



EFFECT OF NEEM LEAF MEAL SUPPLEMENTATION ON GROWTH PERFORMANCE, SERUM BIOCHEMICAL PROPERTIES AND CHOLESTEROL LEVEL IN MEAT OF BROILER CHICKENS

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FP 2016 84

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SERDANG, SELANGOR DARUL EHSAN

2015/2016

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BY

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**A project report submitted to Faculty of Agriculture, Universiti Putra Malaysia,
in fulfillment of the Requirement of SHW 4999 (Final Year Project) for the
award of the degree of Bachelor of Agriculture (Animal Science)**

Faculty of Agriculture

Universiti Putra Malaysia

2015/2016

CERTIFICATION FORM

This project report entitled **EFFECT OF NEEM LEAF MEAL SUPPLEMENTATION ON GROWTH PERFORMANCE, SERUM BIOCHEMICAL PROPERTIES AND CHOLESTEROL LEVEL IN MEAT OF BROILER CHICKENS** is prepared by **KAUSHELIA ELUZTHASSAN D/O NARAYANAN** and submitted to the Faculty of Agriculture in fulfillment of the requirement of SHW 4999 (Final Year Project) for the award of **BACHELOR OF AGRICULTURE (ANIMAL SCIENCE)**.

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ACKNOWLEDGEMENT

First of all, I thank, Almighty God for blessing me with all the strength and courage to accomplish this project successfully. I would like to express all my appreciation and thanks from the bottom of my heart to my supervisor, Dr. Henny Akit for her advice, guidance, moral support, friendliness and encouragement throughout the period of this project. Without her dedication and valuable advice it is impossible for me to complete this project and thesis writing.

I am grateful to thank all my friends who make themselves available to help me throughout this project, especially to my project member Mr. Muhammad Syukur. I also would like to take this opportunity to thank my lecture and everyone from Ladang 10 (Experimental Unit of the Department of Animal Science), Nutrition Laboratory of the Department of Animal Science, and Dr. Mahdi Ebrahimi from Faculty of Veterinary for lending their hand and guidance to make this project completed.

I am grateful and thankful to my parents, Mr. K. E. Narayanan and Mrs. K. Bethinam Devi, and also my siblings, Mr. Tinagan Eluzhassan, Mrs. Usha and Mr. Dayalan for their understanding and motivation.

Last but not least, I would like to acknowledge everyone who helps me in one way another during the course of my study and conducting the project.

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ABSTRACT

TITLE: EFFECT OF NEEM LEAF MEAL SUPPLEMENTATION ON GROWTH PERFORMANCE, SERUM BIOCHEMICAL PROPERTIES AND CHOLESTEROL LEVEL IN MEAT OF BROILER CHICKEN

NAME: KAUSHELIA ELUZTHASSAN D/O NARAYANAN (167158)

NAME OF SUPERVISOR: DR HENNY AKIT

KEYWORD: Broiler, *Azadirachta indica* (neem), growth performance, serum biochemical properties, cholesterol in meat

Neem (*Azadirachta indica*) commonly known as 'margosa' provides medicine and nutritive values to broilers. The objective of this study was to determine the effect of neem leaf meal supplementation on the body weight, average feed intake, feed conversion ratio (FCR), dressing percentage, pH and colour of chicken breast meat, cholesterol content in chicken breast meat and serum biochemical properties. A total of 96 one-day-old Cobb-500 broiler chicks were raised until 42 days of age under open house system. The chicks were divided into four groups in a completely randomized design (CRD): T1: Control – Basal diet; T2: Basal diet + 0.3% neem leaf meal; T3: Basal diet + 0.5% neem leaf meal; T4: Basal diet + 1% neem leaf meal. Fresh, green and undamaged mature neem leaves were collected from a number of trees from the same village and grounded to produce neem leaf meal. The birds were fed with commercially prepared starter ration from day 1 to day 21, and the diet was changed to broiler finisher ration on day 22 until slaughter. Feed and water were given to them *ad libitum* for 6 weeks. At the end of the experiment, all the birds were slaughtered and blood was collected for serum biochemical analysis. Colour, pH and cholesterol assessment were conducted on the breast muscle. Body weight, average feed intake and feed conversion ratio were not influenced by neem leaf.

