

BIBLIOGRAPHY

BASSIT, MARILOU B. OCTOBER 2009. Growth Performance of Broilers Fed with Yacon (*Smallanthus sonchifolius*) Leaf Meal as Feed Supplement. Benguet State University, La Trinidad, Benguet.

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ABSTRACT

This study was conducted at the Benguet State University, Balili, La Trinidad, Benguet from May to June 2009.

One hundred sixty (160) twenty-one days old Cob broiler chicks were randomly distributed into four treatments following the completely randomized designed (CRD). The four treatments were replicated four times with 10 birds per replication. The different treatments used were as follows: T0 (control/pure commercial feeds), T1 (90% commercial feeds plus 10% yacon leaf meal), T2 (80% commercial feeds plus 20 yacon leaf meal) and T3 (70% commercial feeds plus 30% yacon leaf meal).

Results of the study found that there were no significant differences in terms of initial weight, final weight, total gain in weight, feed conversion ratio (FCR), cost of feed to produce a kilogram of broiler and dressing percentage. The overall mean of initial weight, final weights and total gain in weight of the birds were 0.6591kg, 1.8166kg and 1.16kg. Feed conversion ratio, cost of feed to produce a kilogram of broiler and dressing percentage had a mean of 1.847 and 53.672Php and 97.77%. On the other hand, feed consumption and slaughter weight had significant differences among treatments. The mean total of feed consumption observed from

those birds under T3 (70% commercial feeds + 30% yacon leaf meal) was 2.065 kg while those birds under T0 (pure commercial feeds) was 2.178kg. Slaughter weight had an overall mean of 1.030kg. While, the dressed weight has highly significant differences observed in all treatment which has the overall mean dressed weight of 1.007kg.

Furthermore, a better ROI observed from those birds under T3 (70% commercial feeds + 30% yacon leaf meal) which is the highest ROI of 2.41%. The above result shows that yacon leaves can also be converted into feed meal not only as a medicinal plant. This can be used to substitute or add-on 10-30% of commercial feed allowance without harmful effect on the growth performance of the birds as well as reduces feed cost.

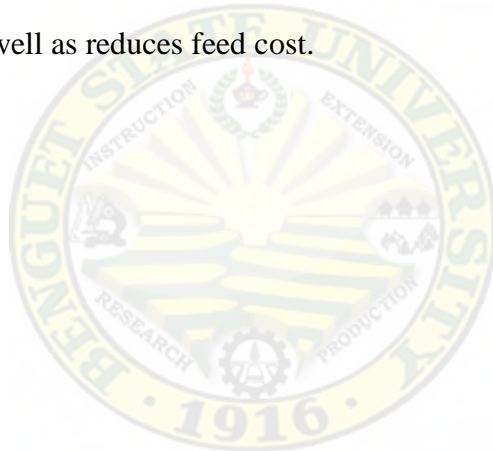


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INTRODUCTION

Feeding has a great effect in the growth performance of broilers. It is important that poultry raisers need to know and understand the nutritional requirements, care and feeding management of broilers to come up with a cheap nutritionally balanced ration. Using locally feed resources is possible. One of this is a new popular root crop that goes by the unusual name “yacon”.

Yacón (*Smallanthus sonchifolius*) is a perennial plant grown in the Andes of Perú for its crisp, sweet-tasting tubers. The texture and flavor have been described as a cross between a fresh apple and watermelon which is why it is sometimes referred to as the apple of the earth. It has recently been introduced into farmer's markets and natural food stores in the US. Yacon is a distant relative of sunflower with edible tubers and leaves. It has a white or yellowish transparent flesh and green leaves. This is low in calories content 54%, low sugar level, decrease cholesterol and triglycerides level. It contains high inulin content 60-70% and froctooligosacharrides (FOS), 87% water, 0.30% protein, 0.30% fat, 0.6% lipids, 0.6% fiber, 54 Kcal energy and a certain traces of 22% phosphorous, 23 mg calcium, and 11% glucides and has a moisture content of 70-85%. Yacon also contains quantities of fructose, glucose, chlorogenic, caffeic, and ferulic acid. (Wikipedia, 2008).

This study aims to utilize cheap feed resources to help poultry raisers produced birds more economically so to lessen the cost of production.

