



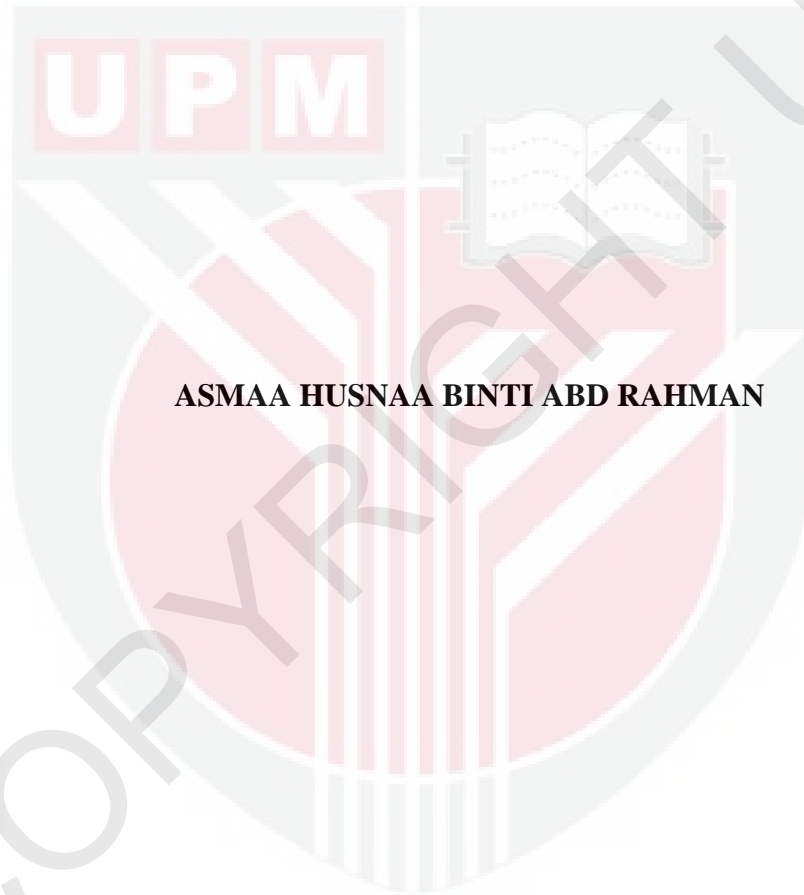
UNIVERSITI PUTRA MALAYSIA

**EFFECT OF CINNAMON, TURMERIC AND BLACK CUMIN SEED
SUPPLEMENTATION ON GROWTH PERFORMANCE, CARCASS
COMPOSITION AND MEAT QUALITY OF JAPANESE QUAIL**

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FP 2015 176

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SERDANG SELANGOR**

2014/2015

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BY:

ASMAA HUSNAA BINTI ABD RAHMAN

A project report submitted to

Faculty of Agriculture, Universiti Putra Malaysia

In Partial fulfillment of requirement of SHW 4999 (Project)

For award of the degree of

BACHELOR OF AGRICULTURE (ANIMAL SCIENCE)

FACULTY OF AGRICULTURE

UNIVERSITI PUTRA MALAYSIA

SERDANG SELANGOR

2014/2015

CERTIFICATION

This project report entitled **EFFECT OF CINNAMON, TURMERIC AND BLACK CUMIN SEED SUPPLEMENTATION ON GROWTH PERFORMANCE, CARCASS COMPOSITION AND MEAT QUALITY OF JAPANESE QUAIL** was prepared by **ASMAA HUSNAA BINTI ABD RAHMAN** and submitted to Faculty of Agriculture, Univeristi Putra Malaysia in partial fulfillment of requirement of SHW 4999 (Final Year Project) for the award of the degree of **Bachelor of Agriculture (Animal Science)**.

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ACKNOWLEDGMENTS

In the name of Allah, for His most graceful and most merciful.

Alhamdulillah, I finally managed to accomplish this final year project. First and foremost, I would like to acknowledge and extend my gratitude to my supervisor, Professor Dr. Abdul Razak Alimon for his guidance, unwavering support, supervisions and valuable advice throughout the course of my study.

I also would like to express my deep gratitude to Professor Dr. Dahlan Ismail as coordinator for the final year projects that always his encouragement, proper guidance and supporting us regarding to this study.

