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Asian Journal of Advanced Multidisciplinary Researches

ISSN: 2782-9057

Different Levels of Powderized *Allium sativum* and Commercial Ration on Broiler Chickens (*Gallus gallus domesticus*)

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ABSTRACT

This study was conducted to achieve the following objectives: to determine the growth performance of broiler chickens fed with commercial ration mixed with different levels of garlic powder (GP); to find out if there is a significant difference among the growth performance of broiler chickens fed with commercial ration mixed with different levels of garlic powder; and, to identify which of the different levels of garlic powder will give the highest growth performance of broiler chickens. The experiment was laid-out using Complete Randomized Design (CRD) with four (4) treatments and four (4) replications. There were eight (8) cages used, each cage measured 2ft. x 8 ft. The cage had two compartments. Each compartment was placed with five (5) heads of broiler chickens. A total of eighty (80) heads of straight-run broiler cobb chicks were used in the study. The four treatments were the following (for birds aging from 11-28days): T1 (control) 100% B-meg integra 2000; T2, 20g of GP+ 980g B-meg integra 2000; T3, 25g of GP+ 975g B-meg integra 2000; and, T4 30g of GP + 970 B-meg integra 2000.The statistical analysis showed that the average final weight, average weight gain, average daily weight gain of broiler chickens in grams per replication per treatment and average feed conversion ratio of broiler chickens had no significant difference among the growth performance of broiler chickens fed with commercial ration mixed with different levels of garlic powder. Based on the results of the study, the following conclusion is drawn: There is no significant difference on the average final weight of broiler chickens in grams per replication per treatment, average weight gain of broiler chickens in grams per replication per treatment, average daily weight gain in grams per replication per treatment and average feed conversion ratio per replication per treatment. Based on the foregoing findings and conclusions the researchers advance the following recommendations: The adoption of any of the four treatments: T_1, T_2, T_3, and T_4 to obtain higher average final weight, to obtain higher average weight gain, to obtain higher average daily weight gain, to obtain lower feed conversion ratio and the adoption of any of the three treatments; T2, T3 and T4 to attain a low cost of production and a follow up study to verify the result of the study.
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Keywords : Broiler Chickens; Garlic Powder (GP); Growth Performance; *Gallus gallus domesticus*

INTRODUCTION

One alternative method to faster escalate the body weight of broilers is to ensure that feed is always available in feed tray or trough. In addition, feed formulation is necessary in achieving desired weight of Broiler Chicken.

The poultry industry is one of the major industries which are supporting nutritional need of vast population of the world. India ranks 3rd in egg production and 6th in broiler meat production across the globe which contribute significantly to agricultural production and plays a major role in providing employment opportunities (Rout et al., 2016).

The improvement in genetic make up, feed managemental practices, disease prevention, etc. has been the main factor for the relentless growth of broiler production. Owing to the progress in fields of genetics and nutritional aspects of poultry, there has been tremendous increase in broiler performance …. (Wilson, 2005).

The use of feeds for broiler chickens is unfortunately accompanied by certain ill effects like high metabolic rate, high mortality, increased body fat, metabolic and skeletal defects (Zubair and Leeson, 1996). So, feed restriction strategies have been introduced to reduce these metabolic problems and hence improve economy of broiler production.

Feed restriction in poultry farming is a method of feeding in which time or amount of nutritive feed is limited and is based on the fact whether the birds are capable of achieving similar final body weight as those fed *ad libitum* or unrestricted (Yu and Robinson, 1992). Generally, feed restriction can be done both quantitatively

(reducing daily feed offered) or qualitatively (nutrient dilution). The benefits of early feed restriction have been reported to improve feed efficiency and reduce incidents of sudden death syndrome (Bhat and Banday, 2000), ascites (Arce etal., 1992), lameness in broiler chicken (Kuhlers and McDaniel, 1996) and reduced skeletal diseases (Robinson et al., 1992). The improvement in feed efficiency in restricted chickens has been attributed to reduce overall maintenance requirements caused by transient decrease in basal metabolic rate (Rincon andLeeson, 2002).