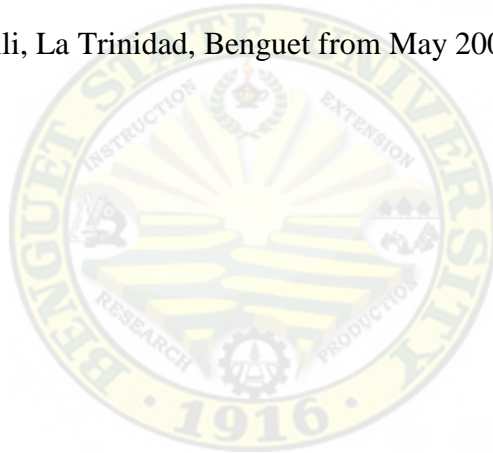
Feeding birds using different kinds of feed resources is one of the most important factors that affect the success of a farm enterprise. It is important to the poultry raisers to know what the best feed for their birds is. Thus, this study helps the poultry raisers to



know how to manage and care their poultry species in terms of feeding management to come out with the best result on the growth performance of broilers given varying levels of yacon.

The general objective of this study was to determine the effect of yacon leaf meal as feed supplement to Cobb broilers. Specifically, it aimed to determine the effect of yacon leaf meal in terms of growth rate, feed consumption, feed conversion ratio, morbidity and mortality rate and dressing percentage of the broilers and to determine which level of yacon leaf meal will give the best result on the performance of broilers.

The study was conducted at the Benguet State University (BSU) Experimental Poultry House at Balili, La Trinidad, Benguet from May 2009 to June 2009.



REVIEW OF LITERATURE

The leaves of yacon contain quantities of fructose, glucose, chlorogenic, caffeic, and ferulic acids, which give tea made from prebiotic and antioxidant properties of leaves. As a result, some researchers have explored the use of yacon tea for treating diabetes and for treating diseases caused by radicals (Wikipedia 2008).

Grau and Rea (2005) stated that the dried leaves of yacon are used to prepare medicinal tea. Dried yacon leaves are used in Japan in mixing with common tealeaves. Hypoglycemic, activity has been demonstrated in the water extract of dried yacon leaves in feeding animals like rats with induced diabetes. Also, yacon carbohydrates including oligofructans can be rapidly metabolized by animals, so tuberous roots and leaves can be used to feed animals such as cattle, sheep and chickens.

According to Bernet and Hermann (2004) yacon leaves contain polyphenols with anti-oxidant activity with the prevention of cancer and arteriosclerosis. Yacon leaf extract is high in polyphenols that have been shown to reduce blood sugar levels in diabetic and non-diabetic ruminant's animal.

Bautista and Mabesa (1993) stated that the practice of poultry and livestock raisers in giving daily feed supplement and other substances to the ration of animals is to minimize production cost. Some feed supplements improve productivity by increasing the appetite of the animals and improving the feed conversion efficiency as well as to lessen the cost of production expenses.

The reason why poultry and livestock raisers practice in giving daily feed supplement and other substances to the ration of the animals is to lessen the cost of production and to improve feed efficiency and animal appetite (Francisco, 1992).



Burn (1985) mentioned that chicken meat production has grown at a faster rate. The demand has also been driven by fast food chains. Profits from poultry meat products are dealt with the basis of feeds and output of poultry meat showing that the ration must give optimum return.

The chemical chromatological study of the leaves has revealed it contains 11% of protein among other components. For this reason, people in the sierra use yacon leaves as fodder for their animals such as cattle, guinea pigs, etc. In Japan, scientists, producers and consumers have formed the Japanese Yacon Association. This association and other foreign analog groups are cultivating it and promoting consumption of “Andean tea” based on the leaves of this plant (Michaels, 2008).

According to the Department of Science and Technology (2009) yacon leaves are positive in alkaloid, tannins and steroids. Alkaloids are naturally occurring chemical compounds containing basic nitrogen atoms. The name derives from the word alkaline and was used to describe any nitrogen-containing base. Alkaloids are produced by a large variety of organisms, including bacteria, fungi, plants, and animals and are part of the group of natural products (also called secondary metabolites). Many alkaloids can be purified from crude extracts by acid-base extraction. Tannins have molecular weights ranging from 500 to over 3,000. Tannins are incompatible with alkalis, gelatin, heavy metals, iron, lime water, metallic salts, strong oxidizing agents and zinc sulfate



MATERIALS AND METHODS

The materials and equipments that were used in the study includes 160 day old cobb broilers, brooding-rearing cages, broiler commercial feeds, disinfectant, feed containers, drinking and feeding troughs, electric bulbs (100 watts), old newspapers, waterers, feeders, weighing scale, NCD vaccine, record book and ground yacon leaf meal.