Chicken fed 1% neem leaf meal had the lowest meat pH ($P < 0.05$). Chicken fed 0.5% neem leaf meal showed the highest redness (a^*) value ($P < 0.05$). Chicken fed 0.5% neem leaf meal had the highest cholesterol in meat compared with other treatment ($P < 0.05$). However, the level of cholesterol in all treatments was still within the normal range. Neem leaf meal had no effect on dressing percentage, lightness (L^*) and yellowness (b^*) of breast meat muscle ($P > 0.05$, respectively). Chicken fed 0.5% neem leaf meal had the highest urea, creatinine and ALT (Alanine transaminase) level in blood serum. While, 1% neem leaf meal had the highest AST (Aspartate transaminase) value. It was concluded that neem leaf meal had no effect on the final body weight, average feed intake, feed conversion ratio as well as meat pH and colour. Neem leaf meal increased the cholesterol level in meat and increased biochemical properties involved in the kidney and liver functions. Based on my study, I would not recommend farmers to feed neem leaf meal for broiler chicken.

ABSTRAK

TAJUK: KESAN DAUN MARGOSA PADA PRESTASI PERTUMBUHAN, SERUM BIOKIMIA DAN KOLESTEROL DALAM DAGING AYAM PEDAGING

NAMA: KAUSHELIA ELUZTHASSAN A / P NARAYANAN (167158)

NAMA PENYELIA: DR HENNY AKIT

KATA KUNCI: ayam pedaging, *Azadirachta indica* (margosa), prestasi pertumbuhan, ciri-ciri serum biokimia, kolesterol dalam daging

Margosa (*Azadirachta indica*) dikenali sebagai “neem” mempunyai nilai perubatan dan nilai pemakanan untuk ayam pedaging. Objektif kajian ini adalah untuk mengenalpasti kesan daun margosa dalam makanan ayam terhadap berat badan ayam, pengambilan makanan purata, nisbah penukaran makanan (FCR), peratusan “dressing”, pH dan warna pada daging dada ayam, kandungan kolesterol dalam daging dada ayam dan serum biokimia. Sebanyak 96 ekor ayam pedaging jantan baka Cobb-500 yang berusia 1 hari telah ditenak sehingga 42 hari di bawah sistem reban terbuka. Anak-anak ayam telah dibahagikan kepada empat kumpulan dalam reka bentuk rawak lengkap (CRD): T1: Kawalan - Makanan komersial; T2: Makanan komersial + 0.3% daun margosa; T3: Makanan komersial + 0.5% daun margosa; T4: Makanan komersial + 1% daun margosa. Daun margosa yang segar, hijau, matang dan tidak rosak dikumpulkan dari beberapa pokok dari kampung yang sama dan dikisar untuk menghasilkan daun margosa kasar. Ayam-ayam telah diberi makanan komersial “starter” dari hari 1 hingga hari ke-21, dan telah ditukar kepada makanan komersial ayam pedaging “finisher” pada hari 22 sehingga hari sembelih. Makanan

dan minuman telah diberikan kepada ayam secara “*ad libitum*” selama 6 minggu. Pada akhir eksperimen, semua ayam disembelih dan darah dikumpulkan untuk analisis serum biokimia. Warna, pH dan penilaian kolesterol dijalankan ke atas daging dada ayam. Berat badan, pengambilan makanan purata dan nisbah penukaran makanan tidak dipengaruhi oleh daun margosa. Makanan ayam yang mengandungi 1% daun margosa mempunyai pH terendah ($P < 0.05$). Ayam yang diberi makanan yang mengandungi 0.5% daun margosa menunjukkan nilai kemerahan tertinggi ($P < 0.05$). Ayam yang diberi makanan 0.5% daun margosa mempunyai kolesterol tinggi dalam daging berbanding dengan rawatan lain ($P < 0.05$). Walau bagaimanapun, tahap kolesterol dalam semua rawatan masih dalam julat normal. Makanan ayam yang mengandungi daun margosa mempunyai kesan ke atas peratusan “*dressing*”, “*Lightness*” (L^*) dan kekuningan (b^*) pada otot daging dada ($P > 0.05$, masing-masing). Ayam diberi makanan 0.5% daun margosa mempunyai urea, kreatinin dan ALT (Alanine transaminase) yang tertinggi dalam darah. 1% makan daun neem mempunyai nilai AST (transaminase Aspartate) tertinggi. Kesimpulannya bahawa daun margosa dalam makanan ayam tidak mempunyai kesan ke atas berat akhir badan, pengambilan makanan purata, nisbah penukaran makanan serta pH daging dan warna. Daun margosa dalam makanan ayam meningkatkan tahap kolesterol dalam daging dan peningkatan ciri-ciri biokimia yang terlibat dalam fungsi buah pinggang dan hati. Berdasarkan kajian saya, saya tidak akan mengesyorkan penternak untuk memberi makan daun margosa untuk ayam pedaging.

