UNIVERSITI PUTRA MALAYSIA

COMPARATIVE COMPOSITION OF FECAL CONTENTS BETWEEN BROILER DUCKS AND VILLAGE CHICKENS

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CERTIFICATION

It is hereby certified that we have read this project paper entitled "Comparative Composition of Fecal Contents between Broiler Ducks and Village Chickens

", by Chong Chiew Foong and in our opinion it is satisfactory in terms of scope, quality, and presentation as partial fulfillment of the requirement for the course VPD 4999 – Final Year Project

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DEDICATION

The final year project thesis is dedicated to my beloved family, all the lecturers, and friends that were involved either directly or indirectly in this project.

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Abstrak daripada kertas projek yang dimukakan kepada Fakulti Perubatan Veterinar untuk memenuhi sebahagian daripada kursus VPD 4999- projek ilmiah tahun akhir

Perbandingan Komposisi Najis antara Itik Pedaging dan Ayam Kampung

Oleh

Chong Chiew Foong

2016

Penyelia : Dr. Lokman Hakim idris

Komposisi najis dan makanan antara itik pedaging (Cherry Valley) dan ayam kampung yang dibela di Perak Duck Food Sdn Bhd dan ladang penternakan ayam kampong berskala kecil dikaji. Jumlah keseluruhan 25 gram najis daripada itik pedaging dan ayam kampung yang matang telah diambil. Analisis proximate dijalankan untuk menganalisis kelembapan, bahan kering, abu, dan protein dalam sampel najis dan makanan menggunakan kaedah rasmi AOAC. Analisis statistic dijalankan dengan menggunakan data yang didapat dengan software statistic SPSS. Keputusan dari proximate analisis makanan menunjukkan ada perbezaan yang signifikan($P<0.05$) dalam peratus kelembapan iaitu 9.8±0% dalam makanan hancur ayam pedaging starter bercampuran biji jagung dan 9.16±0.03% dalam makanan finisher pellet itik pedaging. Keputusan dari proximate analisis makanan menunjukkan tiada perbezaan yang signifikan(P>0.05) dalam peratus bahan kering, abu, dan protein antara makanan hancur ayam pedaging starter bercampuran biji jagung dan makanan finisher pelet itik pedaging. Bahan kering ialah 90.2±0% dan 90.8±0%, abu ialah 90.2±0% dan 90.8±0% dan protein ialah 21.73±0.81% dan 19.92±1.22% masing masing dalam makanan hancur ayam pedaging starter bercampuran biji jagung dan makanan finisher pelet itik pedaging. Keputusan dari proximate analisis najis menunjukkan ada perbezaan yang signifikan(P<0.05) dalam peratus abu iaitu 1.06±0.12% daripada najis ayam kampung dan 3.133±0.49% daripada najis itik pedaging. Keputusan dari proximate analisis makanan menunjukkan tiada perbezaan yang signifikan(P>0.05) dalam peratus kelembapan, bahan kering, dan protein. Kelembapan ialah 75.56±1.31% dan 72.4±1.91% , bahan kering ialah 24.43±1.13% dan 27.6±1.91% protein ialah 7.47±0.37% dan 8.6±0.99% dalam najis ayam kampong dan najis itik pedaging masing –masing.. Keputusan dari proximate analisis penghadaman makanan menunjukkan tiada perbezaan yang signifikan(P>0.05) dalam peratus penghadaman bahan kering dan protein. Peratus penghadaman bahan kering ialah 72.91±1.25% dan 69.6±2.1%, peratus penghadaman protein ialah 65.64±0.39% dan 56.77±4.37% daripada ayam kampong dan itik pedaging masing-masing.

Kata kunci : Itik Cherry Valley , ayam kampung, analisis proximate, penghadaman

ABSTRACT

Abstract of project paper presented to the Faculty of Veterinary Medicine in partial for the course VPD 4999- final year project

Comparative Composition of Fecal Contents between Broiler Ducks and Village Chickens

By

CHONG CHIEW FOONG

2016

Supervisor : Dr. Lokman Hakim Idris

Compositions of fecal contents and feed between broiler ducks(Cherry Valley) and village chickens reared at the Perak Duck Food Sdn. Bhd and a small scale village chicken farm were investigated. A total of 25 grams of fecal sample of adult broiler ducks and village chickens were collected respectively. Proximate analysis was carried out to analyze the moisture, dry matter, ash and crude protein using Kjedahl method contents in the fecal and feed samples using official method of AOAC. Statistical analysis was performed using the data collected by SPSS statistical software. Result from the proximate analysis of feed reveals there is statistically significance ($P<0.05$) different for the percentage of moisture contents. The moisture content in chicken broiler starter crumble mixed with corn is 9.8±0% while in duck broiler finisher pellet is

