



**THE ROLE OF *Dioscorea hispida* IN INDUCING
DNA DAMAGE ON PLACENTAL TISSUES OF
MATERNAL RATS: A MOLECULAR BASIS**

**TENGGU AIDEED SYAH B TENGGU ABU
BAKAR**

**BACHELOR OF MEDICAL LABORATORY TECHNOLOGY
(HONS)
FACULTY OF HEALTH SCIENCES
UNIVERSITI TEKNOLOGI MARA**

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ABSTRACT

The Role of *Dioscorea hispida* in Inducing DNA Damage on Placental Tissues of Maternal Rats: A Molecular Basis

Dioscorea hispida (*D. hispida*) which traditionally known as ‘Ubi Gadong’ is a common food-source among Asian countries’ suburbs. However, the presence of chemically active compound knowingly cyanide in *D. hispida* is attributable to its potential effects on cellular homeostasis; which may be induced by excessive free radicals generation-related oxidative stress. This phenomenon warrants for a systematic toxicology analyses. In this animal modelling study, the deleterious effects of *D. hispida* was assessed by demonstrating molecular DNA damage and oxidative stress in placenta tissues of maternal rats following 15 days of *D. hispida*’s supplementation by oral gavage. From day 6 until 20th day of gestation, pregnant rats were randomly sorted into non-supplemented or control and supplemented groups. Supplemented groups were classified according to three different concentrations; T1: 250 mg/kg, T2: 500 mg/kg and T3: 1000 mg/kg. On day 21, rats’ placenta tissues were harvested following euthanasia and the detrimental effects were elucidated by using biochemical analysis and comet assay for demonstration of oxidative stress and DNA damage. Comet assay revealed significant increase of DNA damage in rat’s placenta tissues which showed significant different comparison between Cx with T1 and T3 at p value < 0.05. Besides, the results revealed that there is significant different between T3 and T2 with p < 0.05. The ROS level depicted an increasing trend proportional to concentration of *D. hispida*, however, no significant value was observed between groups. The outcome from present study may postulate that the production of ROS by-products were triggered following *D. hispida*’s supplementation, and thus highlighted that different of concentration *D. hispida* supplementation toward maternal rat for 15 days could induces alteration in DNA damage through excessive ROS generation

Keywords : *D. hispida*, ROS, DNA damage, placenta

CHAPTER 1

INTRODUCTION

1.1 Background

Yam is the edible starcy plant which commonly distributed in tropical and subtropical countries. It is the climber plant and monocotyledon. Yam common genus is known as *Dioscorea* from the family Dioscoreaceae (Dutta, 2015). There are many species of *dioscorea* such as *D.alata*, *D. Esculenta*, *D. Pentaphylla*, *D. Pubera*, *D.villosa*, *D.acuelata*, *D. Orbiculata* and *D.hispida*. (Dutta, 2015). *Dioscorea hispida* (*dioscorea hispida*) is one of *discorea* genus which mostly distributed at Ghana, Nigeria, the Caribbean's Island, China, Japan, Malaysia, Thailand and Taiwan (Of *et al.*, 2014).. In Malaysia, it is locally known as “ubi Gadong” (Azman *et al.*, 2015).Meanwhile, according to Dutta (2015) the *dioscorea hispida* (*D. hispida*) is known as Hati-muria alu (As) or Thadangjian (DI). It is classified as the wild creeping and climbing plant that can grow up to 20 metre in height. *D. hispida* has similar features with eudicot plant but the different is the seed, tuber and flower of cassava look like monocotyledons plant (Mat & Yunus, 2013). The tuber generally is renewed, occurring at the soil surface, large, lobed, covered with dead roots, bristly, and present numerous starch granules in variable sizes and ovate-shape filling parenchyma cells (Mat & Yunus, 2013). In Indonesia, the tuber is used as the main source of carbohydrate(Cahyo Kumoro, Susetyo Retnowati, & Sri Budiayati, 2014). The surface of *D. hispida* are covered with trichome which giving it become rough, bristly or hairy surface and at the bottom of tuber presence of starch granule (Mat & Yunus, 2013). The cork layer is bright brown in color and occurred as a protective layer. This species is commonly planted at the area that nearby the river and it is also used as an exotic food of importance in Malaysia, especially in Terengganu state, and even some parts of the world (Mat & Yunus, 2013).

In addition, it is also used as herbal remedies among the old folk, and it play important role in biological activity such as anthelmintic activity, antioxidant activity, analgesic, anti-inflammatory activity, antioxidant activity and anti-tumor