CHAPTER 1

INTRODUCTION

1.1 Introduction

Livestock production in general and chicken production in particular plays important socioeconomic roles in developing countries (Melesse *et al.*, 2013). The poultry productions have lead in increasing the production of poultry meat and eggs throughout of the world (Khatun *et al.*, 2013). Poultry farming plays a major role in bridging the protein gap in developing countries (Onyimonyi *et al.*, 2009).

In the modern poultry farming industry there is a major demand to produce high quality poultry meat and egg at low price without relying on antibiotic and other medical use in poultry feed and water. Many synthetic drugs and growth promoters are supplemented to the broilers to effect rapid growth, but their use has shown many disadvantages like high cost, adverse side-effect on health of birds and long residual properties (Wankar *et al.*, 2009). So, scientists are thinking, how poultry farmers can rare birds without using synthetic drugs and growth promoters. This is because continuous feeding of antibiotics to birds can result in accumulation of the antibiotics in meat that can be transferred to human (Jawad *et al.*, 2013). This has lead to the search of alternative natural growth enhancers such as plants and their extracts. Since

consumers are aware of the residual effects of antibiotics in poultry meat that is why the demand of the drug free food products are increasing.

Scientists are giving attention on the use of our ancient medicinal system such as neem (*Azadirachta indica*) which is commonly called as “Margosa” which can be safely used to increased the productivity of animals and poultry (Jawad et al., 2013; Landy, Ghalamkari, and Toghyani 2011; Wankar *et al.*, 2009). Since protein from plants is the most naturally abundant and cheapest sources, there has been growing inteests in the use of plant leaf meals as dietary supplementations in chicken diets.

Neem (*Azadirachta indica*) is a tropical evergreen tree native to India sub-continent (Landy *et al.*, 2011). Among all the plant’s part, the processed leaves play the most significant role in livestock health. The different component of neem e.g. leaves, kernel cake, neem oil etc. extract beneficial effects to improve broiler performances (Rahman *et al.*, 2014). Neem is a fast growing tree which able to provide medicine and nutritive value to broilers. Neem tree had adaptability to wide range of climatic and topographic (Opara and Etuk, 2012). Some researcher have investigated that neem leaf when used in poultry feed can increase antibody against infectious bursal and Newcastle diseases (ND) (Jawad *et al.*, 2013). Neem has attracted to worldwide prominence due to his wide range of medical properties like antibacterial, antifungal, hepatoprotective, antiviral and antiprotozoal and has no side effects (Khatun *et al.*, 2013). Neem plays an important role as growth promoters and feed efficiency due to its antibacterial and hepatoprotective properties (Wankar *et al.*, 2009).

1.2 Research Problem

Decreased in weight gain, management problems and infectious diseases are some of the constraints in the poultry industry. So, research on the use of unconventional feed supplements such as neem leaf in broiler chicken feed is carried out to improve the feed conversion ratio (FCR) in chicken production.

1.3 General Objective

The aim of this study was to investigate the effect of neem leaf supplementation on the growth performance, serum biochemical properties and cholesterol level in broiler chicken meat.

1.4 Specific Objectives

The specific objectives were:

1. To evaluate the growth performance of broiler chickens fed varying dietary level of neem leaf meal.
2. To determine the serum biochemical properties of broiler chickens fed varying dietary level of neem leaf meal.
3. To evaluate the cholesterol level in meat and blood serum of broiler chickens when fed with 0%, 0.3%, 0.5% and 1% of neem leaf meal.

1.5 Research hypothesis

It is believed that supplementing of varying dietary levels of neem leaf meal to broiler chickens can improve the feed efficiency, serum biochemical properties, and decreases the cholesterol level in chicken meat.

1.6 Significance of study

The natural antibacterial and hepatoprotective properties of neem leaf can promote growth and feed efficiency as well as the health status of birds. So the outcome of this study was to address the issue whether feeding different level of neem leaf can influence on the growth performance, serum biochemical properties, and the cholesterol level in the broiler chicken meat. If this study gave promising results, it can be practiced by farmers, which indirectly can contribute towards economic gain and better health of the chicken.

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