

Golden Apple Snail (*Pomacea Canaliculata*) As Feed Supplement on Growth, Carcass and Economic Performance of Broiler's (*Gallus Gallus Domesticus*)

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ABSTRACT: The birds were individually weighed and allocated into four treatments group (T1: 0%,T2:6%,T3:12%,T4: 18% Golden apple Snail meal).each Treatment groups has three replicates and Five birds per cage. All the birds were fed with restriction during the feeding trial which lasted 42 days. Body weight gain, Weekly gain in Weight, Percentage, Growth rate, feed consumption, Feed Conversion ratio and Feed efficiency were measured. The result from the study showed that Treatment 2 has the highest Body weight gain, Weekly gain in weight, Percentage Growth rate ,feed consumption, Lowest Feed Conversion ratio and Feed efficiency. The result recommended the supplementation of Treatment 2 ratio which is 6 % Golden Apple Snail Meal. Using Golden Apple Snail meal as Protein Source is recommended as showed in the data and observation that Golden Apple snail meal can support the growth, Quality Carcass and Higher Return above Feed and Chick Cost

KEYWORDS: growth, performance, golden apples nail,, carcass, economic performance

INTRODUCTION

Livestock and poultry raising is a major industry in the Philippines. In 2021, the total number of chicken in poultry farming in the Philippines amounted to 86.36 million heads Broiler chicken has 32.4 share from the total population. The highest inventory was in Central Luzon with 19.79 million birds, Philippine Statistic Authority (2022). Feeds and feeding play a vital role in the performance of Broiler which every raiser must be consider in order to have a profit. The advantage of Broiler farming are have high feed conversion ratio, rearing period are seventy days, faster return of investment, more number of flocks can be taken the same shed and demand for poultry meat is more compared to sheep/goat meat. Satapathy et al(2017).

The study of Seesanong et al., (2018) on Golden apple snail can be used as a protein source of feed because they have crude protein (CP) 46,2%, metabolism energy (ME) 1920kcal/kg, calcium (Ca) 2,98% and Phosphorus (P) 0,35%.Golden Apple Snail meal is reach in Calcium which is essential to help in Mareks Disease which strengthen the bone.

The meat of snail is considered to be high- quality food packed with protein and a great source of iron. It contains 15% protein 80% water and 2.4 % fat Violet (2019). The different meal forms that can be extracted are golden snail meal was 30% calcium and 15% Crude protein. Golden snail meat meal (62% crude protein and 3336 kcal/kg and Golden shell meal (35% calcium). Feeding traits indicate that golden snail meal can be a part of swine and chicken layer diets up to 15%.Golden snail meat meal can be a part of broiler chicken diet up to 12 %. Feeding fresh and ground golden apple snail to ducks can replace 50 % of their diet under total confinements system. Whereas, golden apple snail meat meal (75% of the diet) plus rice bran can be beneficially fed to tilapia. Golden apple snail meal is a promising animal feed in the Philippines. A.B Serra (1997)

Today commercial feeds are abundantly available in the market but the cost becomes a big problem especially to the small animal raisers due to the increasing of prices in the market. Inadequate supply and high cost of protein source of feed ingredients is the reason on the continuous search for locally available feed ingredients to be added to commercial feed ration.

The population of Golden Apple Snail in our locality are abundant in rice field, dike, river, ponds and others. Likewise, golden apple snail are highly invasive in which there is no way to control in such a way that it can completely destroy 1m² overnight in a rice field. This damage could lead to more than 50% yield loss according to some study of (IRRI).Golden apple snails also can eat young plants and emerging rice plant through cutting the rice stem at the base and destroying the whole plant.

Thus, protein resources are expensive and one reason why farmers cannot afford it. Therefore, this study will evaluate golden apple snail as a partial substitute to the protein source of the diet which are cheap and thus add income to the poultry raisers. Moreover, organic feed formulation is likely positive among health conscious consumers. Hence, this study will be conducted to evaluate the effectiveness on the growth and carcass characteristics of Broiler with fed ration supplemented with Golden Apple Snail

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OBJECTIVES

1. Determine which of the level of Golden apple snail meal affect the growth rate of Broiler Chicken.
2. Find out which of the level of golden apple snail meal that will give the best carcass Yield of Broiler Chicken.
3. Compute the return above feed and chick cost of broiler fed level supplemented with golden apple snail.

