



UNIVERSITI PUTRA MALAYSIA

**EFFECT OF VARYING LEVEL OF PALM KERNEL CAKE (PKC) ON
GROWTH PERFORMANCE, CARCASS COMPOSITION AND MEAT
QUALITY OF CHERRY VALLEY DUCK**

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2014/2015

CERTIFICATION

This project entitle “The effect of varying level of palm kernel cake (PKC) on growth performance, carcass characteristic and meat quality of Cherry Valley duck’ was prepare by Mohamad Arif Bin Zulkipli and submitted to the Faculty of Agriculture in fulfillment of the requirement of the course SHW4999 (Final Year Project) for the award of the degree of Bachelor of Agriculture (Animal Science).

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ABSTRACT

Duck is another source of protein for the human consumption come from poultry industry. Because of the increase in human population, the demand for the duck meat are also increase instead of broiler meat. Palm Kernel Cake (PKC) is the agro industrial by-product form the oil palm plantation which is abundance in amount and can be easily get from the mill. PKC is a cost effective, cheap and a practical ingredient to be utilized in ration formulation for various livestock species. PKC is considered as a moderate protein feed, this is because PKC contain about 16 to 18% crude protein which met the need of requirement of certain classes of poultry. Taking this as an opportunity, a study was conducted using 36 male of Cherry Valley duckling and reared until 56 days of age. The duckling were fed a standard duck commercial diet for 14 days. At 14 days of age, they were divided randomly into three treatment groups. Each treatment had three replicate which contain four duckling per replicate. The dietary treatments were T1 (control), T2 (basal diet + 15% PKC) and T3 (basal diet + 35% PKC) respectively. The experimental diets were isocaloric and isonitrogenous calculated and were formulated to meet the minimum requirements of the National Research Council (NRC). Body weight, feed intake, weight gain and feed/gain were recorded every week. Body weight was measured individually, while feed intake was determined on group basis. After 56 days, one duck from each replicate of treatment was subjected to carcass composition and the remaining of the duck was subjected to the meat quality. Result shows that there were no significance difference ($p>0.05$) of body weight and weight gain of the T2 and T3 when compare to the T1. Significance different ($p<0.05$) for feed intake of T3

when compared to the T1 but T2 show no significant difference ($p>0.05$) when compare with T1. For the feed conversion ratio (FCR), there was significance different ($p<0.05$) for T3 when compared to the T1 but no significance different ($p>0.05$) for T2 when compare to the T1. For meat quality and dressing percentage, there were no significant different ($p>0.05$) for meat quality and dressing percentage of T2 and T3 when compared to the T1. No significant different ($p>0.05$) observed on the organ proportion, liver and heart when compared to the T1. However, significant different ($p<0.05$) was noted for gizzard of T2 and T3 when compared to the T1. From this study, it can be conclude that the inclusion of T2 (15%PKC) was recommended for duck feeding because it has no significant different in terms of growth performance, carcass composition and meat quality when compared to the T1.

