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UNIVERSITI TEKNOLOGI MARA

**THE PROTECTIVE EFFECT OF
Barringtonia racemosa ETHANOLIC
LEAVES EXTRACT ON *Eimeria papillata*-
INDUCED MICE**

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of the requirements for the degree of
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AUTHOR'S DECLARATION

I declare that the work in this dissertation was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

Eimeria papillata is known to be one of the parasites of coccidiosis. It is a specific coccidian that infect mice. Coccidiosis could cause huge economic loss to farmers due to the development of resistance by the parasites towards anti-coccidial drugs. Thus, the study was designed to evaluate anti-coccidiosis activity of *Barringtonia racemosa*, which is also known for its anti-tumour and anti-inflammatory effects. The study was aimed to determine the ability of *B. racemosa* in reducing the parasite burden; to observe the histopathological structure on the mucosal section, as well to examine the presence of Bcl-2 protein as the results of *E. papillata* induction in the mice. Mice were divided into 5 groups (A, B, C, D and E). Mice from Group A was the normal control (non-infected + saline) and mice from Group B were not infected but treated with 500 mg/kg b.wt. *B. racemosa* leaves extract. Groups C, D and E were induced with 1×10^3 oocysts/mL of *E. papillata* oocysts (day 0). Group C was the negative control group (infected but no treatment given), Group D was infected with *E. papillata* and given treatment of 500mg/ kg b.wt of *B. racemosa* leaves extract while Group E (positive control) were infected mice and treated with 20 mg/kg b.wt of Toltrazuril. *B. racemosa* leaves extract were given orally for four consecutive days (day 1-4 post-infection) while Toltrazuril was given once (day 1 post-infection). Fecal samples were collected and oocysts count were determined on day 5 post-infection. The weight of mice were recorded on day 5 post-infection for analysis of weight change due to infection and treatment. Immediately after the oocysts count and weight measurement, mice were humanly sacrificed and jejuna samples were collected and prepared for histopathological and immunohistochemical analysis to examine the presence of Bcl-2 protein. The outcomes of this study showed that infected mice treated with *B. racemosa* leaves extract had significantly lower oocysts count compared to non-treated group. *B. racemosa* extract also was able to prevent the reduction of weight in the infected group. The extract was also able to decrease the destruction on the overall mucosal structure (epithelial layer, villi length and crypt length) of jejunum in infected mice. Lower expression of Bcl-2 protein in infected mice treated with *B. racemosa* leaves extract indicated high apoptosis, hence, less prevention role of the extract against cell death induced by *E. papillata*. In conclusion, *B. racemosa* showed anti-coccidiosis activity at dose of 500 mg/kg b.wt by reducing the oocysts count but the low expression of Bcl-2 protein revealed that *B. racemosa* is less effective in protecting the jejunum against *E. papillata* infection. Therefore, it is suggested to conduct further research to determine the optimum dose of *B. racemosa* leaves extract that could possess protective effect against *E. papillata* infection on the jejunum.

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CHAPTER ONE

INTRODUCTION

1.1 RESEARCH BACKGROUND

Diseases in farm animals are becoming more advanced than the earlier years of their rise. The advancement of the viruses, bacteria, parasites and other diseases-causing microorganisms are due to the modifications in their structure and their pathogenicity, in order to overcome the action mechanism of drugs or vaccine. Some of those organisms may contribute to chances of disease spreading to human beings such as in cases of non-specificity of host. There are reports that claimed coccidiosis is one of parasitic-caused diseases in human beings (Alexander *et al.*, 2005; Cotton *et al.*, 2011). Coccidiosis is known for decades, as one of common veterinary diseases besides botulism, foot and mouth disease, and toxoplasmosis. It is the gastrointestinal disease occurs in animals, especially poultry and livestock. Coccidiosis is caused by several species of Apicomplexa group (also known as coccidian), among which are *Eimeria species*, *Isospora sp.* and *Cyclospora sp.* (Gunn and Pitt, 2012).

Drug resistance among microorganisms of veterinary diseases had caused substantial loss to the poultry and livestock industries. To date, coccidiosis had caused large losses in productivity of poultry and livestock industries, giving huge impact on the economic status of the people in India by affecting 96.51% of total lost (Bera *et al.*, 2010). The reduction of economic status of the farmer is because coccidiosis also induced harmful effect on physiological of the infected host including loss in weight due to anorexia and depression. Bloody and watery feces also are manifestations of animals infected by coccidian (Patra *et al.*, 2009; Mohamad, 2012).

Herbal medications have been used for decades to treat bacterial, fungal, viral and parasitic diseases. These practices are based on parts of the plants or some that had been modified into capsules to be consumed, or application of extracted essential oil of plants on infected area. It was reported earlier, garlic and pomegranate are effective in reducing the parasite burden of *Eimeria papillata* (Dkhil *et al.*, 2011; Amer *et al.*, 2015) while ginger possess anti-bacterial properties against periodontal bacteria and other