METHODOLOGY

The Materials pail, net, Wood and bamboo was joined together by common nails. The roofing was made of galvanize iron and the cage was made with bamboo(20pcs) for flooring, separator for every treatments and for wall. The net (4mx6m) was use in the flooring, nail (6kg) was use to connect and 2x2 wood(15psc) for the skeleton of the cage.The materials used for brooding are 25m extension wire, gallon type waterer (3pcs) rice hull (2sacks), yellow bulb (1psc 50 and 25 watt) also paper, newspaper and cartoons. The materials used were feeding through(12pcs), waterer (12pcs), clock type weighing scale, yellow bulb (12 pcs) and record book. The materials use in preparation of golden stick, and corn mill. The feed ingredients to be use in feed formulation was ground yellow corn, soy bean meal, rice bran, golden apple snail meal, di calcium, phosphate, limestone, vegetable oil, vitamin mineral premix, methionine and salt. Other materials used was disinfectant to sanitize the area. The main materials to be used is the pelletizer machine which use to produce pellet size feeds.

Experimental design, lay-out and treatments

A total of sixty (60) day old broiler chicks were randomly distributed into four (4) treatments following the Completely Randomized Design (CRD). Each treatment were replicated three (3) times with 5 birds per replication. The distribution of experimental units is randomly done by draw lots method. The treatment will be designate as follows:Treatment 1. 0%Golden apple snail meal,Treatment 2. 6%Golden apple snail meal,Treatment 3. 12%Golden apple snail meal,Treatment 4. 18%Golden apple snail meal .The experimental layout is shown below

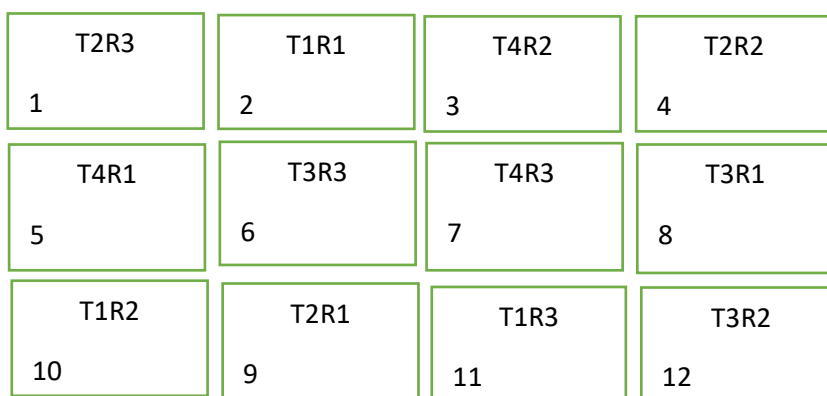


Figure 1. The experimental lay-out of the study

Table 1. Percentage (%) Composition and nutrient analysis of the experimental diets

Feedstuff/Ingredients	STARTER HOMEMIXED RATION				FINISHER HOMEMIXED RATION			
	TREATMENTS				TREATMENTS			
	0%GAS T 1	6%GAS T 2	12%GAS T 3	(18%GAS T 4	0%GAS T1	6%GAS T2	12%GAS T3	18%GAS T4
Ground Yellow Corn	50	50	50	50	50	50	50	50
Soybean meal (SBM)	32	25	20	15	25.7	20	15	10
Rice bran D1	15	15	15	15	20	20	20	20
GAS Meal	0	6	12	18	0	6	12	18
Dicalcium phosphate	1.6	1.6	1.4	0.8	1.5	1.12	1.4	0.9
Limestone	0.8	0.5	0.1	0.2	0.85	0.95	0.1	0
Vegetable oil	0.1	0.9	0.5	0.4	0.9	1	0.3	0.3
vitamin mineral premix	0.1	0.5	0.5	0.1	0.55	0.43	0.7	0.3
Methionine	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2
salt	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Total	100	100	100	100	100	100	100	100

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RESULT AND DISCUSSION

Growth Performance

Initial Weight. Weight of the experimental broilers at the study did not differ among treatments means after 1 week of common brooding. Based on the statistical analysis it does not reject the hypothesis or not significant. This is justified since the broiler have not yet been fed with the experimental diets at this period.

Weekly and Final Body Weight. Weekly body weights of the broilers showed a consistently increasing trend from the first to the fifth week of feeding trial. Significant, No Variation was noted during the first week however the broiler fed with 6% Golden apple snail and homemade feed (T2) produced the heaviest broilers with mean value of 378.7 grams at first week of the study.