ABSTRAK

Itik adalah satu lagi sumber protein untuk kegunaan manusia datangnya daripada industri unggas. Disebabkan berlakunya peningkatan dalam populasi manusia, permintaan untuk daging itik juga meningkatkan selain daripada daging ayam. Isirong kek Sawit (PKC) adalah hasil lebihan industri pertanian ladang kelapa sawit yang mempunyai kuantiti yang banyak dan mudah diperolehi dari kilang. PKC adalah efektif dari segi kos, murah dan kandungannya adalah praktikal untuk digunakan dalam kaedah perumusan makanan bagi pelbagai spesies ternakan. PKC mempunyai kandungan protein sederhana, ini adalah kerana PKC mengandungi kira-kira 16 hingga 18% protein mentah yang memenuhi keperluan kelas-kelas tertentu unggas. Dengan mengambil ini sebagai satu peluang, satu kajian telah dijalankan dengan menggunakan 36 ekor itik Cherry Valley jantan dan dipelihara sehingga umur 56 hari. Anak itik diberi makanan komersial permulaan selama 14 hari. Pada usia 14 hari, mereka telah dibahagikan secara rawak kepada tiga kumpulan. Setiap kumpulan mempunyai tiga replika yang mengandungi empat itik setiap replika. Kumpulan pemakanan pertama adalah T1 (kawalan), kumpulan makanan kedua adalah T2 (makanan asas + 15 PKC) dan kumpulan makanan ketiga ialah T3 (makanan asas + 35%PKC). Kumpulan makanan kajian telah di isocaloric dan isonitrogenous dan telah dirancang bagi memenuhi keperluan minimum Majlis Penyelidikan Kebangsaan (NRC). Berat badan, pengambilan makanan, pertambahan berat dan nisbah pertukaran makanan telah direkodkan setiap minggu. Berat badan diukur secara individu, manakala pengambilan makanan telah ditentukan secara kumpulan. Selepas 56 hari, seekor itik dari setiap replika kumpulan dipilih secara rawak untuk diuji peratusan

karkas dan baki itik telah digunakan untuk kajian kualiti daging. Keputusan menunjukkan bahawa tidak terdapat perbezaan ($p > 0.05$) pada berat badan dan pertambahan berat badan T2 dan T3 apabila dibandingkan dengan T1. Terdapat perbezaan ($p < 0.05$) bagi pengambilan makanan oleh T3 apabila dibandingkan dengan T1 tetapi T2 tidak menunjukkan perbezaan ($p > 0.05$) apabila dibandingkan dengan T1. Bagi nisbah penukaran makanan (FCR), terdapat perbezaan ($p < 0.05$) untuk T3 apabila dibandingkan dengan T1 tetapi tiada perbezaan ($p > 0.05$) untuk T2 apabila dibandingkan dengan T1. Untuk kajian kualiti daging dan peratusan karkas, tidak ada perbezaan ($p > 0.05$) untuk kualiti daging dan peratusan karkas T2 dan T3 apabila dibandingkan dengan T1. Tiada perbezaan ($p > 0.05$) juga pada bahagian organ, hati dan jantung apabila dibandingkan dengan T1. Walau bagaimanapun, terdapat perbezaan ($p < 0.05$) pada hempedal T2 dan T3 apabila dibandingkan dengan T1. Dari kajian ini, dapat disimpulkan bahawa kumpulan makanan T2 (15% PKC) boleh disyorkan kepada itik kerana ia tidak mendatangkan kesan perbezaan dari segi prestasi tumbesaran, komposisi karkass dan kualiti daging apabila dibandingkan dengan T1.

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List of Abbreviations

cal	Calories
cm	Centimeter
CF	Crude fiber
CP	Crude protein
DFD	Dark firm and Dry
°C	Degree celsius
DM	Dry matter
EE	Ether extract
FCR	Feed conversion ratio
g	Gram
Kg	Kilogram
ME	Metabolizable energy
m	Meter
mg	Miligram
ml	Mililiter
%	Percentage
WHC	Water holding capacity

CHAPTER 1

INTRODUCTION

Duck is another source of protein for the human consumption come from poultry industry. Because of the increase in human population, the demand for the duck meat are also increase instead of broiler meat. This can be seen by the increase number of duck farming, variety of the value added duck meat in the market, better processing and packaging of the meat duck product. Currently the rearing of duck meat for commercially purpose are still in semi intensive system around Malaysia. The per capita consumption of duck meat per annum is around 2.0 kg. The low consumption of duck meat in Malaysia is due to Malaysia people which are still more prefer to the broiler meat and the higher price of the duck meat in the market. But, with the encouragement and support from the Malaysian Government for duck production under national Agriculture policy, the demand and supply for meat duck need to be increased in order to meet the population increase on the future

Feed remains the most important critical cost for the animal production. The study are need for feed ingredients which will reduce the cost of production is important aspects in livestock feed and production research. This is because human and livestock are in competition for basic ingredients and such as corn and soybean are not usually produced in sufficient quantities locally (Oluyemi *et al.*,1978). Corn and soybean are source of energy and protein respectively. Therefore, availability of feed thus become the key factor limiting poultry production including duck production.

