

THESIS

PROTECTIVE EFFECT OF OOLONG TEA (*Camellia sinensis*) LEAF EXTRACT ON GENTAMICIN-INDUCED HEPATOTOXICITY IN WHITE RATS (*Rattus norvegicus*)



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ENDORSEMENT FORM

**PROTECTIVE EFFECT OF OOLONG TEA (*Camellia sinensis*) LEAF
EXTRACT ON GENTAMICIN-INDUCED HEPATOTOXICITY IN
WHITE RATS (*Rattus Norvegicus*)**

Thesis

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DECLARATION

Hereby, I declare that in the thesis entitled:

**PROTECTIVE EFFECT OF OOLONG TEA (*Camellia sinensis*) LEAF
EXTRACT ON GENTAMICIN-INDUCED HEPATOTOXICITY IN
WHITE RATS (*Rattus Norvegicus*)**

No other paperwork has ever been published to obtain a bachelor's degree in any other universities and according to my knowledge, there are no paperwork or opinions which have been written or published by someone else, except those which is written, referred in this paper and mentioned in the references.

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SUMMARY

JUSTIN LIM MENG CHUAN. The main function of liver is to remove our body metabolic waste products and also for detoxification (Raoofi *et al.*, 2016). It is one of the largest internal organ in the body. The liver maintains homeostatsis of the body with its important metabolic functions. (Aboubakr and Abdelazem, 2016). Liver tissues is considered one of the most at risk or sensitive tissue in the body against side effects and damage from medications (Najafian *et al.*, 2014).

Oolong tea (*Camellia sinensis*) is a popular tea and mainly consumed and produced in China, especially in South China (He *et al.*, 2009). Many natural antioxidants like caffeine, catechins and flavonoids can commonly be found in Oolong tea. Natural antioxidants like flavonoids has the ability to scavenge free radicals (Tang *et al.*, 2019) (Qin *et al.*, 2002).

Antibiotics such as gentamicin is commonly used to prevent infections such as infections caused by Gram-Negative bacteria. Nonetheless, gentamicin has many side effects that damages various body organs for example kidneys, brain, blood, liver and so on. Due to the increased production in Reactive Oxygen Species (ROS) that induces toxic impacts on the function and structure of tissues for example hepatotoxicity, usage of gentamicin becomes limited (Najafian *et al.*, 2014).

The aim of this reseach is to study the protective effect of Oolong tea leaf extract on gentamicin-induced hepatotoxicity in white rats. Completely randomized design was used in this research. A total of 30 white rats were divided into five groups which is negative control group (C-) which is not given any treatment,

positive control group (C+) which were injected intraperitoneally with 80mg/kgBW of gentamicin, treatment group (T1) which were injected intraperitoneally with 80mg/kgBW of gentamicin and orally administered with 100mg/kgBW doses of Oolong tea leaf extract, treatment group (T2) which were injected intraperitoneally with 80mg/kgBW of gentamicin and orally administered with 200mg/kgBW doses of Oolong tea leaf extract and treatment group (T3) which were injected intraperitoneally with 80mg/kgBW of gentamicin and orally administered with 400mg/kgBW doses of Oolong tea leaf extract. Each treatment group consisted of 6 white rats and treatment was carried out once a day for 7 days.

The liver samples were excised on the 8th day, made into histological preparation with Haemotoxylin eosin staining and later examined with 100x magnification to see the general view with 100x magnification following with 400x magnification to observe the cells precisely. Each data was collected in an average score of five different fields. Histopathology evaluation were based on the result of hepatocytes necrosis, hepatocytes hydropic degenerations and portal inflammation. Data were analysed using Kruskal-Wallis test and Mann-Whitney test.

A noticeable increase in the amount of hepatocytes necrosis, hepatocytes hydropic degeneration and portal inflammation in the rat liver cells after being exposure to gentamicin for 7 days in the positive control group (C+). According to the research data, treatment group (T1) that was given dosage of 100mg/kgBW Oolong tea leaf extract as a preventive treatment present the best result in the amount of hepatocytes necrosis, hepatocytes hydropic degeneration and portal inflammation in the rat liver cells. Treatment group (T3) is not recommended for

clinical use because the result for hepatocytes necrosis, hepatocytes hydropic degeneration and portal inflammation was high and similar to positive control group (C+).

The conclusion of this research is that Oolong tea leaf extract with the dosage of 100mg/kgBW is the most optimum protective effect against hepatocytes necrosis, hepatocytes hydropic degeneration and portal inflammation on gentamicin-induced hepatotoxicity in white rats.

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ABSTRACT

The following study was done to evaluate the protective effect of oolong tea (*Camellia sinensis*) leaf extract on gentamicin-induced hepatotoxicity in white rats (*Rattus Norvegicus*). Thirty male white rats with 150-200 gram BW were used and randomly divided into five groups consisted of the negative control group (C-) which orally received (1ml CMC-Na 0.5% and aquadest), positive control group (C+) which were injected intraperitoneally with gentamicin (80mg/kgBW). There were three treatment groups which were treatment group (T1), treatment group (T2) and treatment group (T3) which received oolong tea leaf extract orally at the dosage level of 100mg/kg BW, 200mg/kg BW and 400mg/kg BW subsequently injected intraperitoneally with gentamicin (80mg/kgBW). Treatment were done once a day for 7 days. The histopathological evaluation was carried out by scoring of the degree of hepatocytes necrosis, hepatocytes hydropic degeneration and portal inflammation. The results showed that Oolong tea leaf extract has protective effect against hepatotoxicity with its high amount of catechin or antioxidants which reduces oxidative stress, anti-allergic and also antiseptic effects. The conclusion of this study was Oolong tea leaf extract with the dosage of 100 mg/kgBW showed the best protective effect on gentamicin-induced hepatotoxicity in white rats against hepatocytes necrosis, hepatocyte hydropic degeneration and portal inflammation.

Key words: Oolong Tea (*Camellia sinensis*) leaf extract, Gentamicin, Necrosis, Hydropic degeneration, Portal Inflammation.

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The author found that there are still many errors and imperfections in the preparation of this thesis. Nonetheless, criticism and improvement given is always welcomed. Lastly, the author hopes that this thesis could be useful information for society especially in the veterinary medicine field.

Surabaya, 1st January 2022



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ABBREVIATION AND MEANING SYMBOL

ATP	: Adenosine Triphosphate
COX2	: Cyclooxygenase-2
CRD	: Completely Randomized Design
CMC NA	: Carboxymethyl Cellulose Sodium
DNA	: Deoxyribonucleic Acid
EGCG	: Epigallocatechin gallate
Et al.	: et alli
GSH	: Glutathione
GST	: Glutathione S-transferase
HO	: Hemeoxygenase
iNOS	: Inducible Nitric Oxide Synthase
NF-Kb	: Nuclear factor-Kappa beta
Nrf2	: Nuclear factor erythroid-2-related factor-2
NQO1	: Quinone Reductase
ROS	: Reactive Oxygen Species
SPSS	: Statistical Analytic Software Program
TNF-a	: Tumor Necrosis Factor-alfa
UGT1A1	: Uridine Disphosphate – Glucuronyl Transferase