Methodology

Pre- Experimental period. The stock were procured from reliable distributor of day old chicks at Baguio City and the yacon leaves were purchased and collected from reliable farmers of yacon at La Trinidad and Tublay, Benguet.

Preparation of brooding and rearing cages. The brooder and rearing cages were clean thoroughly and were sprayed with disinfectant which includes drinking and feeding troughs which was done one week before the arrival of the chicks. After three days, old newspaper sheets were spread to cover the floor of the brooder to conserved heat and to prevent the entrance of draft. It also serves as receptacles for the feeds in the first few days and also maintaining the temperature desired by the chicks. Finally, two hours before the arrival of the chicks, the brooder cages were lightened to ensure a uniform brooding temperature requirement.

Arrival of the stocks. Upon the arrival of the chicks, they were placed in the brooding cages and brooded as a group. They were subjected to the same care and management. At seven days old, they were vaccinated against new castle disease (NCD) vaccine. They were fed with commercial chick booster feeds until they reached their 15th



days old. To ensure good health of the birds, drinking water given to them was medicated with vetracine multi-vitamin soluble particularly in their first two weeks.

Experimental period. At 21 days old of brooding, the chicks were divided randomly into four treatments following the completely randomized design (CRD). Each treatment was replicated four times with 10 birds per replication making a total of 40 birds per treatment. However, before the birds were placed into their respective cages, their initial weights were taken.

The following treatments were as follows:

T₀ – Control (pure commercial feeds)

T₁ – 10% yacon leaf meal plus 90% commercial feeds

T₂ – 20% yacon leaf meal plus 80% commercial feeds

T₃ – 30% yacon leaf meal plus 70% commercial feeds

The birds in all treatments were subjected to the same care and management except on the levels of yacon leaf meal added to their ration. The birds on the control (T₀) were given pure commercial feeds, while the birds assigned to T₁ were given 10% of yacon leaf meal added to 90% commercial feeds, T₂ birds were given 20% of yacon leaf meal plus 80% commercial feeds, and those under T₃ were given 30% of yacon leaf meal plus 70% commercial feeds. Feeding the birds was done three times a day, 6:00 in the morning, 12:00 noontime, and 5:00 in the afternoon. During the first two weeks, the birds were fed with chick booster, followed by broiler starter crumbles for the next two weeks and lastly, finisher crumbles until the termination of the study. Fresh water was always made available. Feeding and drinking troughs were cleaned daily to maintain the good



health of the birds. The light was switch-on 23 hours and switch-off one hour in a day time.

Preparation of yacon leaf meal. Yacon leaves were washed thoroughly with clean water then allowed to drip. It was later sundried until it can be ground into leaf meal. The resulting meal added manually to the commercial feeds on the specified level of treatments. 7.75kilograms of fresh yacon leaves produced 1kilogram of yacon leaf meal.

Slaughtering of the birds. At the termination of the stocks, one broiler taken as sample per replication for a total of four birds per treatment. These were slaughtered following the standard procedure by cutting up into different market cuts, thus, there weights were taken.

Data gathered. The data gathered were as follows:

1. Initial weight of the birds (kg). This was obtained by weighing the chicks individually at the start of the study (21 days of age).
2. Final weight of the birds (kg). This was obtained by getting the total weight of the birds in each treatment and replication divided by the total number of birds per treatment.
3. Total gain in weight of the birds (kg). This was obtained by subtracting the initial weight from the corresponding final weight of the individual birds.
- 4 Total feed consumption (kg). This was taken by adding the total amount of feed consumed by the birds from the beginning until the termination of the study.
5. Feed conversion ratio (FCR). This was obtained by dividing the total feed consumption by the total gain in weight of the birds.



6. Cost of feed to produce a kilogram gain in weight (Php). This was taken by multiplying the feed conversion ratio by the average price of feeds per kilo.

7. Dressing percentage (%). This was obtained by dividing the carcass weight of the birds by the slaughter weight of the birds multiplied by 100.

8. Net profit (Php). This was taken by multiplying the final weight of the birds (input) by the price per kilogram live weight of birds (output).

