



**THE EFFECTS OF *DIOSCOREA HISPIDA* SUPPLEMENTATION IN  
OXIDATIVE DAMAGE-INDUCED TOXICITY ON PLACENTAL TISSUES  
OF MATERNAL RATS**

**By**

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## ABSTRACT

### **The Effects of *Dioscorea hispida* Supplementation In Oxidative Damage-Induced Toxicity on Placental Tissues of Maternal Rats**

*Dioscorea hispida* (*D. hispida*) has been considered as staple foods in tropical and subtropical regions. However, its high contents of dioscorine and cyanides has limited its utilization as a nutrient source. Toxic compounds of *D. hispida* may lead to overproduction of free radicals and cause oxidative damage. In pregnancy, an imbalance level of ROS may lead to miscarriage. The present study was performed to investigate the effects of *D. hispida* on the placental tissues of maternal rats for 15 days through oxidative damage and lipid peroxidation. Pregnant Sprague Dawley rats were divided into 4 different treatment groups (n=5) which consists of a negative control group and 3 groups supplemented with aqueous extract of *D. hispida* at different concentrations (250 mg/kg, 500 mg/kg, and 1000 mg/kg body weight). Extract of *D. hispida* were administered daily on day 6 to day 20 of pregnancy. The rats were euthanized at day 21 and the placenta tissues were harvested for total superoxide dismutase (SOD) inhibition activity and lipid peroxidation (malondialdehyde/MDA) determination. No statistically significant difference was shown between all groups on SOD inhibition activities ( $p>0.05$ ). However, there was an increasing pattern on 250 mg/kg and 500 mg/kg groups compared to the control group with a decreasing pattern at 1000 mg/kg group compared to the 500 mg/kg group. The MDA level determination showed an increasing trend in all experimental groups compared to the control group. Significant differences were observed in the control group compared to the 1000 mg/kg group and for the 250 mg/kg group compared to the 1000 mg/kg group ( $p<0.05$ ). Overall results of the current findings suggested that supplementation of *D. hispida* on the placenta tissues of maternal rats for 15 days may give damaging effects through oxidative damage and lipid peroxidation.

**KEYWORD:** *Dioscorea hispida*, oxidative damage, placenta, ROS, SOD, MDA

# CHAPTER 1

## INTRODUCTION

### 1.1 BACKGROUND

*Dioscorea* or mainly known as yam is a monocots and it is one of the family of *Dioscoreaceae* which is found in worldwide especially in the tropics and subtropics countries. In certain countries used yam daily as staple food (Nashriyah *et al.*, 2011). Cahyo & Hartati (2015) stated that about 350 to 400 species of *Dioscorea* was presented all over the world, especially in Southeast Asia, Pacific Island, West Africa and parts of Central America. *Dioscorea hispida* (*D. hispida*) categorized as climbing and wild creeping plant that usually grows close to the streams or in shaded areas that can grow up to 20 m in height. This yam have provide many uses to the people such as source of nutrients for body, treating diabetes and reduced obesity rate, treat constipation, and others more (Cahyo Kumoro, Susetyo Retnowati, & Sri Budiayati, 2011). However, *D. hispida* become one of the most uncommonly utilized among others species because its contain toxic substances which are dioscorine and hydrogen cyanides that are harmful for human body (Cahyo Kumoro *et al.*, 2011; Cahyo & Hartati, 2015).

In cellular metabolism reactive oxygen species (ROS) is normal byproduct by living organism. Production level of ROS is low in normal condition under physiological and defense mechanism against infectious agent. High level of ROS will lead to occurrence of oxidative stress and in long term it may effect cell components such as lipid and DNA. Oxidative stress is condition which there were imbalance amount of oxidant and antioxidant in human body. Oxidative stress cause deleterious effects to human body because it may lead to various health problems if it not well control in steady state (Birben, Sahiner, Sackesen, Erzurum, & Kalayci, 2012; Valko, Rhodes, Moncol, Izakovic, & Mazur, 2006). Oxidant and antioxidant balance play an important role in order to maintain redox balance in human body under normal conditions. This balance is important for the organism survival and their health. Overproduction of ROS can cause oxidative stress by use of oxygen in metabolic