The demand for the animal products are globally increased as a result of improved living standards, many farmers tend to manipulate their animals with various substances such as hormones, enzymes and replace several feed ingredients with agricultural by-product in order for such animals to reach market weight with lower cost of production. Improved efficiency of feedstuff utilization and the use of a wide range of feed ingredient currently considered inferior likely to produce the largest advances in animal feeding. Kwari *et al.*, (2004) stressed the need to utilize alternative feed ingredients far removed from human and industrial interest in order to reduce feed cost and the cost of poultry products. This type of feed resources should be fully utilized to reduce feed cost and also curb the problem of environmental pollution that accompanies its disposal. One of the alternatives is by using palm kernel cake as feed ingredient in livestock feeding.

In Malaysia, Palm Kernel Cake (PKC) is the agro industrial by-product form the oil palm plantation which is abundance in amount and can be easily get from the mill. PKC is a cost effective, cheap and a practical ingredient to be utilized in ration formulation for various livestock species. Onwudike (1986) and Ezieshi and Olumu (2004) had report significant reduction in feed cost per gain with increasing PKC inclusion rates. Besides that, palm kernel cake (PKC) is a major by-product of palm oil production. The by-product from the mechanical expeller procedure is referred to as palm kernel cake, while by product from the solvent extraction technique is called palm kernel meal (Choct, 2001). The economic incentive arising from the favorable cost of PKC relative to cereals add its potential as a source of energy and protein would explain its increasing use as feed for animals.

Utilization of PKC in animal feed is also a great benefit to the economy as a whole. An abundant agro industrial by product, treated as a waste, has become a valuable resources and is significantly enhancing the total revenue derivable from the oil palm industry. In order to maximize the revenue obtainable from processing of palm kernels, demands for PKC must be maximized by the incorporation of PKC in animal's diets at the highest and most profitable level. This level would be determined, not by the level of biological yield (meat products) only, but more importantly by derivable profitability as the major criteria. In this regard, the relationship between live-weight gain, and the associated feed cost is paramount importance. Moreover, it is known that cost of feeding represent 70-80% of the total variable cost of poultry production.

The use of PKC in poultry rations including ducks ration is very limited due to its high fiber content. The optimum inclusion level of PKC in poultry rations is various. The main reasons are because of the origin and variations in the oil and shell content of the PKC used. The optimum levels for broiler chickens, layer chickens and ducks are appear to be 20%, 25% and 30% respectively. Higher levels of PKC in poultry or ducks rations may result in energy deficiency due to the high fiber content.

Although numerous research have been conducted on the effect of feeding PKC on animal growth and carcass characteristic, it appears that the effect on meat quality had been neglected. Thus, this study was designed based on assumptions that feeding varying level of dietary palm kernel cake (PKC) had different effect on growth performance, carcass composition and meat quality of Cherry Valley duck.

1.1 Research Hypothesis

Different level of palm kernel cake (PKC) have different effects on growth performance, carcass composition and meat quality of cherry valley duck.

1.2 Objective

The general objective of this study was:

To evaluate the effect of varying levels of dietary palm kernel cake (PKC) on growth performance, carcass composition and meat quality of Cherry Valley duck.

The specific objectives of this study were:

1. To determine the body weight, weight gain, feed intake and feed conversion ratio (FCR) of varying levels of palm kernel cake on cherry valley duck.
2. To determine the effect of PKC diet on carcass composition
3. To determine the water holding capacity, pH, texture and color of duck meat fed with varying levels of palm kernel cake.

1.3 Significance of the study

Cost of feeding represent 70-80% of the total variable cost of poultry. Therefore, the proposed research to determine effect of varying levels palm kernel cake (PKC) on growth performance, feed intake, carcass composition and meat quality of cherry valley duck. Thus help farmer to reduce cost and increase the cherry valley production.

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