UNIVERSITI TEKNOLOGI MARA

EFFECTS OF STEVIOSIDE ON *IN-VITRO* ADIPOCYTE DIFFERENTIATION

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ABSTRACT

Diabetes mellitus is characterized by insulin resistance leading to irregularities in protein, fat and carbohydrate metabolism. Commercially available drugs like metformin is commonly prescribed to treat Type 2 diabetes, though its usage is burdened by contraindications such as congestive heart failure, chronic obstructive pulmonary disease and chronic renal insufficiency. In accordance to this problem, *Stevia rebaudiana* Bertoni contains stevioside which is a potent bioactive compound to treat diabetes and has been suggested to benefit glucose metabolism. The purpose of this study is to investigate the inhibitory potentials of stevioside on 3T3-L1 adipocyte differentiation and lipid production. The methods used in this study include cell culture, cell differentiation, treatment with stevioside, Oil Red-O (ORO) staining and statistical analysis. The results showcased a significant difference, proving that stevioside possibly might possess the capability to inhibit adipocyte differentiation. As a conclusion, *Stevia rebaudiana* Bertoni might prove to play a vital role in the treatment of diabetes mellitus in the near future as this study has proven its potential to inhibit adipocyte differentiation.

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CHAPTER 1: INTRODUCTION

1.1 Introduction

Diabetes is a global problem, punctuated by the fact that there will be a 69% increase in the number of adults with diabetes in developing countries between 2010 and 2030 (Table 1) (Shaw, Sicree, & Zimmet, 2010). The situation is no less worrisome in Malaysia where the prevalence of diabetes among individuals aged 18 years and older has experienced an increment from 11.6% in 2006 to 15.2% in 2011 (Kaur, Tee, Ariaratnam, Krishnapillai, & China, 2013). Characterized by insulin resistance which leads to irregularities in protein, fat and carbohydrate metabolism, diabetes can be categorized into two main groups: type I and type II. In Type I diabetes, the sugar is incapable of entering the cells in the body for energy metabolism due to the lack of insulin production by the pancreas. According to Ashcroft and Rorsman (2012), it is an autoimmune disease that results in β cell destruction, therefore depriving the pancreas of its ability to produce sufficient levels of insulin to regulate glucose uptake. Patients of type I diabetes typically require insulin injections to manage their blood glucose.

	2010		2030	
	Country	**Prevalence (%)**	**Country**	**Prevalence (%)**
1	Nauru	30.9	Nauru	33.4
2	United Arab Emirates	18.7	United Arab Emirates	21.4
3	Saudi Arabia	16.8	Mauritius	19.8
4	Mauritius	16.2	Saudi Arabia	18.9
5	Bahrain	15.4	Reunion	18.1
6	Reunion	15.3	Bahrain	17.3
7	Kuwait	14.6	Kuwait	16.9
8	Oman	13.4	Tonga	15.7
9	Tonga	13.4	Oman	14.9
10	Malaysia	11.6	Malaysia	13.8

Table 1: Top 10 countries for diabetes prevalence in 2010 and 2030 (Shaw *et al.*, 2010)