

**THESIS**

**PROTECTIVE EFFECT OF *Ocimum sanctum*  
LEAVES ETHANOL EXTRACT ON THE  
HISTOPATHOLOGICAL CHANGES OF  
KIDNEY IN MICE (*Mus musculus*)  
EXPOSED BY LEAD ACETATE**



**BY:**

**KRISTANIA CELIA**

**SIN 061611133128**

**FACULTY OF VETERINARY MEDICINE  
UNIVERSITAS AIRLANGGA  
SURABAYA  
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Thesis

Submitted as partial fulfilment of the requirements for the degree of  
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at

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Surabaya

By:

**KRISTANIA CELIA**  
**SIN 061611133128**

Approving

Supervisor Committee,



**(Prof. Dr. Rahaju Ernawati, drh., M.Sc.)**

Supervisor



**(Dr. Boedi Setiawan, drh., M.P.)**

Co-Supervisor

## DECLARATION

Hereby, I declare that in this thesis entitled:

**PROTECTIVE EFFECT OF *Ocimum sanctum* LEAVES ETHANOL  
EXTRACT ON THE HISTOPATHOLOGICAL CHANGES OF  
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LEAD ACETATE**

There is no other work ever published to obtain a college degree in certain college and to my knowledge there is also no work or opinion ever written or published by others, except those in writing referred to this paper and mentioned in the references.

Surabaya, February 14<sup>th</sup> 2020



**Kristania Celia**

**SIN 061611133128**

Has been assessed in Result Seminar

Date: February 21<sup>th</sup> 2020

**RESULT SEMINAR ASSESSMENT COMMITTE**

Head : Prof. Dr. Wiwik Misaco Yuniarti, M. Kes., Drh.

Secretary : Dr. Eka Pramytha Hestianah, drh.

Member : Dr. Rahmi Sugihartuti, drh., M.Kes

Supervisor : Prof. Dr. Rahaju Ernawati, drh., M.Sc.

Co-Supervisor : Dr. Boedi Setiawan, drh., M.P.

Examination of Thesis

Date: 6<sup>th</sup> March 2020

**ASSESMENT COMMITTEE OF THESIS SEMINAR**

Chairman : Prof. Dr. Wiwik Misaco Yuniarti, drh., M.Kes

Secretary : Dr. Eka Pramytha Hestianah, drh., M.Kes.

Member : Dr. Rahmi Sugihartuti, drh., M.Kes.

Prof. Dr. Rahaju Ernawati, drh., M.Sc.

Dr. Boedi Setiawan, drh., M.P.

Surabaya, 9<sup>th</sup> March 2020

Faculty of Veterinary Medicine

Universitas Airlangga

Dean,



**Prof. Dr. Pudji Srianto, drh., M.Kes.**

NIP. 195601051986011001

## SUMMARY

**Kristania Celia.** Protective Effect of *Ocimum sanctum* Leaves Ethanol Extract on the Histopathological Changes of Kidney in Mice (*Mus musculus*) Exposed by Lead Acetate. Under the supervision of Prof. Dr. Rahaju Ernawati, drh., M.Sc. as the first supervisor and Dr. Boedi Setiawan, drh., M.P. as co-supervisor.

Lead acetate are the most commonly found heavy metal in the surroundings. High amount of lead exposure has resulted in poor performance, poisoning, and death in animal because of it affect on producing serious disorders on central nervous, hematopoietic, hepatic and renal system. Lead can induce Reactive Oxygen Spesies (ROS) like hydroxyl radicals, lipid peroxide, superoxide radicals and hydrogen peroxide that can cause oxidative stess in the living cell. Histopathological result of lead-induced nephrotoxicity showed structural changes in the renal tissue such as necrosis and degeneration in proximal convulated tubules, and glomerular necrosis that may demonstrate extensively atrophied glomerulus.

*Ocimum santum* commonly known as the Holy Basil is an aromatic herb that belongs to the family Lamiaceae. More than 60 chemical compounds have been reported for *Ocimum santum*. The leaves of *Ocimum santum* is mainly reported to contain 0.7% volatile oil comprising about 71% eugenol. Leaves of *Ocimum santum* also contain vitamin C, phenolic, flavonoid, riboflavin, and mineral. Antioxidants properties in *Ocimum sanctum* leaves ethanol extract bind with free radical by giving up their own electron and supress chain initiation to scavenge the active radical.

This research used pre-treatment method as kidney protector. Experimental animal used in this research were 20 male mice divided into five groups of treatment with four repetition in each group. *Ocimum sanctum* leaves ethanol extract were given per oral for the first 3 days and 21 days after to the treatment groups T1, T2, and T3 with dose of 140 mg/kg BW, 280 mg/kg BW, and 560 mg/kg BW and lead acetate 20 mg/kg BW for 21 days given one hour after each treatment. Negative control group (C-) was given Tween 80 and aquadest, while positive control group (C+) was given Tween 80 and lead acetate 20 mg/kg BW.

Microscopic observation of the kidney used a microscope with 100x, 200x, and 400x magnification to analyses the histopathological changes. Indicators observed in this research were based on modified Klopffleisch (2013) scoring which observed pathological changes of tubular epithelial degeneration, tubular epithelial necrosis, and glomerular necrosis. The end result of this research analysed with Kruskal-Wallis Test followed by Mann-Whitney Test showed significant difference ( $p < 0.05$ ) for tubular epithelial hydropic degeneration and tubular epithelial necrosis, while glomerular necrosis did not show significant difference ( $p > 0.05$ ). The best dose of *Ocimum sanctum* leaves ethanol extract in this research was 560 mg/kg BW.