

THESIS

**HEMATOLOGICAL PROFILE AND  
HISTOPATHOLOGICAL CHANGES OF INDUCED  
PERIODONTITIS IRRIGATED BY LEMONGRASS  
(*Cymbopogon citratus* (DC.) Staph) IN MALE RATS  
(*Rattus norvegicus*)**



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**ENDORSEMENT FORM**

**HEMATOLOGICAL PROFILE AND HISTOPATHOLOGICAL  
CHANGES OF INDUCED PERIODONTITIS IRRIGATED BY  
LEMONGRASS (*Cymbopogon citratus* (DC.) Staph)  
IN MALE RATS (*Rattus norvegicus*)**

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## DECLARATION

I hereby declare that this thesis entitled

**Hematological Profile and Histopathological Changes of Induced  
Periodontitis Irrigated by Lemongrass (*Cymbopogon  
citratatus* (DC.) Staph) in Male Rats  
(*Rattus norvegicus*)**

submission is originally conducted by me and that to the best of my knowledge and belief. It contains no material previously published or written by other neither person nor material except those referred to in this manuscript are mentioned in the bibliography to obtain a bachelor's degree from a particular institution.

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## SUMMARY

Periodontal disease is a common disease found in small animal practice (Gorrel, 2008). Periodontal disease is classified as number one health problem in small animal patients too (Niemec, 2008). It is further divided into gingivitis and periodontitis (Pieri *et al.*, 2012).

Treatment which is commonly used in periodontal disease are 0.2% Chlorhexidine solution and antibiotics like tetracycline hydrochloride (Alhaarbi *et al.*, 2017, Fernandes *et al.*, 2010). However, these conventional treatments has its own disadvantages where the attention therefore shifted to using medicinal plants. This is especially important when problems with chemical agents and safety concerns increase (Alhaarbi *et al.*, 2017, Badole *et al.*, 2016).

Lemongrass *Cymbopogon citratus* (DC.) Staph is found to be effective to treat periodontal disease according to recent research (Warad *et al.*, 2013). It contains antibacterial and anti-inflammatory property due to presence of geranial and neral component (Nail *et al.*, 2010, Shah *et al.*, 2011, Han and Parker, 2017).

This research is done to evaluate whether lemongrass *Cymbopogon citratus* (DC.) Staph of different concentrations given supragingiva twice a day for one week of lower front incisors affect the hematological profile and histopathological features of periodontal tissue of male rats (*Rattus norvegicus*) induced using 3/0 non-absorbable silk thread ligature.

Periodontal disease are numerous group of clinical where inflammation reaction is induced and results in destruction of attachment apparatus, loss of

supporting alveolar bone and eventually losing teeth if this condition is left untreated. Interest on relationship between periodontal disease and systemic problems also increases recently (Guthmiller and Novak, 2002).

25 male albino rats (*Rattus norvegicus*) were used in this research where it first undergo acclimatization process for 7 days. After that, periodontitis is induced for 7 days using 3/0 non-absorbable silk thread ligature. Treatment using lemongrass *Cymbopogon citratus* (DC.) Staph extract irrigation made using decoction method were given supra-gingiva for 7 days, blood sample were taken via cardiac puncture and periodontal tissue were sectioned after euthanasia.

The result showed a significant change of red blood cell parameters like decrease of haemoglobin, increase of erythrocytes, decrease and normal values of haematocrit, decrease of mean corpuscular volume (MCV) and mean corpuscular haemoglobin concentration (MCHC) among control and treatment groups while no significant changes for mean corpuscular volume (MCH) and white blood cells parameters namely leucocytes and differential count of leucocytes as well as thrombocytes where it shows a result according to reference intervals and also a decrease in number. However, the differential count of leucocytes shows a decrease in value while total leucocytes shows normal and lower values overall. Subsequently, a significant change is showed according to statistical analysis of histopathological scoring of inflammation of gingiva, inflammation of periodontal ligament and alveolar bone osteolysis.

To recapitulate, lemongrass *Cymbopogon citratus* (DC.) Staph extract irrigation of concentrations are effective as anti-inflammation but the most effective

lemongrass concentration is T2 of 0.25% concentration due to the presence of citral. This is due to the fact that induced periodontitis shows a significant change in the level of red blood cells, the white blood cells does not show significant change but the level increases as indication of wound healing process as well as thrombocytes. The histopathological statistical scoring data also showed significant changes where the PMN inflammatory cells of gingiva and periodontal ligament shows the least amount as well as the decrease of alveolar bone osteolysis using T2, 0.25% lemongrass extract as treatment.