9. Returned of investment (ROI). This was obtained by using this formula:

$$\text{ROI} = \frac{\text{Net Profit}}{\text{Total Cost of Production}} \times 100$$

All the data gathered were consolidated, tabulated and subjected to analysis of variance for completely Randomized Design (CRD). The Duncan's Multiple Range Test (DMRT) was used to determine the significance between the treatment means.



RESULTS AND DISCUSSION

Initial and Final Weight

The initial and final weights of the birds in different treatments are presented in Table 1. Statistical analysis showed that there were no significant differences in all treatments in terms of initial and final weights of the birds. It implies that the birds at the start and end of the study were more or less of the same weight. The initial weights of the birds had a total mean of 0.6591 kg and the final weight of the birds had a total mean of 1.8166 kg of replacing 10-30% yacon leaf meal. The result shows that increasing the amount of yacon leaf meal can produce a little increased in final weight.

Total Gain in Weight

The total gains in weight of the birds in the different treatments are presented in Table 2. Statistical analysis showed that there were no significant differences between treatment means. The total gain in weight of the birds given 10% yacon leaf meal and those given 30% yacon leaf meal had a means of 1.17 kg each. While the birds in control

Table 1. Initial and final weights of the birds under the different treatments (kg)

TREATMENT	MEAN	
	Initial weight (kg)	Final weight (kg)
Pure commercial feed	0.6622	1.8075
90% commercial feeds + 10% yacon leaf meal	0.6516	1.8150
80% commercial feeds + 20% yacon leaf meal	0.6575	1.8175
70% commercial feeds + 30% yacon leaf meal	0.6649	1.8262

^{ns=} means with no superscripts are not significantly different at 5% level by DMRT.



(pure commercial feeds) and 20% yacon leaf meal had a mean of 1.15 kg and 1.16 kg.

The result below revealed that substituting 10-30% commercial feeds allowance of the birds with yacon leaf meal does not have detrimental effect on the growth rate of the birds.

Feed Consumption of the Birds

The feed consumption of the birds in the different treatments is presented in Table 3. Statistical analysis showed that the mean of feed consumption is significantly differ from each other. The birds under To (pure commercial feeds) had the highest mean of 2.178kg and those birds under T3 (70% commercial feeds and 30% yacon leaf meal) had the lowest mean of 2.065kg. The result below shows that replacing 10-30% commercial feeds allowance of the birds with yacon leaf meal does not have detrimental effect on the growth performance of the birds and would reduce commercial feeds.

Table 2. Total gain in weight of the birds (kg)

TREATMENT	WEIGHT (kg)
Pure commercial feed	1.15
90% commercial feeds + 10% yacon leaf meal	1.17
80% commercial feeds + 20% yacon leaf meal	1.16
70% commercial feeds + 30% yacon leaf meal	1.17

^{ns=} means with no superscripts are not significantly different at 5% level by DMRT



Table 3. Feed consumption of the birds from day 1 to 42 (kg)

TREATMENT	WEIGHT (kg)
Pure commercial feed	2.178a
90% commercial feeds + 10% yacon leaf meal	2.168a
80% commercial feeds + 20% yacon leaf meal	2.145a
70% commercial feeds + 30% yacon leaf meal	2.065b

*= means with no superscripts are not significantly different at 5% level by DMRT.

Feed Conversion Ratio

The feed conversion ratio of the birds in the different treatments is presented in Table 4. On this parameter, statistical analysis showed that there were no significant differences between the feed conversion ratio of the birds in all treatment. The birds under To (pure commercial feeds) had the highest FCR mean of 1.905, followed by 1.863 of those birds under T1 (90% commercial feeds +10% yacon leaf meal), then, those birds under T2 (80% commercial feeds + 20% yacon leaf meal) was 1.850 and lastly, those birds under T3 (70% commercial feeds + 30% yacon leaf meal) with mean of 1.768. They are not significantly differ from each other. The result shows that increasing the amount of yacon leaf meal given to the birds would improve the FCR of the birds.

Cost of Feed to Produce a Kilogram of Broiler

The cost of feed to produce a kilogram of broiler in the different treatments is presented in Table 5. Statistical analysis showed that there were no significant differences observed among treatments with means ranging from Php54.75 (pure commercial feeds)



to Php53.50 (70% commercial feeds + 30% yacon leaf meal). This study connotes that the cost of feed to produce a kilogram of broiler was almost the same in all treatments.