Treatment	Body Weight of the Birds					
	Initial	Week 1	Week 2	Week 3	Week 4	Week 5
1	194.5	281.3	386.3 _a	470.7 _a	623.1 _a	863.1
2	220.1	378.7	598.7 _b	843.3 _b	1080.4 _b	1297.5
3	218.7	322.0	549.6 _b	715.3 _b	926.1 _b	1183.8
4	232.3	340.0	564.2 _b	773.9 _b	988.9 _b	1204.8
F-value	2.34	1.55	6.32	12.76	10.35	3.84
p-value	.150	.275	.017	.002	.004	.057
Decision	Fail to Reject Ho	Fail to Reject Ho	Reject Ho	Reject Ho	Reject Ho	Fail to Reject Ho

* Means not sharing subscript are significantly different based on Tukey's HSD Test at a = .05

Weekly and Final Gain in body weight. The experimental broilers showed significant from the third week of the feeding trial The broiler fed with 6% Golden Apple Snail Meal gained more weight HSD (.05) with mean Of 157.8 grams at the end of first week. It was followed by the broiler fed with 18% Golden apple snail meal(T4),12% Golden apple snail meal(T3) and 0% Golden apple snail meal(T1), with comparable mean values of 107.7,103.3 and 86.9 grams, respectively.No variation was noted during the period of fourth and fifth week from the experimental broilers

In the study o Nlipes R. Et al (2023). Shows in their findings indicate that the substitution level of (30%) of the GAS meal might result in the efficient growth performance of mallard ducks.

Treatment	Gain in Weight of the Birds					
	Week 1	Week 2	Week 3	Week 4	Week 5	Total
1	86.9	104.9	84.4 _a	152.4	240.1	668.7
2	157.8	220.1	244.6 _b	237.1	217.1	1076.7
3	103.3	227.6	165.7 _b	210.8	257.7	965.1
4	107.7	224.2	209.7 _a	215.1	215.9	972.5
F-value	1.00	2.85	9.95	2.57	0.18	-----
p-value	.441	.105	.004	.127	.906	-----
Decision	Fail to Reject Ho	Fail to Reject Ho	Reject Ho	Fail to Reject Ho	Fail to Reject Ho	-----

* Means not sharing subscript are significantly different based on Tukey's HSD Test at a = .05

Percentage Rate of Growth

Result revealed no variation among treatment means from First week to Fifth week from the experimental broilers as shown in Table 5 In the first week Golden apple snail has mean value ranging from 52.2 % to 36. 5%, Second week has mean value of 57. % to 31.5, Third week has mean value of 31.6 %, to 19.6%, Fourth week has mean value of 27.7% to 24.4% and Fifth week has mean value of 31.9 to 19.7 %.

In the study of Francisco F. Buctot (2018) it stated that in the result of his study that the average feed consumption and average body weight shows significant difference and feed conversion ratio efficiency shows no significant difference but near to standard FCE.

Treatment	Percent Growth Rate of the Birds				
	Week 1	Week 2	Week 3	Week 4	Week 5
1	36.5	31.5	19.6	27.7	31.9
2	51.2	45.6	34.0	24.6	17.6
3	37.35	52.7	26.2	25.7	24.4

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4	37.0	49.5	31.6	24.4	19.7
F-value	0.73	1.35	3.66	0.58	2.98
p-value	.562	.326	.063	.658	.096
Decision	Fail to Reject Ho	Fail to Reject Ho	Fail to Reject Ho	Fail to Reject Ho	Fail to Reject Ho

* Means not sharing subscript are significantly different based on Tukey's HSD Test at a = .05

Treatment	Cumulative Feed Consumption (g)					
	Week 1	Week 2	Week 3	Week 4	Week 5	Total
1	344.7	484.5 _a	600.3 _a	649.6 _a	864.7	2943.8
2	422.7	495.6 _b	615.7 _b	668.9 _b	882.9	3085.7
3	337.3	491.9 _b	607.5 _c	657.5 _a	819.3	2913.6
4	339.7	494.7 _b	609.7 _c	659.6 _a	879.8	2983.4
F-value	1.07	12.62	28.26	15.70	3.00	-----
p-value	.414	.002	<.001	.001	0.095	-----
Decision	Fail to Reject Ho	Reject Ho	Reject Ho	Reject Ho	Fail to Reject Ho	-----

* Means not sharing subscript are significantly different based on Tukey's HSD Test at a = .05

Feed Consumption. On the first week of feeding trial, no variation was noted on the weekly feed consumption. Result in fifth week showed insignificant difference in feed consumption in all treatments. However 6% Golden apple snail meal show higher feed consumption with a mean value of 882.9. The rest broiler feed with 18% Golden apple snail meal (T4) has mean value of 879.8 grams, 12% Golden apple snail(T3) with 819 grams and 0% Golden apple snail(T1) with 864.7 grams.