9.16±0.03% but there is no statistically significance ($P>0.05$) different in percentage of dry matter, ash and crude protein content between chicken broiler starter crumble mixed with corn and duck broiler finisher pellet. The dry matter is 90.2±0% and 90.8±0%, ash is 4.43±0.63% and 5.23±0.83% and crude protein is 21.73±0.81% and 19.92±1.22% in chicken broiler starter crumble mixed with corn and duck broiler finisher pellet respectively. The results for the proximate analysis of fecal samples is that there is statistically significance ($P<0.05$) different for the percentage of ash contents which is 1.06±0.12% in village chicken feces and 3.133±0.49% in Cherry Valley duck feces but there is no statistically significance ($P>0.05$) different in percentage of moisture, dry matter, ash and crude protein content between feces of village chicken and Cherry Valley. The moisture is 75.56±1.31% and 72.4±1.91% , the dry matter is 24.43±1.13% and 27.6±1.91% while the crude protein is 7.47±0.37% and 8.6±0.99% respectively in feces of village chicken and Cherry Valley ducks. The results for the digestibility of feed is that there is no statistically significance ($P>0.05$) different in digestibility of dry matter and crude protein content between village chicken and Cherry Valley duck. The digestibility of dry matter is 72.91±1.25% and 69.6±2.1%, the digestibility of crude protein is 65.64±0.39% and 56.77±4.37% in village chicken and Cherry Valley ducks respectively.

Keywords : Cherry Valley ducks, village chickens, proximate analysis, digestibility

1.0 INTRODUCTION

1.1Study Background

Most of the meat and eggs being consumed is produced by the chicken , only part of them are from ducks and geese as well as exotic birds. The nutritional value in products from ducks can enhance the nutritional standard in human food.(Heinz Pingel, 2004). Due to lack of duck farmers, limited development of duck meat products and little promotion of duck meat has led to limited consumption among the consumers(Aronal *et al*., 2012). Being the 14^{th} producer of duck meat in the world shows that duck industry can be an important business in Malaysia (FAO, 2011). The increase in production of duck for local consumption and exportation has been encouraged by the current agricultural policies set by the Malaysia government (Adzitey *et al*.,2012). At present, the management system of duck being practiced by Malaysia mostly are still open housed free range system with sand litter but there are some large scale company practicing closed housed system with slatted floor. There are some countries like Japan, South Korea, Malaysia and Philippines are still practicing rice-duck farming system (Choi *et al*., 1996).

The village chicken in Malaysia is called as “Ayam Kampung”(village chicken) in Bahasa Malaysia which is the result of crossbreeding of the Red Jungle Fowl with mixed exotic domestic breeds brought by the Europeans, mainly the British (Azahan and Zahari, 1983).Just like a lot other tropical countries, the village chicken or *Gallus domesticus* is kept by over three-quarters of semi-rural and rural households in Malaysia as small backyard flocks. The chickens are being kept free range in the daytime and housed at night or integrated farming system with sand litter (Aini, 1990).

Animals fed with commercial formulated diets consume considerable amount of protein and other nitrogen-containing substances in their diets. The conversion of dietary nitrogen to animal products is relatively inefficient; 50 to 80 percent of the nitrogen is excreted (Arogo et al., 2001). Nitrogen is excreted in both organic and inorganic compounds. Nitrogen emissions from manure take four main forms: ammonia, dinitrogen, nitrous oxide and nitrate. Ducks and chickens had same proventriculus weights and lengths and weights of caeca and colon. However, the ducks had 22%, 27%, 30%, 37% and 60% greater mass specific small intestinal weights and lengths, and liver, gizzard and pancreas weights, respectively, than chickens. In the wild, ducks generally prefer eating water plants, which commonly have higher water contents, such as duckweed, azolla and algae, but have high digestible dry matter (Leng and Bell, 1995). SO it is reasonable to assume that ducks would develop larger small intestines, allow more rapid passage of digesta and efficient absorption. However, the greater caeca and colon volume of chickens would increase the digestive capacity with respect to diets high in fibre compared with ducks. In addition the caeca in chickens contain higher concentration of bacteria (Barnes *et al.,* 1972) and therefore play an important role in the microbial degradation of some carbohydrates (Jorgensen *et al.,* 1996), synthesis of vitamins(Coates *et al*., 1968) and degradation of nitrogenous compounds(Goldstein, 1989).