Slaughter Weight of the Birds

The slaughter weight of the birds in the different treatment is presented in Table 6. Statistical analysis shows that the mean slaughter weight significantly differ among treatments with highest mean of 1.55kg (70% commercial feeds + 30% yacon leaf meal) and a lowest mean of 1.44kg under To (pure commercial feeds). The overall mean slaughter weight of the birds was 1.51kg. This implies that replacing 10-30% commercial

Table 4. Feed conversion ratio of the birds

TREATMENT	FCR
Pure commercial feed	1.905
90% commercial feeds + 10% yacon leaf meal	1.863
80% commercial feeds + 20% yacon leaf meal	1.850
70% commercial feeds + 30% yacon leaf meal	1.768

^{ns=} means with no superscripts are not significantly different at 5% level by DMRT.

Table 5. Cost of feed to produce a kilogram of broiler (Php)

TREATMENT	COST (Php)
Pure commercial feed	54.75
90% commercial feeds + 10% yacon leaf meal	53.125
80% commercial feeds + 20% yacon leaf meal	53.313
70% commercial feeds + 30% yacon leaf meal	53.50

^{ns=} means with no superscript are not significantly different at 5% level by DMRT.



Table 6. Slaughter weight of the birds (kg)

TREATMENT	WEIGHT (kg)
Pure commercial feed	0.993b
90% commercial feeds + 10% yacon leaf meal	1.0175a
80% commercial feeds + 20% yacon leaf meal	1.045a
70% commercial feeds + 30% yacon leaf meal	1.065a

*= means with no superscript are not significantly different at 5% level by DMRT.

feed allowance of the birds with yacon leaf meal have a good effect on the slaughter weight of the birds.

Dressed Weight and Dressing Percentage of the Birds

The dressed weight and dressing percentage of birds in the different treatments is presented in Table 7. Statistical analysis shows that the dressed weights are highly significant differences from each other while dressing percentage are not significant differences in all treatment. The dressed weight ranged from 1.040 kg (97.68% dressing percentage) obtained from the birds fed with 70% commercial feeds plus 30% yacon leaf meal to 0.973kg (97.99% dressing percentage) obtained from the birds fed with pure commercial feeds. The results imply that birds in the different treatments are not comparable to each other in term of dressed weight and dressing percentage.

Mortality and Morbidity Rate

There was neither mortality nor morbidity among birds experimented from the start until the termination of the study. This indicates that the birds had more or less showed



Table 7. Dressed weight (kg) and Dressing percentage (%)

TREATMENT	Dressed Weight (kg)	Dressing Percentage (%)
Pure commercial feed	0.973c	97.99
90% commercial feeds + 10% yacon leaf meal	0.995b	97.79
80% commercial feeds + 20% yacon leaf meal	1.020a	97.63
70% commercial feeds + 30% yacon leaf meal	1.040a	97.68

***= means with no superscripts are not significantly different at 5% level by DMRT

good performance against diseases as well as proper care and management of the researcher.

Net return and Return on Investment

The return on investment in the different treatments is presented in Table 8. The ROI of the birds was not subjected into statistical analysis, however, it is shown in the table that birds given 30% yacon leaf meal had the highest numerical ROI of 4.47 followed by birds given 20% yacon leaf meal with 3087% ROI, also the birds given 10% yacon leaf meal with 3.02% ROI and finally, those given pure commercial feeds with an ROI of 2.65%. Results showed that the birds given commercial feeds had a higher income brought about by their heavy weights, but still they had a lowest ROI because of the higher feed cost.



Table 8. Net income and return on investment (%)

TREATMENT	TOTAL SALES	TOTAL COST	NET INCOME	ROI (%)
Pure commercial feed	5880.50	5729.75	151.75	2.65
90% commercial feeds + 10% yacon leaf meal	5805.00	5634.75	170.25	3.02
80% commercial feeds + 20% yacon leaf meal	5635.75	5425.75	210.00	3.87
70% commercial feeds + 30% yacon leaf meal	5475.00	5240.50	234.50	4.47



SUMMARY, CONCLUSION AND RECOMMENDATION

Summary

This study was conducted to determine the effect of yacon leaf meal on the growth performance of cob broilers. This was conducted at the Benguet State University Poultry Experimental House, Balili, La Trinidad, Benguet from May to June 2009.