In the Study of A.B Serra(1997) it stated that GAS can be added to chicken diet up to 12 %. Golden snail meal can be a part of broiler chicken diet up to 12 %.

Feed Conversion Ratio(FCR). Variation existed during the third week of the experimental. The broiler fed with 6% Golden apple snail meal(T2) ration consumed the least feed during the first week (3.3 kg/kg meat) for every unit of weight gain.

The weekly FCR from fourth week to fifth week of the broilers did not show any significant differences between treatments. The different treatments did not show differences on the feed conversion ratio of values ranging from 2.9-4.4 kg on the fourth week and 3.3 to 5.3kg on the fifth week of the study.

Treatment	Feed Conversion Ratio of the Birds				
	Week 1	Week 2	Week 3	Week 4	Week 5
1	4.2	4.6	7.3 _a	4.4	3.9
2	3.3	2.3	2.6 _b	2.9	5.3
3	4.4	2.2	4.0 _b	3.1	3.3
4	3.4	2.8	3.0 _b	3.1	4.2
F-value	0.208	4.034	12.366	3.158	0.544
p-value	.888	.051	.002	.086	.666
Decision	Fail to Reject Ho	Fail to Reject Ho	Reject Ho	Fail to Reject Ho	Fail to Reject Ho

*Means not sharing subscript are significantly different based on Tukey's HSD Test at a = .05

Feed Conversion Efficiency (FCE). The experimental broilers showed insignificant variation during the third week of the experiment. However, the broiler fed with 6% Golden apple snail meal (T2) were more efficient feed converters with mean values of 41.7% which is better than birds fed with other Golden apple snail meal levels together with birds without Golden apple snail meal in the ration at the end of first week 35.4 to 23.4 percent in the fourth week and 31.2 to 24.5 percent on the fifth week of the study.

In the research of Amobi M.I et al (2019) it recommend that waste from micro livestock such as snail should incorporated in the diets of broiler to partially replaced fish meal in feed formulation.

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Treatment	Feed Conversion Efficiency of the Birds				
	Week 1	Week 2	Week 3	Week 4	Week 5
1	25.2	21.7	14.1 _a	23.4	27.8
2	41.7	44.4	39.7 _b	35.4	24.7
3	31.1	46.3	27.3 _b	32.1	31.2
4	31.8	45.3	34.4 _b	32.6	24.5
F-value	0.452	2.780	9.698	2.381	0.356
p-value	.723	.110	.005	.145	.786
Decision	Fail to Reject Ho	Fail to Reject Ho	Reject Ho	Fail to Reject Ho	Fail to Reject Ho

* Means not sharing subscript are significantly different based on Tukey's HSD Test at a = .05

B. Carcass Characteristics Dressing Percentage with giblets of the experimental birds fed with and without golden apple snail meal did not differ significantly. Dressing percentage without giblets showed similar result where no significant differences were noted between and among treatment groups of the birds subjected to feeding trials .

In the study of N. Budhari et. al (2021) stated in their result that using golden apple snail meal on Muscovy duck feed had a significant effect (p<0.05) on the final body weight ,carcass yield and commercial cuts.

Treatment	Dressing Percentage			
	With Giblets		Without Giblets	
	Male	Female	Male	Female
1	73.42	71.59	65.69	62.96
2	73.87	73.90	67.04	67.59
3	74.39	73.17	69.17	66.98
4	72.96	73.71	67.52	67.86
F-value	0.364	0.460	1.763	2.213
p-value	.781	.718	.232	.164
Decision	Fail to Reject Ho	Fail to Reject Ho	Fail to Reject Ho	Fail to Reject Ho

* Means not sharing subscript are significantly different based on Tukey's HSD Test at a = .05

Giblets. The giblets has four parts namely liver, heart, spleen and Gizzard. The Giblets of Experimental birds was no significant variation. However there is significant to Gizzard.