Poultry manure is an excellent fertilizer material as it contains high nutrient content, especially for nitrogen(N), phosphorus(P), and potassium(K). these nutrients plus others come largely from bird feces. Manures decompose (mineralize) in the soil releasing nutrients for crop uptake. If poultry litter is readily available locally, it can help reduce fertilizer cost in vegetable production(George H. *et al.,* 2009).

The aim of this study is to compare the composition of fecal contents like moisture, dry matter, ash and crude protein in village chickens and Cherry Valley ducks and also to determine the digestibility of village chickens and Cherry Valley ducks as well as to identify which feces is better to be used as manure fertilizer.

1.2 Justification

i) This project allowed us to access the digestibility of feed and the left over nutrients in the broiler ducks and the village chickens feces which are managed extensively with sand litter.

ii) Data on the composition of feces in the broiler ducks and village chickens allowed more efficient use of the manure as fertilizer in crop production.

1.3 Study objectives:

i) To determine the digestibility of feed of broiler ducks and village chickens.

ii) To identify which feces is better to be used as fertilizer between feces of broiler ducks and village chickens.

1.4 Hypothesis

Broiler ducks have lower digestibility and will be a better source of fertilizer as compared to feces of village chickens.

1.0 LITERATURE REVIEW

2.1 Poultry manure as fertilizer

Poultry manures have been used as natural crop fertilizers for centuries. It has been long recognized as one of the most desirable manures due to its high nitrogen contents. Besides fertilizing crops, manures also supply other essential plant nutrients and improve soil quality by adding organic matter, which help to improve soil's moisture and nutrient retention. Poultry manure's nutrients composition may vary depending on manure- to litter- material ratio, litter handling, and the type of bird, feed, and litter material. Fertilizer grades for manure can be calculated by comparing the total amounts of nitrogen, phosphorus, and potassium as a simple ratio. Not all nitrogen in the manure will be in the same form. Some nitrogen in poultry manure will be in the form of ammonium which is volatile, so there will be some loss of this nitrogen to the atmosphere. Environmental conditions, such as rainfall, wind, and sunlight will also affect the availability of organic nitrogen, phosphorus, and potassium(Michael ,1992)

2.2 Protein and amino acid requirements of ducks

Global production if duck meat shows a continuous and rapid increase(FAOSTAT, 2003). The growth and protein utilization of ducks have been improved by selective breeding in recent decades with respect to changes in body composition and improvement in feed conversion ratio(Timmler and Jeroch, 1999). Studies on the requirement of the modern breeds for essential amino acids, however, there are not amny, but do exist (Elkin , 1987).

Many studies on protein and amino acid requirements of chickens have been carried out, but very few on ducks. These values differ , depending on the kind and age of bird and the purpose of it production.

2.3 Digestibility

It is important to measure the digestibility in order to define the efficiency of utilization of nutrients in foods, to classify the nutritional value of food and also to formulate diets for poultry. There are two types of expressions for digestibility, that is , apparent or true digestibility. Apparent digestibility is the relationship between the quantity of nutrients consumed in the diets and the amount that disappears from the gastrointestinal tract (nutrient intake- nutrient in feces)/ nutrient intake. Apparent digestibility indicates that the measurement is biased by the amount of a nutrient that was absorbed but then excreted back into the digestive tract, as well as by endogenous nutrient losses, such as those from the shedding of the intestinal epithelial and mucus secretions. True digestibility exclude those components of the excreted nutrients that is not from the food. So, the value obtained for true digestibility are always greater than those for apparent digestibility. It is difficult to separate the endogenous losses arising from the digestive tract from the metabolic losses excreted in urine in birds because of the mixture of feces and urine together in the excreta.(Nguyen,2005).

2.3.1 Excreta digestibility

This was first used by Kuiken and Lyman(1948), who measured the difference between amino acids consumed in the feed and in the corresponding feces. Excreta digestibility is employed in birds due to the mixing of feces and urine. Determination of apparent digestibility through analysis of excreta samples has been criticized as this approach fails to distinguish amino acids excreted which are not direct dietary origin(endogenous excretory losses) (Short *et al*., 1999). Also, the major criticism of both the faecal and excreta digestibility by removing undigested amino acid residues. If this happens, the digestibility values will be higher than in birds in which microbial action has been prevented.