One hundred sixty (160) twenty-one days old broiler chicks were used in the study. This was divided into four treatments following the Completely Randomized Designed (CRD). The four treatments were replicated four times with 10 birds per replication. The different treatments used were as follows: T₀ (control/pure commercial feeds), T₁ (90% commercial feeds plus 10% yacon leaf meal), T₂ (80% commercial feeds plus 20% yacon leaf meal) and T₃ (70% commercial feeds plus 30% yacon leaf meal).

Results of the study found that there were no significant differences in terms of initial weight, final weight, total gain in weight, feed conversion ratio (FCR), cost of feed to produce a kilogram of broiler and dressing percentage. The overall mean of initial weight, final weights and total gain in weight of the birds were 0.6591kg, 1.8166kg and 1.16kg. Feed conversion ratio, cost of feed to produce a kilogram of broiler and dressing percentage had a mean of 1.847 and 53.672Php and 97.77%. On the other hand, feed consumption and slaughter weight had significant differences among treatments. The mean total of feed consumption observed from those birds under T₃ (70% commercial feeds + 30% yacon leaf meal) was 2.065 kg while those birds under T₀ (pure commercial feeds) was 2.178kg. Slaughter weight had an overall mean of 1.030kg. While, the dressed weight has highly significant differences observed in all treatment which has the overall mean dressed weight of 1.007kg.



Although the net profit and return on investment (ROI) were not subjected to statistical analysis, the study shows that the higher net profits and return on investment observed numerically from those birds given the level of 10-30% add-on to commercial feeds.

Conclusion

Based on the results of the study, it is therefore concluded that yacon leaf meal can replace 10-30% of commercial feeds allowable to the birds without detrimental affect on their growth performance.

Recommendation

Based on the results showed in the study, it is recommended that yacon leaves can be converted into meal that can be used to replace 10-30% of the commercial feeds allowance to reduce feed cost especially this time of crisis. It is also recommended that further studies of yacon leaf meal as feeds for broilers should be made; however, it includes not only the growth performance but also the effect on the carcass quality.



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APPENDICES

Appendix Table 1. Initial weight of the birds (kg)

TREATMENT	REPLICATION				TOTAL	MEAN
	I	II	III	IV		
T ₀	0.6840	0.6523	0.6720	0.6405	2.6488	0.6622
T ₁	0.6580	0.6270	0.6700	0.6515	2.6067	0.6515
T ₂	0.6700	0.6415	0.6812	0.6375	2.6302	0.6575
T ₃	0.6265	0.6705	0.6900	0.6725	2.6595	0.6649
GRAND TOTAL					10.5452	
GRAND MEAN						0.6591

ANALYSIS OF VARIANCE

SOURCES OF VARIATION	DEGREE OF FREEDOM	SUM OF SQUARE	MEAN SQUARE	COMPUTED F	TABULATED F	0.05	0.01
TREATMENT	3	0.0004	0.0001	0.28 ^{ns}	3.05		5.95
ERROR	12	0.0057	0.0005				
TOTAL	15	0.0061					

ns= not significant

Coefficient of Variance: 3.30%



Appendix Table 2: Final weight of the birds (kg)

TREATMENT	REPLICATION				TOTAL	MEAN
	I	II	III	IV		
T ₀	1.885	1.860	1.750	1.735	7.23	1.8075
T ₁	1.815	1.800	1.865	1.780	7.26	1.8150
T ₂	1.855	1.825	1.515	1.775	7.27	1.8175
T ₃	1.785	1.855	1.845	1.820	7.30	1.8262
GRAND TOTAL					29.065	
GRAND MEAN						1.8166

ANALYSIS OF VARIANCE

SOURCES OF VARIATION	DEGREE OF FREEDOM	SUM OF SQUARE	MEAN SQUARE	COMPUTED F	TABULATED F 0.05	TABULATED F 0.01
TREATMENT	3	0.0007	0.0002	0.10 ^{ns}	3.05	5.95
ERROR	12	0.00275	0.0023			
TOTAL	15	0.0282				

ns= not significant

Coefficient of Variance: 2.63%



Appendix Table 3. Total gain in weight (kg)

TREATMENT	REPLICATION				TOTAL	MEAN
	I	II	III	IV		
T ₀	1.20	1.21	1.08	1.09	4.58	1.15
T ₁	1.16	1.17	1.20	1.13	4.66	1.17
T ₂	1.19	1.18	1.13	1.14	4.64	1.16
T ₃	1.16	1.18	1.16	1.17	4.67	1.17
GRAND TOTAL					18.55	
GRAND MEAN						1.16