Lipids constitute the source with highest calorific value. Besides having high caloric values, they are the major sources of essential fatty acids (Ω-3 and Ω-6), fat soluble vitamins (A, D, E and K) and lecithin. This "extra-caloric" effect of the fat comes from the-increased utilization of other dietary components. Additionally, fats facilitate absorption of fat soluble vitamins and increases taste and palatability of diet. Also, fat supplementation decreases the passage rate of food and hence increase absorption of nutrients. Also, chicks-fed diets devoid of supplemental fat had higher levels of lipogenesis and increased adipose fat deposition (Dvorinet al., 1998).

So, feed restriction and fat supplementation in poultry diet play an important role in growth performance, nutrient utilization as well as body composition of birds. There is scanty information regarding the effect of phased feed restrictions with graded fat supplementation on broiler's performance. Therefore, efforts were made to study the effect offeed restrictions with graded fat supplementation on growth performance in broiler chicken.

METHODOLOGY

The equipment used in the study were the following: Existing poultry house, brooder, cages, feeding and watering troughs, weighing scale, leg bands, knife, ball pen, record notebook, camera, tape measure, empty feed sacks, laminated sacks, newspapers and bulbs. Eighty (80) heads of Cobb broiler chicks were used in the study. Creoline was disinfectant chemical used in the study. Dextrose Powder, an immediate source of energy which was given to chick drinking water upon releasing them into the brooder. Empty feed sacks/laminated sacks were materials used as covering of the sides of the poultry house, brooder and rearing cages at nighttime and day time of bad weather. In addition, B-Meg Integra 1000 was fed to birds at day 1 up to day 10 and B-Meg Integra 2000 from day 11 up to day 28.

Sundried cloves of garlic bulbs were pounded to come up with garlic powder which was mixed with the commercial feeds for the chicks. Open tray, a shallow wide mouth tray, was also used. Selectrogen Plus, a water soluble vitamin, was given to the birds via drinking water from June 13 to July 8, 2020 every other day of the operation, and; Vitracin Gold, an antibiotic which was given to the birds infested with infectious coryza via drinking water for 1-week duration.

The existing poultry house of the College of Agriculture, Mindanao State University – Buug Campus, Datu Panas, Buug, Zamboanga Sibugay was used in the conduct of the study. The poultry house and its premises were thoroughly cleaned and disinfected with Creoline spray solution two (2) weeks before the operation started. The brooder, cages, waterers, and feeders were properly cleaned with soap and water. They were sundried and disinfected. Disinfection was done 2 weeks before the arrival of the chicks to eliminate the possible presence of microorganism that can cause disease outbreak. The poultry house was installed with LED electric light bulbs a week before the start of the operation. Laminated sacks were made ready on every side of the poultry house for protection against strong winds heavy rains and typhoon. They were rolled down during nighttime and day time of bad weather. However, they were rolled up at day time of fair weather.

A brooder measuring 3m in length and 1m in width was installed with three (3) pieces 50 watts' incandescent bulbs a week before the arrival of the chicks. Empty feed sacks were made ready in every side of the brooder which were used as covering of the brooder at nighttime to prevent entry of draft that may possibly cause respiratory trouble. Eight (8) rearing cages were used in the study. It has two compartments. Each compartment was installed with two (2) pieces of incandescent light bulbs as source of light and heat during rearing up to finishing stage. Empty feed sacks were made ready at the top and sides of the rearing cages as covering at nighttime and at day time of bad weather. Empty feed sacks were rolled down at nighttime and daytime of bad weather and rolled up at day time of fair weather.

Cloves of garlic bulb were detached from each other and they were sundried for three (3) days. The dried cloves were pounded using steel hammer and the results was strained to separate the granules for further pounding and straining until the resulting pounded granules of garlic gloves appeared powder in form. The powder was stored in a glass container ready to be mixed into the commercial feed as ration of the birds.

The study was laid out using the Complete Randomized Design (CRD) with 4 treatments. Each treatment was replicated four (4) times. Eighty (80) heads of cobb chicks were used in the study.

