Journal of Entomology and Zoology Studies

Available online at www.entomoljournal.com

E-ISSN: 2320-7078
P-ISSN: 2349-6800
JEZS 2018; 6(6): 128-131

Received: 07-09-2018
Accepted: 09-10-2018

SB Aswar
M.V.Sc Scholar, Department of Poultry Science, Post Graduate Institute of Veterinary and Animal Sciences, Akola, Maharashtra Animal and Fishery Science University, Nagpur, Maharashtra, India

MA Gole
Department of Poultry Science, Post Graduate Institute of Veterinary and Animal Sciences, Akola, Maharashtra Animal and Fishery Science University, Nagpur, Maharashtra, India

SJ Manwar
Department of Poultry Science, Post Graduate Institute of Veterinary and Animal Sciences, Akola, Maharashtra Animal and Fishery Science University, Nagpur, Maharashtra, India

KK Khose
Department of Poultry Science, Post Graduate Institute of Veterinary and Animal Sciences, Akola, Maharashtra Animal and Fishery Science University, Nagpur, Maharashtra, India

MR Wade
Department of Poultry Science, Post Graduate Institute of Veterinary and Animal Sciences, Akola, Maharashtra Animal and Fishery Science University, Nagpur, Maharashtra, India

PS Bankar
Department of Animal Genetics and breeding, Post Graduate Institute of Veterinary and Animal Sciences, Akola, Maharashtra Animal and Fishery Science University, Nagpur, Maharashtra, India

Correspondence
SB Aswar
M.V.Sc Scholar, Department of Poultry Science, Post Graduate Institute of Veterinary and Animal Sciences, Akola, Maharashtra Animal and Fishery Science University, Nagpur, Maharashtra, India

Effect of feeding moong dal waste with enzyme supplementation on growth performance of broiler chicken

SB Aswar, MA Gole, SJ Manwar, KK Khose, MR Wade and PS Bankar

Abstract
The present experiment was conducted on 240 day-old broiler to evaluate effect of moong dal waste with enzyme supplementation on growth performance of broiler. They were equally and randomly distributed in to 4 treatments having three replicates of 20 birds. The birds in control group (A) offered basal diet. The birds in dietary treatment groups B, C and D offered diet with moong dal waste at 5%, 10% and 15% level with enzyme, respectively. At the end of study, the broilers chicken fed with the 15% moong dal waste with enzyme recorded significantly higher body weight than control and all other groups. The birds in group D fed with 15% moong dal waste with enzyme showed significantly higher cumulative weight gain as compared to other groups. At end, groups receiving moong dal waste with enzyme showed numerically better cumulative feed conversion ratio as compared to control group. The overall results indicated that, the 15% moong dal waste with enzyme resulted in increased live body weights (16.60%) over control. Hence, it may be concluded that inclusion of 15% moong dal waste with enzyme can be incorporated in the broiler diet for optimum growth performance in broilers.

Key words: Broilers, moong dal waste, enzyme, performance

Introduction
Feed constitutes 60 to 70 per cent of the total cost of production in poultry production. To reduce the total cost of production, attempt should be made to reduce the feed cost. Maize and soybean meal are popularly used by poultry farmers as a sources of energy and vegetable protein, respectively. The cost of this feed ingredient is steeply increasing. It is therefore essential to provide alternative source for each of these ingredients. Protein sources of inb poultry feed are costly and they constitute about 30-35% of their diet. Continuous use of soybean as major source of protein in poultry feed leading to shortage of this and consequently high-cost of poultry feeds [1]. Hence, there is definitely scope to utilize locally available materials for economic production of broilers.

Moong bean waste is a by-product product during the processing of moong for human consumption, containing broken pieces of endosperm including germ and a very small portion of husk [2]. Moong bean bran is a good source of protein (19-23%). The Moong dal waste contained 22.22, 23.85, 1.09, 49.28 and 3.56%, respectively of CP, EE, CF, NFE and total ash [3]. Moong bean waste contains less fiber% than moong bean chuni. The nutritive value of moong bean lies in its high protein content and protein digestibility. Moong beans contain approximately 25–28% protein, 1.0% ether extract, 3.5–4.5% fiber, 4.5–5.5% ash and 62–65% carbohydrates [4]. Moong bean contain protein, fat, carbohydrates, vitamins B1 and B2, carotene, niacin, folic acid, also contains minerals calcium phosphorus, iron, etc. [5]

Poultry is having lack fiber degrading enzyme for breakdown of complex carbohydrates. Since, the complex carbohydrate (like cellulose, hemicellulose and lignin) is a major component of fibrous by-products. Hence, there is need to find ways for improvement in the utilization of these fibrous materials. Definitely, adding the enzymes in the poultry feed can help in digestion of complex carbohydrates. There is rising demand for conventional feed ingredients for feeding of poultry. Hence, it is necessary search for an alternative feed source has become expected to reduce the feed cost [6]. In view of the above facts the present investigation was planned to study the effect of feeding moong dal waste with enzyme supplementation on performance of broiler chicken.

Materials and Methods

Experimental Design and Management

The experiment was carried out on 240, commercial day old broiler chicks of *'Vencobb 400'* strain for a period of 42 days. The experimental birds were randomly assigned to 4 treatment groups A, B, C and D with 60 birds in each treatment group having 3 replicates of 20 birds each. The birds in control group (A) offered basal diet adequate in all nutrients as per BIS, 2007 [7]. The birds in dietary treatment groups B, C and D were offered diets containing moong dal waste at 5, 10 and 15% level with enzyme at recommended dose 400 g/ton of feed, respectively. The standard and uniform managemental practices were followed for all treatment groups throughout the experimental period. The birds were offered *ad-lib* fresh and clean drinking water throughout the experiment. The nutritional composition of moong dal waste was carried out and presented in Table 1.