ANALYSIS OF VARIANCE

SOURCES OF VARIATION	DEGREE OF FREEDOM	SUM OF SQUARE	MEAN SQUARE	COMPUTED F	TABULATED F	0.05	0.01
TREATMENT	3	0.0012	0.0004	0.235 ^{ns}	3.05		5.95
ERROR	12	0.020	0.0017				
TOTAL	15	0.0212					

ns= not significant

Coefficient of Variance: 3.55%



Appendix Table 4. feed consumption of the birds (kg)

TREATMENT	REPLICATION				TOTAL	MEAN
	I	II	III	IV		
T ₀	2.14	2.20	2.10	2.27	8.71	2.178
T ₁	2.13	2.18	2.16	2.20	8.67	2.168
T ₂	2.18	2.15	2.10	2.15	8.58	2.148
T ₃	2.14	2.10	2.0	2.02	8.26	2.065
GRAND TOTAL					34.22	
GRAND MEAN						2.139

ANALYSIS OF VARIANCE

SOURCES OF VARIATION	DEGREE OF FREEDOM	SUM OF SQUARE	MEAN SQUARE	COMPUTED F	TABULATED F 0.05	TABULATED F 0.01
TREATMENT	3	0.0313	0.01043	3.65*	3.05	5.95
ERROR	12	0.0345	0.00286			
TOTAL	15	0.0668				

* = significant

Coefficient of Variance: 2.50%



Appendix Table 5. Feed conversion ratio (FCR)

TREATMENT	REPLICATION				TOTAL	MEAN
	I	II	III	IV		
T ₀	1.78	1.82	1.94	2.08	7.62	1.905
T ₁	1.84	1.86	1.80	1.95	7.45	1.863
T ₂	1.83	1.82	1.86	1.89	7.40	1.850
T ₃	1.84	1.78	1.72	1.73	7.07	1.768
GRAND TOTAL					29.54	
GRAND MEAN						1.847



ANALYSIS OF VARIANCE

SOURCES OF VARIATION	DEGREE OF FREEDOM	SUM OF SQUARE	MEAN SQUARE	COMPUTED F	TABULATED F 0.05	TABULATED F 0.01
TREATMENT	3	0.0398	0.013267	2.02 ^{ns}	3.05	5.95
ERROR	12	0.0788	0.006567			
TOTAL	15	0.1186				

^{ns} = not significant

Coefficient of Variance: 4.39%



Appendix Table 6. Cost of feed to produce a kilogram of broiler (Php)

TREATMENT	REPLICATION				TOTAL	MEAN
	I	II	III	IV		
T ₀	53.75	53.00	55.75	56.50	219.00	54.75
T ₁	52.75	52.25	52.50	55.00	212.50	53.125
T ₂	52.25	52.75	54.25	54.00	213.25	53.313
T ₃	53.75	52.50	54.00	53.75	214.00	53.50
GRAND TOTAL					858.75	
GRAND MEAN						53.672

ANALYSIS OF VARIANCE

SOURCES OF VARIATION	DEGREE OF FREEDOM	SUM OF SQUARE	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05	0.01
TREATMENT	3	6.480465	2.16016	1.52 ^{ns}	3.05	5.95
ERROR	12	17.109279	1.42578			
TOTAL	15	23.589844				

ns= not significant

Coefficient of Variance: 2.22%



Appendix Table 7. Slaughter weight of the birds (kg)

TREATMENT	REPLICATION				TOTAL	MEAN
	I	II	III	IV		
T ₀	1.0	1.0	0.98	0.99	3.97	0.993
T ₁	1.02	1.03	1.01	1.01	4.07	1.0175
T ₂	1.02	1.02	1.10	1.04	4.18	1.045
T ₃	1.03	1.04	1.14	1.05	4.26	1.065
GRAND TOTAL					16.48	
GRAND MEAN						1.030

ANALYSIS OF VARIANCE

SOURCES OF VARIATION	DEGREE OF FREEDOM	SUM OF SQUARE	MEAN SQUARE	COMPUTED F	TABULATED F 0.05	TABULATED F 0.01
TREATMENT	3	0.012	0.0040	3.64*	3.05	5.95
ERROR	12	0.013	0.0011			
TOTAL	15	0.025				

