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**RADIOPROTECTIVE EFFECT OF 50% WATERMELON (*Citrullus lanatus*
(Thunb.) Matsum. And Nakai) JUICE IN LIVER**

By

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**Thesis Submitted in Partial Fulfillment of the Requirements for
Bachelor of Medical Laboratory Technology (Hons.)
Faculty of Health Sciences, Universiti Teknologi MARA**

2015

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DECLARATION

“I hereby declare that this thesis is my original work and has not been submitted previously or currently for any other degree at UiTM or any other institutions.”



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ABSTRACT

Radioprotective properties of 50% watermelon [*Citrullus Lanatus* (Thunb.) Matsum. and Nakai] juice in liver

Ionizing radiation is one of a radicals sources inside human body which resulted in oxidative damage. Overproduction of ROS and imbalance of antioxidant production can contribute to various pathological condition such as cancer and tissues injuries. To date, lack of information about capability of watermelon in reducing oxidative damage cause by oxidant such as IR. Therefore, the present study was aimed to evaluate the radioprotective effect of 50% watermelon (*Citrullus lanatus* (Thunb.) Matsum. and Nakai) juice against low dose ionizing irradiation – induced oxidative stress in liver. Eighteen healthy male ICR mice was randomly divided into three group consist of negative control group, radiation and treatment groups (n=6). Negative control and radiation groups mice received filtered tap water, but radiation group was exposed to low dose radiation (100 μ Gy) on day 15 whereas treatment group was supplemented with 50 % of watermelon juice *ad libitum* for 14 days prior to total body X-ray exposure in single dose. SODs inhibition activities, total glutathione (GSH) and Malondialdehyde (MDA) level was assessed in mice liver. Level of DNA damage was studied by measuring olive tail moment using Comet assay. The SOD inhibition activities and GSH level showed significant reduction in radiation and treatment group compared to negative control group ($P < 0.05$), however no significant marked between both groups although treatment group had higher mean compared to radiation group. MDA level among all the groups showed no significant differences, but in treatment group showed decrease of MDA level compared to radiation group. However, finding of DNA damage observed significantly increased in radiation group compared to negative control and treatment groups ($P < 0.05$). In conclusion, present study reveal biological evidence that support radioprotection effect of 50% watermelon juice in molecular changes and several biochemical changes against radiation-induced oxidative damage for 14 days in mice liver.

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

Recently, radiation plays a major role in detecting abnormalities inside human body, by becoming a modern therapy against certain disease. However, this diagnostic tool will give both advantages and disadvantages. Ionizing Radiation (IR) therapy is one of the modern and important therapeutic tools which widely used to diagnosed variety of tumors and cancer. Earliest groups that exposed to ionizing radiation (IR) are occupational groups such as radiologist. Besides curing several types of cancer, radiation such as X-ray will cause abnormalities to human body because of its carcinogenic characteristic. Exposure of IR to cell will cause the production of free radicals and reactive oxygen species (ROS) for several minutes or hours after being exposed. Overproduction of ROS and imbalance of antioxidant production will lead to oxidative stress that can contribute to various pathological conditions. Besides disturbing in atom structure and producing chemical, IR also gives effect to living cell by causing biological damage to tissues and may be affect whole body. Despite causing damage to cell, tissues and organs, IR also can lead to radiolysis of water which then produce superoxide radical anion (O_2^-) which caused damage to nucleic acid (DNA), lipids and protein, thus contribute to various pathological conditions.

Oxidative stress and an antioxidant activity can be measured by detecting several parameters. The parameter including enzymatic antioxidant activity of superoxide dismutase (SOD), non-enzymatic antioxidant activity of total glutathione (GSH) level, lipid peroxidation level by quantified end-product of this reaction which is Malondialdehyde (MDA), and also DNA damage. However, presently there is no gold standard parameter to measure the oxidative stress. GSH act as primary defense against oxidative stress whereas SOD is the primary enzyme activity in body. Another parameter