Treatment	Giblets of the Birds			
	Liver	Heart	Spleen	Gizzard
1	24.3	5.7	2.7	28.0 _a
2	35.0	9.0	4.7	36.0 _a
3	28.7	9.0	2.0	31.7 _a
4	30.7	8.7	2.3	25.7 _b
F-value	1.54	1.78	1.91	5.60
p-value	.278	.229	.206	.023
Decision	Fail to Reject Ho	Fail to Reject Ho	Fail to Reject Ho	Reject Ho

Cuts up parts. The cut up parts of the bird has five parts namely neck, breast, back weight, thigh, drumstick and wings. The Giblets of Experimental birds has significant variation in neck, back weight, thigh, drumstick and wings

Treatment	Cut Up Parts of the Female Birds					
	Neck	Breast	Back weight	Thigh	Drumstick	Wings
1	35.3 _a	126.0 _a	119.0 _a	78.0 _a	72.3 _a	66.0 _a
2	60.3 _b	259.0 _b	200.3 _b	141.7 _b	127.7 _b	108.0 _b
3	48.7 _a	193.7 _a	173.7 _b	118.0 _b	184.0 _c	93.0 _a
4	48.3 _a	195.0 _b	183.3 _b	118.3 _b	117.0 _b	94.7 _a
F-value	5.04	5.21	8.50	9.04	19.90	6.52
p-value	.030	.028	.007	.006	<.001	.015
Decision	Reject Ho	Reject Ho	Reject Ho	Reject Ho	Reject Ho	Reject Ho

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C. Economic Analysis

RETURN ABOVE FEED AND	CHICK	COST		
Particular	T1	T2	T3	T4
Average final weight,kg	0.863	1.298	1.184	1.205
Price/kg –live weight,Php	165	165	165	165
Average sales,Php	142.4	214.17	195.36	198.825
Ave.starter feed intake,kg	1.429	1.533	1.436	1.444
Price/kg of feed,Php	46.73	45.3	42.07	36.11
Feed cost,Php	66.777	69.4449	60.41252	52.14284
Ave.finisher feed intake,(kg)	1.514	1.551	1.476	1.539
Price/kg of feed,Php	42.97	39.15	37.8	33.06
Feed cost,Php	65.057	60.7217	55.7928	50.87934
Total feed Consumed,(kg)	2.943	3.084	2.912	2.983
Total feed cost,Php	131.83	130.167	116.20532	103.02218
Ave. chick cost,Php	43	43	43	43
Average total feed chick cost,php	174.83	173.167	159.20532	146.02218
Average return above feed and chicken cost Php	-10.64	41.0035	36.15468	52.80282

CONCLUSION AND RECOMMENDATION

Based on the foregoing findings, all level of Golden apple snail meal in the ration produced higher result than 0% were golden apple snail meal are not included in their ration in terms of different parameters such as body weight, gain in weight, growth rate, feed consumption, feed conversion ratio, feed conversion efficiency, dressing percentage with and without giblets, giblets parts, cut up parts weight. The 6% Golden apple snail meal (T2) were better among treatments followed by 18% Golden apple snail meal (T4) and 12% Golden apple snail meal (T3).The inclusion of 18% and 6% golden apple snail meal (T4 and T2) on the diet of broilers found economical in the highest return and will benefit the local broilers growers by reducing the feed cost.

In the Study of A.B Serra (1997) Feeding traits indicate that golden snail meal can be a part of chicken layer diets up to 15%.Golden snail meal can be a part of broiler chicken diet up to 12 %. Feeding fresh and ground golden apple snail to ducks can replace 50 % of their diet under total confinements system. Whereas, golden apple snail meal (75% of the diet) plus rice bran can be beneficially fed to tilapia. Golden apple snail meal is a promising animal feed in the Philippines.

RECOMMENDATION

1. Broilers fed rations with golden apple snail meal obtained the highest return above feed cost hence, recommended for broiler feed formulation is limited ranging from 6% to 18%.
2. Use of Golden Apple Snail Meal as Protein source is recommended as shown in the result it contribute to the growth, Carcass Yield and in Return Above Feed and Chick cost. Compared to controlled.
3. It is recommended that a similar study along this line be conducted during cool months of rearing and try to include fish meal to the feeding ratio
4. It is recommended for to try single face feeding using the Starter ration and Finisher ration
5. When similar study conducted the use of pelletizer is recommended for efficient feeding and better result.
6. Likewise, the use of broiler colored strain as experimental stock is recommended in order to verify the results and findings of the present study.

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