Treatments	Description	
	Garlic Powder	Feeds
T_1	No GP Application	1000g B-meg Integra 200
T_2	20g	980g B-meg Integra 200
T_3	25g	975g B-meg Integra 200
T_4	30g	970g B-meg Integra 200

Treatment (T), Garlic Powder (GP)

One hour before the arrival of the chicks, the floor of the brooder which measured 3m in length x 1m in width, was covered with newspapers to protect the birds from floor draft and it was then preheated to prevent the feet of the chicks from thermal shock upon releasing them into the brooder. At the arrival of the chicks, they were immediately placed into the brooder. A gallon of fresh clean water mixed with twenty grams (20 g) of dextrose powder was given to the chicks for 4 hours as an immediate source of energy. Thereafter, the drinking water was added with selectrogen plus a water-soluble vitamin to prevent the birds from deficiencies. However, the provision of selectrogen plus into the drinking water was done only every other day up to the termination date of the study for economy reason. Supply of heat by means of electric light bulbs at day time

was given to chicks as needed especially during the occurrence of inclement weather. Strict observance of electric light bulbs as a source of light and heat for the chicks was done every 5 pm to 6:30 am on the following day. The illumination that was produced by the electric light bulbs served as guide of the birds at nighttime in finding the feed and water to consume, essential in achieving their maximum growth potential. The brooder was enclosed with empty feed sacks as covering to prevent entry of draft. The empty sacks used to cover of the brooder helped in the maintenance of the optimum brooder temperature not only at nighttime but also during day time (especially of bad weather). After the first four hours provision of drinking water with dextrose powder. B-Meg Integra 1000 was given to the birds. Feeding was done always with the right amount to minimize feed wastage. After twelve hours until the second day, chicks' feeders were gradually introduced to replace the open trays used as feeders. On the third day, all feed supply was placed in the chick's feeders. However, starting on the 8th day a gradual provision of B-Meg 2000 was given by following the feeding scheme below:

No. of days	B-meg Integra 1000		B-meg Integra 2000
8th	750g	+	250g
9th	500g	+	500g
10th	250g	+	750g

B-meg Integra 2000 mixed with different levels of garlic powder was given to the birds based on recommended treatment from day eleven (11) up to day twenty-eight (28).

Incandescent electric light bulbs as source of heat and light were provided to the chicks to maximize their growth potential. Flash light was used as substitute during electric current black out. On the 11th day of operation, the weight of each bird was taken early in the morning using digital weighing scale. Numbered leg bands were placed on the left shank of each bird after each weighing for proper identification during the collection of data. At this stage, the birds were placed at the compartments in every cage. They were randomly distributed to the four (4) treatments. Each treatment was replicated four (4) times. Each replication consisted five (5) heads of birds. This was considered as the experimental phase of the study. Rearing cages were continuously lighted at night.

Clean potable water was given sufficiently and it was made available at all times to the birds. Cleaning of watering troughs were done every after used with soap and water and they were sundried to kill the possible presence of harmful organisms. Thereafter, selectrogen plus was mixed into the drinking water every other day to minimize the cost of production. The birds were provided with comfortable and clean-living quarters. Strict hygiene and sanitation had to be observed daily. Feeding troughs and watering troughs were properly cleaned every after used with soap and water and they were sundried to eliminate the possible presence of disease-causing organisms before reusing them. Manure and dirts were removed and disposed properly every early morning to avoid accumulation which can cause eye irritation of the birds due to uric acid breakdown by bacteria. Birds that exhibited symptoms of infectious coryza were placed in another compartment and they were given with vitracin gold via drinking water for a week duration which suppressed the outbreak of infection. Recovered birds from illness were placed back to their original compartment where they were taken.