Furthermore, I would like to special thanks to Mr. Faizal, Mr. Azam, Mr. Saparin, and Mrs. Rohaida for providing me with some priceless information and help me during the experiment time. Special thanks are also to all staffs of Animal Science Department for their technical assistance and guidance.

My gratitude is also extended to my colleagues and friends especially Norashidah Ibrahim @ Abdul Aziz, Nor Farhana Roslan, Madihah Ismail, Nurul Afifah Ismail and Hanifa Syahida Darmaji for their invaluable help, support, advice and cooperation to fulfill this project.

Last but not least, my deepest gratitude goes to my beloved mother, Dayang binti Ali and also to my brothers and sisters for their endless love, prayers and encouragement.

Thank you so much.

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LIST OF ABBREVIATIONS

$^{\circ}\text{C}$	Degree Celsius.
%	Percentage.
AGP	Antibiotic growth promoter.
Cm	Centimeter.
DM	Dry matter.
FCR	Feed conversion ratio.
G	Gram.
GIT	Gastro-intestinal tract.
Kcal	Kilocalories.
ME	Metabolize energy.
Mg	Milligrams.
NGP	Natural growth promoter.
ORAC	Oxygen Radical Absorbance Capacity.
USDA	United States Department of Agriculture.

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ABSTRACT

The objective of this study was to evaluate the effect of herbs supplementation on growth performance and carcass composition of Japanese quail (*Coturnix japonica*). The reduction in the use of antibiotic as a growth promoter due to concern of bacterial resistance has initiated the utilization of herbs in poultry diets. This study was conducted at Universiti Putra Malaysia and used 120 one-day old Japanese quail which were randomly divided into four treatment groups with three replicates each in a completely randomize design. One group served as a control group (T1) that received the basal diet and the rest three experimental diets consisted of the basal diet with addition of 0.5% of cinnamon (T2), 0.5% turmeric (T3) and 0.5% black cumin seed (T4). The body weight gain and feed intake were recorded weekly. The feed conversion ratio (g feed/ g weight gain) was then calculated by dividing the feed intake with body weight gain. At the end of the 42-day feeding period, the quails were slaughtered and the relative weight of gastro-intestinal tract, liver and gizzard measured. The weight of hot carcass was recorded and then the dressing percentage of quail for each treatment was calculated. Following that, meat and bone of carcass was been separated to determine meat to bone ratio for each replicate. The breast muscle was taken from carcass to analyze meat quality of quail for each treatment. Meat quality was analyzed based on drip loss, cooking loss, color and tenderness of quail. For growth performance, the total feed intake, body weight gain and feed conversion ratio showed significant increases ($P < 0.05$) due to the supplementation of herbs. Carcass composition, dressing percentage, liver and gizzard showed no significant different between ($P > 0.05$) the treatments. But for meat to bone ratio and gastro-intestinal tract showed significant ($P < 0.05$) between the treatments. For meat quality, drip loss, cooking loss and shear force did not show significant

different between the treatment ($P>0.05$) but color of meat show significant different between the treatments ($P<0.05$). Under condition of this study, it was concluded that herbs has a potential in improving the quail performance in growth, carcass composition and meat quality. Further research to investigate the growth performance and carcass composition of Japanese quail by supplemented with herbs in feed was recommended.