2.3.2 Ileal digestibility

According to Payne *et al.*(1968), in order to overcome potential problems of microbial action on amino acids in excreta digestibility studies in poultry, the use of ileal digestibility is suggested. Two basic methods are to insert a cannula into the terminal ileum or to kill the birds and remove the ileal contents. Techniques for ileal cannulation have been described by Raharjo and Farell(1984a) and Gurnsey and James(1985). Surgical expertise is require for the cannulation method. Payne *et al.(*1968) first purposed the method of collection and analysis of ileal contents after slaughtering the birds, and this method has been used by many groups. The general procedure used includes feeding diets to birds for around 2 weeks, killing the birds using crvical dislocation, carbon dioxide gas or anesthesia and then collecting the intestinal contents from the vitelline diverticulum to the ileal- caecal junction.

2.4 Gut microflora in poultry

Microbila activity in the digestive tract of broilers is mainly affected by the diet in relation to nutrient digestion. In poultry, fermentation occurs mainly in caeca. The caeca provide a more stable environment for micro-organisms to function as compared to other parts of gastrointestinal tract. According to Raharjo and Farrel (1984), amino acid metabolism by the hindgut microflora in poultry can be substantial so measuring the digestibility of protein will be more accurate as compared than those measured in excreta. The digestion and absorption of nutrients by animals depend on the rate of hydrolysis by the animals' enzymes and the activity of the microflora. There are many different bacteria species present in the gastrointestinal tract of poultry. Thus, bacteria in the digestive tract can play an important role in metabolism in the intestinal tract (Savage, 1986). In the small intestine, the bacterial population appears to be established within approximately 2 weeks (Smith, 1965). However it takes much longer for the caecal environment to develop (Bames *et al*., 1972).

The development of the microflora is also affected by the digestibility of the diet. Lee (1985) reported that dietary factors such as nutrient digestibility can influence the environment of the intestinal tract especially in the caeca and large intestine. The microflora compete with the host animal for dietary nutrients. For highly digestible diet this competition is usually in favour for the host. However, if the birds receive poorly digestible diets rich in non-digestible carbohydrates, more substrate moves to the lower part of the intestinal tract, so favouring the microflora. In young birds, the digestive system capacity is still not fully developed (Nitsan *et al*., 1991). More substrates are left for microbial fermentation. Part of the reduction in nitrogen digestibility can be explained by the fact that the micro-organismss can incorporate dietary amino acids into microbial protein(Salter and Coates, 1974). An increase in microbial activity stimulates proliferation of mucosal cells (Sakata, 1987), causing increased losses of epithelial cells which increases endogenous losses. Hence, it will contribute to a greater faecal nitrogen output and, therefore, to a decrease in the apparent digestibility of nitrogen.

2.5 Dry matter

Dry matter represents everything contained in a sample except water; this includes protein, fiber, fat, minerals, etc. The total weight of sample minus the weight of water in the sample, express in percentage. Drying is done in an oven until a stable weight is achieved. (Uttam etal, 2013)

2.6 Ash

The ash fraction of the proximate analysis represent most of the mineral contents of food. Some of the minerals are volatilized and lost form the sample at the high temperature of ashing. Samples in porcelain crucibles are placed in a muffle furnance and ignited at temperature in excess of 600 degree celcius. The residue that is leftover is called ash.(Marion and Audrey,1993)

2.7 Crude Protein

Protein, on the average , contains about 16% nitrogen. When the amount of nitrogen is obtained, the crude protein can be estimated by multiplying the nitrogen content of sample by 6.25. The commonly used procedure for determining the nitrogen content of sample is called the "Kjeldahl determination." (David, 2005)The figure derived from the analysis represents only the approximation of the protein content. There are two assumptions applied in this procedure , that is , proteins contain approximately 16% nitrogen. In fact, this just represent the average. Some samples may contain more than 16% nitrogen while some can be lower than that. Second assumption is that all nitrogen is in the form of protein. For some sample, this might be true. But there are other compound that contain nitrogen for example nucleic acids.(Marion and Audrey,1993)

3.0 MATERIALS AND METHODS

3.1 Sampling

Pool sampling of feces was done on a commercial Cherry Valley duck farm and a small scale village chicken farm where they are managed in open housed free ranged system (Figure 1) and closed housed system respectively. Both systems are using sand litters. The ducks and village chickens are all in their adulthood. The sampling was done randomly in the shelter with as little sand litter contamination as possible(Figure 2). The samples were put in sealable plastic bags and stored in an ice box. Feed samples were collected from the duck broiler finisher pellet feed and also chicken broiler starter crumble mixed with corn directly from the feed bags. Samples were put in sealable plastic bags(Figure 3).