Harvesting was done early morning of the day following the last day of operation. Feed supplied to them was removed at 10: 00 pm of the last day of operation. Final body weight was taken per treatment per replication. The following data were gathered for statistical analysis and interpretations: (1) Average Initial weight of broiler chicken in grams per replication per treatment. The average initial weight of broiler chickens was taken using the digital weighing scale on the 11th day upon releasing the birds into the rearing cage. The total weight of the birds per replication per treatment realizes by dividing the total numbers of the birds per replication per treatment: (2) Average final weight of broiler chickens in grams per replication per treatment. The average final weight of broiler chickens was taken using the digital weighing scale early morning of the following day of the last day of experimentation. The total weight of the birds per replication per treatment was done by dividing the number of the birds per replication per treatment: (3) Average weight gain of broiler chickens in grams per replication per treatment. The average weight gain of broiler chickens per replication per treatment was determined by subtracting initial weight from the average final weight of the birds: (4) Average daily weight gain of broiler chickens in grams per replication per treatment. The average daily weight gain of broiler chickens per replication per treatment was determined by dividing the average weight gain by the number of days from 11th-28th days (termination period): (5) Average feed conversion ratio per replication per treatment. The average feed conversion ratio of broiler chickens per replication per treatment was arrived at by dividing the average feed consumption per birds by the average weight gained.

Analysis of Variance (ANOVA) for One-Way Classification was used in the study to determine if there is a significant difference among the growth performance of broiler chickens (Gallus gallus domesticus) fed with commercial ration mixed with different levels of garlic (Allium sativum) powder.

RESULTS AND DISCUSSIONS

Average initial weight of broiler chickens in grams per replication per treatment. Table 1 presents the average initial weight of broiler chickens in grams per replication per treatment. The results show that T2 obtained the highest average initial weight of 289.45 grams, T3 with 274.8 grams, followed by T4 with 265.7 grams and the lowest average initial weight was obtained by T1 with 263.2 grams.

Average final weight of broiler chickens in grams per replication per treatment. Results revealed that T2 obtained the highest average final weight of 1404.05 grams, followed by T1 with 1396.05 grams, T3 with 1370.7 grams, and the lowest average final weight was obtained by T4 with 1307.7 (see Table 2).

Average weight gain of broiler chickens in grams per replication per treatment. Table 3 presents the average weight gain of broiler chickens in grams per replication per treatment. The results show that T1 attained the highest average weight gain with 1132.85 grams, followed by T2 with 1114.6 grams, T3 with 1095.9 grams and the lowest average weight gain was obtained by T4 with 1042 grams.

Average daily weight gain of broiler chickens in gram per replication per treatment. Results show that T1 obtained the highest average daily weight gain with 62.93 grams, followed by T¬2 with 61.92 grams, T3 with 60.88 grams, and T4 obtained the lowest average daily weight gain with 57.88 grams (see Table 4).

Average feed conversion ratio of broiler chickens per replication per treatment. Table 5 presents the average feed conversion ratio of broiler chickens per replication per treatment. The results reveal that T2 obtained the highest average feed conversion ratio of broiler chickens with 8.59, followed by T1 and T4 with 8.16, and the lowest feed conversion ratio was obtained by T3 with an average of 8.06. The lowest the value the best is the feed conversion ratio.

CONCLUSION

Based on the results of the study, the following conclusion is drawn: There is no significant difference on the average final weight, average weight gain, average daily weight gain, average feed conversion ratio of broiler chickens fed with commercial ration mixed with different levels of garlic powder.

RECOMMENDATIONS

Based on the foregoing findings and conclusion, the following recommendations are advanced: The adoption of any of the four (4) treatments to obtain higher average final weight, to obtain higher average weight gain, to obtain higher average daily weight gain, to obtain better feed conversion ratio of broiler chickens.

REFERENCES

M. Afsharmanesh, M. Lotfi and Z. Mehdipour. “Effects of wet feeding and early feed restriction on blood parameters and growth performance of broilerchickens”. Anim. Nutr. 2: 168-172.2016.

S.S. Al-Taleb. 2003. “Effect of an early feed restriction of broiler’son productive performance and carcass quality”. OnlineJ. Biolog. Sci. 3: 607-611.2003.

J. Arce, M. Berger and C.L. Coello. 1992. “Control of ascitessyndrome by feed restriction techniques”. J. Appl.Poult. Res. 1: 1-5.1992.

G.A. Bhat and M.T. Banday. “Effect of feed restrictionon the performance of broiler chickens during thewinter season”. Indian J. Poult. Sci. 35: 112-114.2000.

