

Thesis

**THE EFFECT OF AROMATIC GINGER (*Kaempferia galanga* L.)
EXTRACT ON THE HISTOLOGY OF MALE MICE
(*Mus musculus*) LUNGS EXPOSED TO
CIGARETTE SMOKE**



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**FACULTY OF VETERINARY MEDICINE
UNIVERSITAS AIRLANGGA
SURABAYA
2022**

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Thesis

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Bachelor of Veterinary Medicine
on
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DECLARATION

Hereby, I declare that in this thesis entitled:

**THE EFFECT OF AROMATIC GINGER (*Kaempferia galanga L.*) EXTRACT
ON THE HISTOLOGY OF MALE MICE (*Mus musculus*)
LUNGS EXPOSED TO CIGARETTE SMOKE**

There is no other work ever published to obtain a college degree in a certain college and according 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 reference.

Surabaya, August 25th, 2022



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SUMMARY

Syifa Salsabila Defci Putri. Research on **The Effect of Aromatic Ginger (*Kaempferia galanga* L.) Extract on The Histology of Male Mice (*Mus musculus*) Lungs Exposed to Cigarette Smoke** under the supervision of the first supervisor Prof. Sri Agus Sudjarwo, drh., Ph.D. and Dr. Rimayanti drh., M.Kes. as the co-supervisor.

Smoking is the activity of inhaling and exhaling smoke from burning tobacco in various ways. Health problems caused by smoking come from the main smoke and side smoke from burning cigarettes. Each cigarette burned will produce around 4000 kinds of chemicals that are toxic.

Exposure to cigarette smoke can form free radicals in the body. Free radicals that come from cigarette smoke cause damage to the lungs due to continuous exposure to pollutants. The lungs are vital respiratory organs in the body which are directly affected when exposed to cigarette smoke. The effects of free radicals in the body will be neutralized by antioxidants.

Antioxidant are molecules that can donate electrons to free radical molecules, thereby stopping the chain reaction. In plants there are many chemical components that can be used as medicine. Aromatic ginger contain flavonoid and polyphenol compounds which act as anticancer, antioxidant, anti-inflammatory, allergy and antihypertensive.

This research aims to determine the protective effect of aromatic ginger (*Kaempferia galangal* L.) extract on the histological damage of male mice lungs exposed to cigarette smoke. The experimental animals used were 20 male mice

(*Mus musculus*) which were randomly divided into two control groups and three treatment groups. On the first day until the fourteenth day, all groups were induced by cigarette smoke one cigarette per day. After that, on the fifteenth day to the twenty-eighth day, the treatment groups will be give aromatic ginger extract with a dose of 150mg/kgBW/day for treatment group one (T1), 300mg/kgBW/day for treatment group two (T2) and 600mg/kgBW/day for treatment group 3 (T3).

The statistical results of this study were carried out using the Kruskal Wallis test followed by the Mann Whitney test which showed that there were significant differences in each group ($p < 0.05$). The observational data on histological damage to the lungs of male rats with parameters of inflammatory cells and hemorrhage were statistically analyzed using the Kruskal-Wallis test and obtained significant results ($p < 0.05$) with $p\text{-value} = 0.031$ for inflammatory cells and $p\text{-value} = 0.008$ for hemorrhage parameters. This proves that the treatment has a significantly different effect, then continued with the Mann-Whitney test to see the difference between the treatment groups.

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Syifa Salsabila Defci Putri

ABSTRACT

The purpose of this study was to determine the protective effect of aromatic ginger (*Kaempferia galanga L.*) extract on the histological damage of male mice lungs exposed to cigarette smokes. Twenty male mice were divided randomly into five groups of treatment (n=5). The treatments of this research were C- (normal mice), C+ (mice exposed to cigarette smoke without being given aromatic ginger extract), T1 with extract dose 150 mg/kgBW, T2 with extract dose 300 mg/kgBW, T3 with extract dose 600 mg/kgBW. The data were test with Kruskal Wallis – Mann Whitney, and the result show there were significant different ($p < 0,05$) between treatment groups. The result also showing treatment (T2) with 300 mg/kgBW extract dose is best to protect from the histological damage of male mice lungs. This study has proven that aromatic ginger extract has the potential to reduce histological damage in mice exposed to cigarette smoke.

Keywords: Mice (*Mus musculus*), Extract of Aromatic Ginger (*Kaempferia galanga L.*), Cigarette Smoke Exposed, Histological Damage, Lungs.

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Surabaya, August 25th, 2022

Syifa SalsabilaDefci Putri

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ABBREVIATIONS AND MEANING OF SYMBOLS

°C	= Celsius
cc	= Chest Circumference
CD8	= <i>Cluster of Differentiation 8</i>
cm	= centimeter
CMC-Na	= <i>Carboxyl Methyl Cellulose - Natrium</i>
CO	= <i>Carbon Monoxide</i>
CRD	= Complete Randomized Design
DNA	= <i>Deoxyribonucleic acid</i>
DPPH	= <i>2,2 - diphenyl - 1 - picrylhydrazyl.</i>
HE	= <i>Hematoxylin Eosin</i>
i.e	= id est
IL-8	= <i>Interleukin 8</i>
IL-4	= <i>Interleukin 4</i>
IL-3	= <i>Interleukin 3</i>
KgBW	= Kilogram Body Weight
M1P1- α	= <i>Macrophage Inflammatory Protein-1α</i>
MCP1	= <i>Monocyte Chemoattractand Protein-1</i>
mg	= Miligram
ml	= Mililiter
mm	= Milimeter
PAH	= <i>Polynuclear Aromatic Hydrogen</i>
pH	= <i>Power of Hydrogen</i>
rpm	= revolution per minute
RNS	= Reactive Nitrogen Species
ROS	= Reactive Oxygen Species
SPSS	= Statistical Package for the Social Sciences
TNF- α	= <i>Tumor Necrosis Factor alpha</i>
UPT	= Unit Pelaksana Teknis
WHO	= World Health Organization