ABSTRAK

Objektif bagi kajian ini adalah untuk menilai kesan suplemen pemakanan herba pada prestasi pertumbuhan dan komposisi karkas puyuh Jepun (*Coturnix japonica*). Pengurangan dalam penggunaan antibiotik sebagai penggalak pertumbuhan dalam industri ternakan adalah berikutan kebimbangan rintangan bakteria dan oleh itu herba digunakan sebagai inisiatif dalam makanan ayam. Sebelum ini, banyak kajian memberi tumpuan kepada pembangunan alternatif untuk menjaga kesihatan dan prestasi pertumbuhan haiwan dengan mengeksploitasi tumbuhan semula jadi yang telah dikenal pasti untuk menjadi alternatif yang berkesan untuk antibiotik. Kajian ini telah dijalankan di Universiti Putra Malaysia dengan menggunakan sebanyak 120 anak puyuh Jepun yang secara rawak dibahagikan kepada empat kumpulan makanan dengan tiga replikat setiap kumpulan makanan. Pembahagian puyuh dilakukan secara rawak. Satu kumpulan bertindak sebagai kumpulan kawalan (T1) yang menerima makanan asas dan selebihnya makanan kajian yang terdiri daripada makanan asas dengan penambahan 0.5% daripada kayu manis (T2), 0.5% kunyit (T3) dan 0.5% biji jintan hitam (T4). Pertambahan berat badan dan pengambilan makanan oleh puyuh direkodkan setiap minggu. Nisbah penukaran makanan kemudiannya dikira dengan membahagikan pengambilan makanan dengan kenaikan badan. Pada akhir tempoh umur 42 hari, burung puyuh disembelih dan berat relatif usus, hati dan pedal ditimbang. Berat karkas setelah disembelih dicatatkan dan kemudian peratusan persalinan puyuh bagi setiap rawatan dikira. Berikutan itu, daging dan tulang dari karkas dipisahkan untuk menentukan nisbah daging kepada tulang bagi setiap replika. Daging bahagian dada diambil dari karkas untuk menganalisis kualiti daging puyuh bagi setiap rawatan. Kualiti daging dianalisis berdasarkan air yang hilang dari daging menggunakan kaedah titisan dan memasak, warna dan kelembutan

daging puyuh. Untuk prestasi pertumbuhan, jumlah pengambilan makanan, berat badan dan nisbah penukaran makanan mengalami kenaikan signifikan ($P < 0.05$) kerana suplemen herba. Komposisi karkas, peratusan berpakaian, hati dan pedal menunjukkan tiada perbezaan yang signifikan antara rawatan. Tetapi untuk daging kepada nisbah tulang dan usus menunjukkan signifikan ($P < 0.05$) antara rawatan. Untuk kualiti daging, keupayaan memengan air dan kelembutan daging tidak menunjukkan perbezaan antara rawatan tetapi warna daging menunjukkan perbezaan signifikan antara rawatan. Kesimpulannya, herba mempunyai potensi dalam meningkatkan prestasi puyuh. Dalam tumbesaran, karkas and kualiti daging. Disyorkan kajian lanjutan berkaitan prestasi pertumbuhan dan komposisi karkas puyuh Jepun dengan penambahan herba di dalam makanan .

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

In the last few years, the use of antibiotic as growth promoter for animal production has been reduced due to concern of bacterial resistance. Many study focus on development of alternative such as herbs to maintain animal health and performance by exploitation of natural growth promoters that had been identified to be effective alternative for the antibiotics.

The term “herb” has a lot of definition. According to botanists, they describe an herb as a small, seed bearing plant with fleshy rather than woody parts. The herbs include trees, shrubs, annuals, vines and more primitive plants such as ferns, mosses, algae, lichens, and fungi. The herbs have valued in flavor, fragrance, medical and healthful qualities, economic and industrial uses, pesticide properties, and coloring materials (Bown, 2001).

The herbs have been used a long time ago by human. The utilization of herbs has been increasing for therapeutic uses or growth promoter in human and animal farm. The herbs can acts as antioxidant, growth promoter, antibacterial, antifungal and so on. The antioxidant acts to neutralize free radicals that are generating in the body and prevent damage to cell protein, lipids and carbohydrate. Effective antioxidant properties can enhance nutrient digestibility and growth performance (Wang *et al.*, 2008). The main antioxidant source is from plant material.

Cinnamon is native to tropical Asia, especially Sri Lanka and India. Cinnamon is used as spices and for the production of essential oil. Cinnamon is a small evergreen tree 10 – 15 m tall, belonging to the family Lauraceae. Cinnamon bark and leaf are widely used as a spices throughout the world (Seidemann, 2005). Cinnamon also has a lot of medical properties and antioxidant activity (Simsek *et al.*, 2013). Cinnamon contains essential oil cinnamaldehyde and eugenol, which are known as bioactive substances with potential health effect (Chao *et al.*, 2005). In medicine it has been used to treat diarrhea and other problems of digestive system (Petrović *et al.*, 2010). A number of studies carried out of effect cinnamon powder on broiler performance and meat acceptability but the result not consistent (Toghyani *et al.*, 2011).