E. Demir, S. Sarica, A. Sekeroglu, M.A. Oczan and Y, Seker. “Effects of early and late feed restriction or feedwithdrawal on growth performance, ascites and bloodconstituents of broiler chickens”. Acta AgriculturaeScandinavica. 54: 152-158.2004.

A. Dvorin, Z. Zoref, S. Mokady and Z. Nitsan.”Nutritional aspects of hydrogenated and regularsoybean oil added to diets of broiler chickens”. Poult.Sci. 77: 820-825.1998.

U. Ewa, V. Nwakpu, P. Emeka and M. Otuma. “Effect offeed restriction on growth performance and economyof production of broiler chicks”. Anim. Res. Int. 3:513-515.2006.

ICAR. “Nutrient Requirements of Poultry”. 3rd edn. KrishiBhawan. New Delhi, India.2013.

D.L. Kuhlers and G.R. McDaniel. “Estimates of heritabilities and genetic correlations between tibial dyschondroplasia expression and body weight at twoages in broilers”. Poult. Sci. 75: 959-961.1996.

S. Mahmood, S. Mehmood, F. Ahmad, A. Masood and R. Kausar. “Effects of feed restriction during starterphase on subsequent growth performance, dressingpercentage, relative organ weights and immuneresponse of broilers”. Pak. Vet. J. 27: 137.2007.

S. Mehmood, A. W. Sahota, M. Akram, K. Javed, J. Hussain, H. Sharif. and A. S. Jatoi. “Influence of feedrestriction regimes on growth performance of broilerswith different initial weight categories”. J. Anim. PlantSci. 26: 1522-1526.2013.

A. Mirshamsollahi. “Effect of different food restrictionon performance and carcass characteristics of Arianand Ross broiler”. Int. J. Agr. Res. Rev. 3: 495-501.2013.

E. N. Nwachukwu and S. N. Ibe. “Effects of quantitativefeed restriction on broiler growth and economics ofproduction”. Nigerian J. Anim. Prod. 17: 6-10.1990.

D. J. Omosebi, O.A. Adeyemi, M. O. Sogunle, O. M. O. Idowu and C. P. Njoku. “Effects of duration and level offeed restriction on performance and meat quality ofbroiler chickens”. Arch. Zootec. 63: 611-621.2004.

S. Rahimi, S. Kamran Azad and M. A. Karimi Torshizi.”Omega-3 enrichment of broiler meat by using twooilseeds”. J. Agric. Sci. Technol. 13: 353-365.2011.

K. P. Rai, M. K. Gendley, S. P. Tiwari, T. Sahu and S. K. Naik. “Influence of post hatch dietary supplementationof fat on performance, carcass cuts and biochemicalprofile in Vencobb broiler”. Vet. World. 8: 187-191.2015.

M. U. Rincon and S. Leeson. “Quantitative andqualitative feed restriction on growth characteristicsof male broiler chickens”. Poult. Sci. 81: 679-688.2002.

F. Robinson, H. L. Clessen, J. A. Hpnson and D. K. Onderkp. “Growth performance, feed efficiency and theincidence of skeletal and metabolic disease in FA-fedand feed restricted broiler and roaster chickens”. J. Appl.Poult. Res. 1: 33-41.1992.

S. K. Rout, C. R. Pradhan. N. Rajashree Rath. Panda, B. Panigrahi and P. K. Pati. “Influence of probioticsand acidifier supplementation on growth, carcasscharacteristics and economics of feeding in broilers”.Indian J. Anim. Nutr. 33: 97-101.2016.

SAS. SAS User’s Guide: Statistics. SAS Institute Inc.USA.2000.

S. N. Saber, N. Maheri-Sis, A. Shaddel-Telli, K. Hatefinezhad, A. Gorbani and J. Yousefi. “Effect of feedrestriction on growth performance of broiler chickens”.Annals Biol. Res. 2: 247-252.2011.

E. A. Saleh, S. E. Watkins, A. L. Waldroup and P. W. Waldroup. “Effects of early quantitative feed restriction onlive performance and carcass composition of malebroilers grown for further processing”. J. Appl. Poult.Res. 14: 87-93.2005.

