UNIVERSITI TEKNOLOGI MARA

EFFECTS OF CRUDE AND FRACTION (C3) ENDOPHYTIC *ASPERGILLUS* SP. HAB10R12 ON THE TNF- α INDUCED - INSULIN RESISTANCE DIFFERENTIATED 3T3-L1 ADIPOCYTES

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ABSTRACT

Endophytes *Aspergillus* sp strain HAB10R12 isolated from tree *Garcinia scortechinii* (kenondong krot @ kandis) exert many beneficial effects such as anticancer, antimicrobial, and anti-diabetic. However, the study on the antidiabetic of this compound is still limited. In the present study, we analysed the possible effect of the Endophytes *Aspergillus* using the 3T3-L1 cells as an *in vitro* cellular model. MTT assay has confirmed that the endophyte extracts do not cause cytotoxic effect on 3T3-L1 adipocytes since there is no IC-50 after 24 hours exposure. However, endophytes may or may not stimulate the glucose uptake 3T3-L1 adipocytes. The observation on glucose uptake demonstrated that endophytes had varying ability to take up glucose in the insulin resistance induced 3T3-L1 adipocytes with TNF.

CHAPTER ONE

INTRODUCTION

1.1 Introduction

Insulin resistance associated with obesity is the major risk for type 2 diabetes (Kalupahana, Moustaid-moussa, & Claycombe, 2012). It is characterized as a condition of impaired biological response to insulin and prevent glucose uptake for metabolism. Insulin resistance related to obesity occurs due to the accumulation of excess adipose tissue which leads to the defect in the insulin signaling cascade (Greenfield & Campbell, 2010). Excess adipose tissue causes an increment in the secretion of pro-inflammatory cytokine, for example tumor necrosis factor-α (TNF-α). This cytokine induces the insulin resistance in adipose tissue by various mechanisms (Ruan & Lodish, 2003).

Insulin resistance is the fundamental aspect in the pathogenesis of type 2 diabetes (Ruan & Lodish, 2003). Type 2 diabetes is the most common diabetes that occurs worldwide (Marchetti, Dotta, Lauro, & Purrello, 2008). Reduction in insulin secretion and resistance to insulin in insulin sensitive tissue for example adipose tissue are the common defects that lead to type 2 diabetes (Poston, 2011). Type 2 diabetes related to