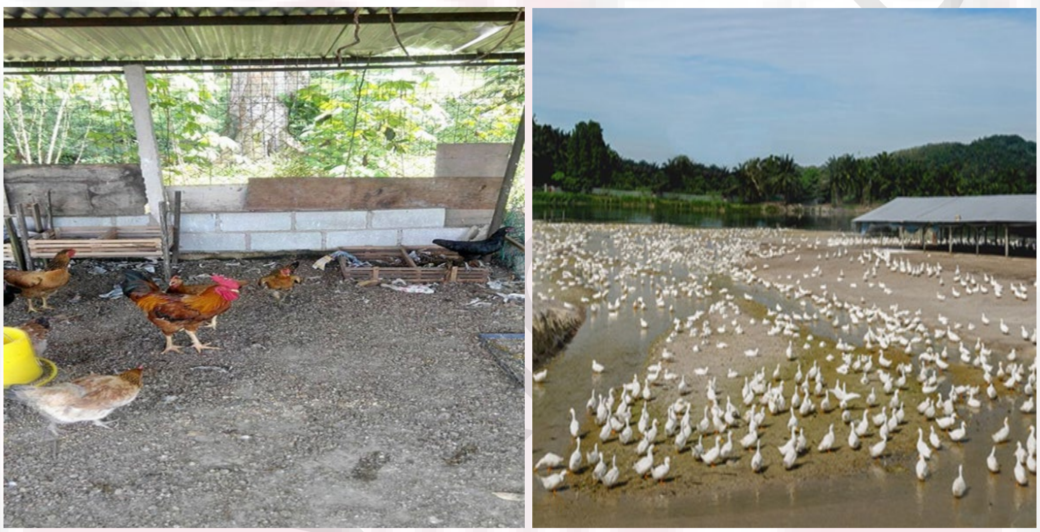

Figure 1 : Open housed free ranged system(village chickens and broiler ducks)

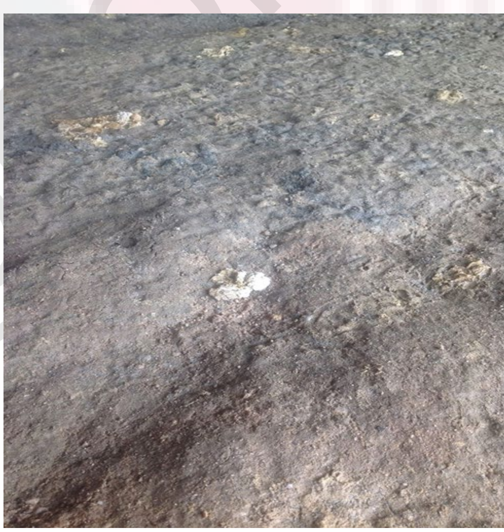

Figure 2 : Feces on sand litter Figure 3 :Feed sample in plastic bag

3.2 Proximate analysis

The fecal samples and feed samples were analysed for moisture, dry matter, ash and crude protein by the standard procedures of AOAC(1995).

3.2.1 Moisture

The empty crucible were first dried in an oven (Memert 800, Germany) at 100 degree celcius for 24 hours and weighed and recorded as W1 after cooling in desiccator for approximately 15 minutes. Approximately 3 gram of feces and feed samples were put into the dry crucible and again the weights were recorded as W2 using electronic weight machine Shimadzu AY from Germany. The samples within the crucible were then dried in an oven(Memert 800, Germany) at 100 degree celcius for 24 hours. The dried samples were cooled for 15 minutes prior to recording the last weight that is W3. The calculation of moisture and dry matter was done as follows:

Moisture content (%)= (W2-W3)/(W2-W1) x100

W1 = weight of dry crucible only

W2 = weight of dry crucible and sample (before dry)

W3 = weight of dry crucible and sample (after dry)