H. A. Shahryar, R. Salamatdoust Nobar, A. Lak and A. Lotfi. “Effect of dietary supplemented canola oil andpoultry fat on the performance and carcasscharacterizes of broiler chickens”. Current Res. J. Biol.Sci. 3: 388-392.2011.

D. L. Taylor. “Effect of maternal dietary fats andantioxidants on growth and bone development ofcommercial broilers”. Department of

Animal andPoultry Science, Michigan State University. (Cited byEI-Bahr et al., 2013. Int. J. Poult. Sci. 12: 726-734). 2000.

M. Wilson. "Production focus (In; Balancing genetics,welfare and economics in broiler production)". 1(1): 1.Publication of Cobb-Vantress, Inc. (Cited by Jang I. S.et al., 2009. Asian-Australas. J. Anim. Sci. 22: 388-395).2005.

M. W. Yu, F.E. Robinson, M. T. Clandinin and L. Bodnar "Growth and body composition of broiler chickens inresponse to different regimens of feed restriction". Poult.Sci. 69: 2074-2081.1990.

M. E. Yu and F. E. Robinson. "The application ofshort-term feed restriction to broiler chickenproduction: A review". J. Appl. Poult. Res. 1: 147-153.1992.

A. K. Zubair and S. Leeson. "Compensatory growth inthe broiler chicken: A review". World's Poult. Sci. 52:189-201.1996.

APPENDICES

Table 1.
Average Initial Weight of Broiler Chickens in Grams per Replication per Treatment

Commercial Ration Mixed with Different Levels of Garlic Powder					
	T_1	T_2	T_3	T_4	
	266.2	308	293.4	273.2	
	260	273.2	276	256.4	
	252.2	308.4	238.6	266	
	274.4	268.2	291.2	267.2	
Total	1052.8	1157.8	1099.2	1062.8	4372.6
Mean	263.2	289.45	274.8	265.7	273.28

Table 2.
Average Final Weight of Broiler Chickens in Grams per Replication per Treatment

Commercial Ration Mixed with Different Levels of Garlic Powder					
	T_1	T_2	T_3	T_4	
	1468.4	1408.4	1542.8	1370.8	
	1370.8	1275.8	1440	1310	
	1360	1592	1225	1295	
	1385	1340	1275	1255	
Total	5584.2	5616.2	5482.8	5230.8	21914
Mean	1396.05	1404.05	1370.7	1307.7	1369.62

Table 3.
Average Weight Gain of Broiler Chickens in Grams per Replication per Treatment

Commercial Ration Mixed with Different Levels of Garlic Powder					
	T_1	T_2	T_3	T_4	
	1202.2	1100.4	1249.4	1097.6	
	1110.8	1002.6	1164	1053.6	
	1107.8	1283.6	986.4	1029	
	1110.6	1071.8	983.8	987.8	
Total	4531.4	4458.4	4383.6	4168	17541.4
Mean	1132.85	1114.6	1095.9	1042	1096.33

Table 4.
Average Daily Weight Gain of Broiler Chickens in Gram per Replication per Treatment

Commercial Ration Mixed with Different Levels of Garlic Powder					
	T_1	T_2	T_3	T_4	
	66.78	61.13	69.41	60.97	
	61.71	55.7	64.66	58.53	
	61.54	71.31	54.8	57.16	
	61.7	59.54	54.65	54.87	
Total	251.73	247.68	243.52	231.53	974.46
Mean	62.93	61.92	60.88	57.88	60.90

Table 5.
Average Feed Conversion Ratio of Broiler Chickens per Replication per Treatment.

Commercial Ration Mixed with Different Levels of Garlic Powder					
	T_1	T_2	T_3	T_4	
	7.69	8.63	7.00	7.74	
	8.32	9.47	7.51	8.06	
	8.34	7.40	8.87	8.26	
	8.32	8.86	8.89	8.60	
Total	32.67	34.36	32.27	32.66	131.96
Mean	8.16	8.59	8.06	8.16	8.24