lipid accumulation when treated with ethanol extract of GBR. GBR may act as potential treatment and/or in prevention of obesity in the future

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Obesity has becoming an alarming issues to the worldwide concerns as this issues keep on increasing (Yun et al., 2010). Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health (WHO, 2015). Obesity and overweight are actually a type of chronic metabolic disorder caused by imbalance intake of food in relation to the energy used. Obesity can lead to many diseases particularly diabetes, heart diseases and hypertension. This particular disease has become a target in the medical study in order to prevent the increase of the diseases.

There are a few drugs that have already been marketed and used in treating obesity such as orlistat and sibutramine. However, the use of these drugs has been demonstrated to induce serious side effects (Jin et al., 2012). Thus, many researchers come into concerns in using natural products in treating obesity which is more efficient and safe to be used for long term treatment (Rahul et al., 2007). Furthermore, there is variety of natural products from all over the world that is not fully being explored in seeking the potential treatment for obesity.