Today, turmeric has gained interest among researchers as an alternative to antibiotics. Turmeric is a perennial plant that grows around 6 feet high in tropical region of Southern Asia with trumpet-shaped and dull yellow flower. The turmeric roots are bulbs that also produce rhizomes, which then produce stems and roots for new plants. The turmeric is obtained from roots with brown skin and deep orange flesh. The active ingredient that is found in the turmeric is curcumin, demethoxycurcumin, bisdemethoxycurcumin (Wuthi-Udomler *et al.*, 2000) and tetrahydrocurcuminoids (Osawa *et al.*, 1995). In addition, turmeric can act as an antioxidant. As an antioxidant, curcumin is able to neutralize free radicals, chemicals that can travel through the body and cause great amount of damage to healthy cells and cell membranes. Turmeric that boosts levels of natural cellular antioxidants such as glutathione, superoxide dismutase, and catalase are critical for the body to limit oxidative stress all day long. The greater the surplus of cellular antioxidants the less stress and damage occurs to vital organs.

systems (Jockers, 2011). The turmeric extract were found to have antifungal (Wuthi-Udomler *et al.*, 2000) and antioxidant (Osawa *et al.*, 1995). According to Al-Sultan (2003), the uses of turmeric as feed additive at level 0.5% also enhanced the overall performance of broiler chickens.

Black cumin seed is belonging to the Plant family of Ranunculaceae and they are flowering plant that is native to southwest Asia. The black cumin seed can grow to 20 to 30 cm tall with linear leaves and they can be used in raw or cooked to flavor breads, pickles, cakes and countless other dishes. The composition and their properties have been investigated and many researcher reported that black cumin seed have antioxidant, antimicrobial, antihistaminic, antitumor, antihypertensive and anti-inflammatory effects. Most properties of black cumin seed are mainly attributed to quinine constituent compound. Quinonic alkaloids are likely to be involved in pharmaceutical properties. Therefore, black cumin seeds appear to be potential feed growth promoter and maybe promising broiler performance, particularly feed efficiency, weight gain and immune system (Al-Beitawi *et al.*, 2009).

Japanese quail is hardy birds that are not expensive to keep and it's known as *Coturnix japonica*. They are affected by common poultry disease but are fairly diseases resistant. Japanese quail mature in about 6 weeks and their life expectancy is only 2 to 2 ½ years. In addition, the Japanese quail is easily to managed, fast growing, small in size and can produce eggs at high rate.

Many studies have been conducted on the use of herbs on growth promoters in poultry, but them is little or no information in quails. Because the uses of antibiotic have

been banned, herbs that contain antibacterial compounds and antioxidants may play an important role in promoting growth and production in quails. Majority of herbs do not have residual effects. The aim for this study is to investigate the effect of dietary supplementation of cinnamon, turmeric and black cumin as a growth promoter and improve carcass composition in Japanese quail.

1.2 RESEARCH PROBLEM

The use of Antibiotic Growth Promoter (AGP) has been widely practiced in animal production. However, the use of AGP can result in the drug resistant bacteria (Alexander *et al.*, 2008). According to Griggs and Jacob (2005), the uses of AGP has been ban, therefore is important to find alternative of AGP. Many studies have been conducted on the use of herbs on growth promoters in poultry, but little or no information in quails.

1.3 HYPOTHESIS

Herbs supplement (cinnamon, turmeric and black cumin seed) can improve the growth performance and carcass composition of quail.

1.4 OBJECTIVE

The general objective of this study is to evaluate the effect of herbs supplementation on growth performance and carcass composition of Japanese quail. The specific objectives of this study are:

1. To determine the effect of cinnamon, turmeric and black cumin seed on the growth performance of quails during the growing period.
2. To investigate the effect of dietary herbs supplementation on carcass composition and carcass quality of quails.
3. To investigate the effect of dietary herbs supplementation on meat quality of quail.

1.5 SIGNIFICANCE OF STUDY

Determination on the effect of cinnamon, turmeric and black cumin seed supplementation herbs that contain antioxidant and antimicrobial properties. This research may help farmer in increasing their profit by enhance the growth performance, carcass and meat quality of Japanese quail. These herbs have potential alternatives to antibiotic growth promoter in diets of quail and it is easily available and can be used safely without any residual effects.

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