Dry matter content (%) = 100% - moisture

3.2.2 Ash content

The same samples for analysis of moisture and dry matter were used for ash content analysis. The crucibles were placed in muffle furnance (Carbolite from England) at 600 degree celcius for 4 hours. The samples were cooled for 15 minutes in dessicator prior to weighting the crucibles and the ash content(W4). The calculation of ash percentage was based on the dry matter content. Formula as below:

Ash (%) = (W4 – W1) / (W2 – W1) x 100x% of dry matter

3.2.3 Crude protein

Crude protein was determined according to Kjedahl method (AOAC, 1990). The sample of about 1 gram of feed and feces was placed in a Kjedahl tube and one tablet of catalyst (Kjedahl catalyst high selenium) was added. 20 ml of concentrated sulphuric acid (98%) was then added and well mixed sampled. The temperature was heated slowly to 270°C for 1 hour and 400 °C for 2 hours for digestion of the sample. The digestion of the sample was completed when the mixture turned clear(bluish or greenish) in colour. The digestion tubes were allowed to cool down. 75ml of 2% Boric Acid and 8 drops of indicator was added in an Erlenmeyer flask. The Erlenmeyer flask was placed at the distillate platform and the tip of distillation tube was immersed into the acid solution. 30 ml of distilled water was poured into Kjeldahl's flask and was placed at the platform. In the digestion process the general equation is

Organic N + H_2SO_4 ⟶ $(NH_4)SO_4$ + H_2O + CO_2 + other sample matrix by-product

This was followed by steam distillation using an automated steam distillation apparatus (Automatic 2400 Kjeltec Analyzer Unit, Foss, Tecator, Sweeden) which would liberate entrapped sulphate salt of ammonium yielding ammonia through the following reaction, initiated by an addition of 10M of sodium hydroxide, the acid digestion mixture was diluted and made strongly alkaline with NaOH, liberating NH_3 as follow :

$(NH_4)_2SO_4 + 2NaOH \longrightarrow 2NH_3 + Na_2SO_4 + 2H_2O$

This was followed by titration with 0.1 M Hydrochloric Acid until the solution turn to pink colour. The colume of Hydrochloric Acid used during titration was recorded. The nitrogen content was calculated as follow:

% of Nitrogen , N =

[[(volume of titrant – blank value) x acid normality x 14.0067] / weight of sample] x 100

% of Crude protein = % N x protein factor

Protein factor = 6.25

3.3 Apparent digestibility of feed

The proximate composition of the feed and the feces were used to calculate digestibility for dry matter, ash and crude protein using the following formula:

Digestibility % = (Nutrient in feed – Nutrient in feces/ Nutrient in feed) x 100

3.4 Statistical analysis

Data were then subjected to statistical analysis. The moisture, dry matter, ash, crude protein and feed digestibility were analysed using independent sample T- test (SPSS 20.0)

4.0 RESULTS

4.1 Means percentage of proximate analysis of feed

Table 1.0 : Means percentage of proximate analysis of feed (mean±SE ; n =3)

Type of feed	Moisture (%)	Dry matter (%)	Ash (%)	Crude protein (%)
Chicken broiler starter crumble mixed with corn	9.8 ± 0^{a}	90.2 ± 0^{a}	4.43 ± 0.63^{a}	21.73 ± 0.81^{a}
Duck broiler finisher pellet	9.16 ± 0.03^{b}	90.8 ± 0^{a}	5.23 ± 0.83^{a}	19.92 ± 1.22^{a}

^{ab} Means in columns with different superscripts are significantly different at $P\leq 0.05$

The mean of proximate analysis of feed for chicken broiler starter crumble and duck broiler finisher pellet were shown in the table 1.0. The results for the proximate analysis is that there is statistically significance ($P<0.05$) different for the percentage of moisture contents but there is no statistically significance ($P>0.05$) different in percentage of dry matter, ash and crude protein content between chicken broiler starter crumble mixed with corn and duck broiler finisher pellet.

Table 1.1 Means percentage if proximate analysis of feces (mean±SE ; n =3)

Type of feces	Moisture (%)	Dry matter (%)	Ash (%)	Crude protein (%)
Village chicken feces	75.56 ± 1.31^{a}	24.43 ± 1.13^{a}	1.06 ± 0.12^{a}	7.47 ± 0.37^{a}
Cherry Valley duck feces	72.4 ± 1.91^{a}	27.6 ± 1.91^{a}	3.133 ± 0.49^{b}	8.6 ± 0.99^{a}

^{ab} Means in columns with different superscripts are significantly different at $P\leq 0.05$

The mean of proximate analysis of feces for village chicken and Cherry Valley were shown in the table 1.1. The results for the proximate analysis is that there is statistically significance ($P<0.05$) different for the percentage of ash contents but there is no statistically significance ($P>0.05$) different in percentage of moisture, dry matter, ash and crude protein content between feces of village chicken and Cherry Valley.