* = significant

Coefficient of Variance: 3.22%



Appendix Table 8. Dressed weight of the birds (kg)

TREATMENT	REPLICATION				TOTAL	MEAN
	I	II	III	IV		
T ₀	0.98	0.98	0.96	0.97	3.89	0.973
T ₁	1.0	1.01	0.99	0.98	3.98	0.995
T ₂	1.0	1.0	1.06	1.02	4.08	1.020
T ₃	1.01	1.02	1.10	1.03	4.16	1.040
GRAND TOTAL					16.11	
GRAND MEAN						1.007

ANALYSIS OF VARIANCE

SOURCES OF VARIATION	DEGREE OF FREEDOM	SUM OF SQUARE	MEAN SQUARE	COMPUTED F	TABULATED F 0.05	TABULATED F 0.01
TREATMENT	3	0.0103	0.00515	7.57**	3.05	5.95
ERROR	12	0.0082	0.00062			
TOTAL	15	0.0185				

**=highly significant

Coefficient of Variance: 2.60%



Appendix Table 9. Dressing percentage of the birds (%)

TREATMENT	REPLICATION				TOTAL	MEAN
	I	II	III	IV		
T ₀	98	98	97.96	97.98	391.94	97.99
T ₁	98.04	98.06	98.02	97.03	391.15	97.79
T ₂	98.04	98.04	96.36	98.08	390.52	97.63
T ₃	98.06	98.08	96.49	98.10	390.73	97.68
GRAND TOTAL					1564.34	
GRAND MEAN						97.77


 ANALYSIS OF VARIANCE

SOURCES OF VARIATION	DEGREE OF FREEDOM	SUM OF SQUARE	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05	0.01
TREATMENT	3	0.294	0.098	0.24 ^{ns}	3.05	5.95
ERROR	12	4.816	0.401			
TOTAL	15	5.110				

^{ns}= not significant

Coefficient of Variance: 0.65%



Appendix Table 9. Return on investment

PARTICULARS	TREATMENTS			
	To (Php)	T2(Php)	T3(Php)	T4 (Php)
Feeds				
Chick booster	285.50	285.50	285.50	285.50
Chick starter	990.50	953.75	900.00	865.25
Broiler finisher	2,164.00	2,105.85	1,950.90	1,800.00
Bulb	192.25	192.25	192.25	192.25
Vetracin	300.00	300.00	300.00	300.00
Biocid 30	37.50	37.50	37.50	37.50
Vaccine NCD	30.00	30.00	30.00	30.00
Stocks	1,700.00	1,700.00	1,700.00	1,700.00
Transportation	30.00	30.00	30.00	30.00
Grand Total	5,829.50	5,634.60	5,425.90	5,240.25
Gross Income	5,935.00	5,760.50	5,555.00	5,370.00
Net income	105.50	125.90	129.10	129.75
Return on Investment (%)	1.77	2.18	2.32	2.41



Benguet State University
COLLEGE OF AGRICULTURE
La Trinidad, Benguet

November 10, 2009
Date

APPLICATION FOR MANUSCRIPT ORAL DEFFENSE

Name: MARILOU B. BASSIT
Degree (Major Field): BACHELOR OF SCIENCE IN AGRICULTURE (Animal Science).
Title of the Thesis: GROWTH PERFORMANCE OF BROILERS FED WITH YACON (Smallanthus sonchifolius) LEAF MEAL AS FEED SUPPLEMENT.
Date and Time of defense: November 10, 2009
Place of Defense: College of Agriculture (AC 201)

Endorsed: SAMUEL CRESCENCIO S. ARCELLANA
Adviser and Chairperson, Advisory Committee
(Printed Name and Signature)

Approved: BEN B. LUIS
Member, Advisory Committee
and Department Chairperson

RESULT OF ORAL DEFENSE

Name and Signature	* Remarks (Passed/Failed)
<u>SAMUEL CRESCENCIO S. ARCELLANA</u> Adviser and chairperson, Advisory Committee	_____
<u>MADELINE S. KINGAN</u> Member, Advisory Committee	_____
<u>BEN B. LUIS</u> Member, Advisory Committee and Department Chairperson	_____

Copy Furnished:

- Adviser
- Member of Advisory Committee
- Department Chairperson
- College Secretary

