

UNIVERSITI TEKNOLOGI MARA

**THE EFFECT OF MALAYSIAN GELAM HONEY
ON THE TENSILE STRENGTH OF DIABETIC
RATS**

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ABSTRACT

Wound healing impairment is a major complication of diabetes mellitus. Existing treatments of diabetic wounds are not very effective because of prolong and highly cost. The present study was designed to evaluate the tensile strength of diabetic wound tissue healing after treated with Gelam honey and to compare the efficacy of Gelam honey with silver sulfadiazine (SSD) in treating the diabetic wounds. The efficacy of diabetic wounds treated with Gelam honey was evaluated in 48 male Sprague-Dawley rats weighing 250-350 g. The rats were randomly divided into 4 groups of 6 rats each. Rats were anesthetized by IP injection with ketamine 50 mg/kg and xylazine 5 mg/kg and 3 cm full-thickness incision wounds were created by using sharp blades. The wounds were treated with Gelam honey and silver sulfadiazine cream once daily on day 1 and day 14. Control animals received no treatment and served as negative control while SSD treated group served as positive control. Six rats from each experimental group were euthanized at each time interval and the skin samples were removed in strips and a (TA. XT-plus) Texture Analyser machine was used to measure the tensile strength. Based on the result, tensile strength of skin treated with Gelam honey was highest both on day 1 ($0.0933 \pm 0.0038 \text{ N/mm}^2$) and day 14 ($0.1997 \pm 0.0399 \text{ N/mm}^2$). Therefore, the result obtained showed that Gelam honey has the potential to enhance diabetic wound healing with the regards to the tensile strength property.

CHAPTER 1

INTRODUCTION

1.1 Background of study

Diabetes mellitus is one of the metabolic diseases that occurred because of defects in insulin secretion, insulin action or both (Association, 2005). Insulin deficiency results in hyperglycemia which is an increase of blood glucose level above the normal value and also altered glucose, fat and protein metabolisms (Ichinose *et al.*, 2007). Based on statistics recorded by World Health Organization (WHO) in 2004, more than 150 million people in this world suffered from diabetes and its occurrence is increasing rapidly to the point that this number will double by the year 2025 (Al-Waili *et al.*, 2011).

Diabetes mellitus can be categorized into three types which are type 1, type 2 and gestational diabetes mellitus (GDM) (Moura *et al.*, 2013). Type 1 diabetes is also known as juvenile-onset or insulin-dependent diabetes is caused by autoimmune destruction on the pancreatic β -cell (Association, 2008). Type 2 diabetes or non-insulin-dependent diabetes is caused by two factors which are genetic factors associated with impaired insulin secretion and insulin resistance as well as