Table 2.0 Means digestibility of feed (mean±SE ; n =3)

	Digestibility of dry matter (%)	Digestiblity of crude protein (%)
Village chicken	72.91±1.25[a]	65.64±0.39[a]
Cherry Valley duck	69.6±2.1[a]	56.77±4.37[a]

[ab] Means in columns with different superscripts are significantly different at $P \leq 0.05$

The mean of digestibility of feed for village chicken and Cherry Valley duck were shown in the table 1.1. The results for the digestibility of feed is that there is no statistically significance ($P>0.05$) different in digestibility of dry matter and crude protein content between village chicken and Cherry Valley duck.

5.0 DISCUSSION

5.1 Proximate Analysis

The nutrient composition of poultry manure varies with the type of bird, the feed ration, the proportion, the proportion of the litter to droppings, the manure handling system, and the type of litter. In my study, the results for the proximate analysis is that there is statistically significance ($P<0.05$) different for the percentage of ash contents but there is no statistically significance ($P>0.05$) different in percentage of moisture, dry matter, ash and crude protein content between feces of village chicken and Cherry Valley which is supported by the study done by Zublena *et al*.,(1997) where they found that the ash contents in chickens feces are more than that in ducks but mine findings were the opposite where ash contents in duck feces are more than that in the chickens. The study done by Zublena *et al*.,(1997) show that there was no significant different in total nitrogen in chicken and ducks feces. A study done by Burton and Turner, (2001) shows that the moisture and dried matter contents can be greatly influence by several factors and type of animals, type of management system, climate, temperature, humidity , manure storage and handling methods.

The mean of digestibility of feed for village chicken and Cherry Valley duck were shown in the table 1.1. The results for the digestibility of feed is that there is no statistically significance (P>0.05) different in digestibility of dry matter and crude protein content between village chicken and Cherry Valley duck. A study done by Kong and Adeola,(2013) show that ducks have higher basal endogenous AA losses compared with broiler chickens as well as higher ileal Cys and Pro digestibility although the general crude protein digestibility was not done. The amino acid digestibility of ducks are lower than that of chickens and turkeys found by Kluth and Rodehutscord,(2006). In addition the caeca in chickens contain higher concentration of bacteria (Barnes *et al.,* 1972) and therefore play an important role in the microbial degradation of some carbohydrates (Jorgensen *et al.,* 1996), synthesis of vitamins(Coates *et al*., 1968) and degradation of nitrogenous compounds(Goldstein, 1989).

Poultry manure has been widely used as fertilizer as it contains considerable amount of nutrients such as nitrogen , phosphorus, and other excreted substances such as hormones, antibiotics, pathogens and heavy metals which are introduced through feed

(Steinfeld *et al.,* FAO, 2006). Leaching and runoff of these substances has the potential to result in contamination of surface water and groundwater resources.

Steven S., (2013) suggested some methods to reduce manure losses for example use a lot of bedding to absorb liquid manure on concrete floor like duck manure, store manure in an area that has a water-tight bottom and provide overhead protection from weather as well as add phosphate to manure pile to trap nitrogen.

6.0 CONCLUSION AND RECOMMENDATION

The aim of this study is to determine the digestibility of feed of broiler ducks and village chickens and to identify which feces is better to be used as fertilizer between feces of broiler ducks and village chickens.

The result indicates there is no significant difference in the crude protein and dry matter content in the feces of both village chicken and broiler ducks but there is significant difference in ash contents. The key determinants of manure fertilizer quality is the ratio of nitrogen(N), phosphorus(P), and potassium(K). Hence I conclude that both village chickens and broiler ducks feces are both suitable to be used as manure fertilizer depending on type of crops and application rate of manure.

For recommendation for further study, the sample size should be increased in order to obtain more significant results. The study also will be more informative if content of phosphorus and potassium is included so that a better manure fertilizer can be determined more precisely. And lastly to include factors like age of the animals and type of feed as they play important role in determining the fecal compositions.

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