Table 1: Nutrient composition of moong dal waste

Nutrients	Availability
Moisture,%	8.43
Protein,%	21.76
Fat,%	1.26
Fiber,%	2.24
ME, kcal/kg	2600

Data Collection

Data was collected on the basis of weekly weight changes. The weekly live weight gain was calculated from the difference in body weight attained at the end of week and the start of week. Weekly feed consumption was calculated by the amount of feed consumed by each group in a week. The average feed consumption was calculated from the total feed offered substracting left over feed. Weekly feed conversion ratio was calculated by dividing the average weekly feed intake by average weekly weight gain taking into consideration mortality if any.

Table 2: Ingredient and nutrient composition of various rations containing moong dal waste at different levels

Ingredients	Pre-starter				Starter				Finisher			
	A	B	C	D	A	B	C	D	A	B	C	D
Maize	52.18	48.40	44.62	40.84	53.34	49.56	45.78	42.00	57.83	54.05	50.27	46.49
Soybean Meal	40.70	39.04	37.38	35.72	38.20	36.54	34.88	33.22	32.90	31.24	29.58	27.92
Moong dal waste	0.00	5.00	10.00	15.00	0.00	5.00	10.00	15.00	0.00	5.00	10.00	15.00
Vegetable Oil	3.10	3.50	3.90	4.30	4.40	4.80	5.20	5.60	5.25	5.65	6.05	6.45
Dicalcium Phosphate (DCP)	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
Limestone Powder (LSP)	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
Salt (Nacl)	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Trace Mineral Premix	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Vitamin Premix	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
DL-Methionine	0.15	0.16	0.17	0.18	0.18	0.19	0.20	0.21	0.15	0.16	0.17	0.18
L-Lysine	0.02	0.05	0.08	0.11	0.03	0.06	0.09	0.12	0.02	0.05	0.08	0.11
Choline Chloride 60%	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Toxin Binder	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Coccidiostat	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Sodium Bicarbonate	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Nutrient composition												
ME (Kcal/kg)	3003.83	3003.36	3002.89	3002.42	3099.69	3099.22	3098.75	3098.28	3199.41	3198.94	3198.47	3198.00
Crude Protein (%)	23.01	23.01	23.01	23.01	21.99	21.99	21.99	21.99	20.01	20.01	20.01	20.01
Ether Extract (%)	5.48	5.78	6.07	6.37	6.80	7.09	7.38	7.68	7.77	8.07	8.36	8.66
Crude Fiber (%)	4.21	4.10	3.99	3.88	4.08	3.97	3.86	3.76	3.87	3.76	3.65	3.55
Calcium (%)	1.01	1.03	1.04	1.05	1.00	1.02	1.03	1.04	0.98	1.00	1.01	1.02
Total Phosphorus (%)	0.70	0.69	0.69	0.69	0.69	0.68	0.68	0.67	0.67	0.66	0.66	0.65
Total Lysine (%)	1.28	1.28	1.29	1.29	1.22	1.23	1.23	1.24	1.08	1.08	1.09	1.09
Total Methionine (%)	0.50	0.50	0.50	0.50	0.51	0.51	0.51	0.51	0.46	0.46	0.46	0.46

Statistical Analysis

All the generated data was subjected to statistical analysis by using Complete Randomized Design by Snedecor and Cochran [8]. The treatment means were compared by Critical Differences (CD) and Analysis of Variance.

Results and Discussion

Live Body Weight and Weight Gain

The live body weight and cumulative weight gain showed significant ($P<0.01$) differences among the treatment groups (Table 3, 4). At the age of 6th week, live body weight, cumulative weight gain showed significantly ($P<0.05$) higher in group receiving 15% moong dal waste with enzyme as compared to other groups. However, the differences between control and other treatment groups A, B and C where statistically ($P>0.05$) non-significant. Rizwanuddin [9] has reported significant improvement in live body weight of birds fed with 10% toor dal waste with enzyme supplementation. Bharthidhasan *et al.* [10]. reported that birds fed with enzyme 750 g/ton in feed and 1000 g/ton showed significantly higher body weight over control. Similarly, Lodebo [11] reported that birds grown on moong bean have non-significantly higher live

weight than those on control diet. Murwani [12] recorded body weight gain of corn-moong bean based diet was nearly same as the body weight of broilers fed commercial diets. Singh *et al.* [13] observed that the weight gain during (0-35day) was significantly higher in sprouted moong bean supplemented groups as compared to control groups. Creswell *et al.* [14] studied the raw and boiled moong bean replacing soybean meal at graded level at 20% and 40% in corn based diet where they observed that weight gain of birds fed with moong bean diet was similar to birds of control group. Brenes *et al.* [15] observed that addition of crude enzyme (100mg/kg) to wheat and barley diets improved the weight gain of broilers by 13 and 9%, respectively. Similarly, Kavitha Rani *et al.* [16] reported that supplementing multienzyme in corn-soy based diet to broilers increased the body weight in enzyme treated groups.

Table 3: Average weekly live body weight (g/b) of broilers fed with different levels of moong dal waste with enzyme

Treatments	Age (weeks)						
	Day-old	1st	2nd	3rd	4th	5th	6th
A	47.48 ± 0.68	154.28 ± 5.46	391.27 ± 11.00	657.95 ± 18.20 ^{c}	1036.56 ± 36.27 ^{c}	1368.25 ± 12.83 ^{c}	1807.39 ± 28.84^{b}
B	47.07 ± 0.74	152.60 ± 0.92	385.53 ± 9.37	730.03 ± 15.66 ^{b}	1127.20 ± 30.39^{bc}	1539.82 ± 21.19^{b}	1942.32 ± 34.95 ^{b}
C	47.67 ± 0.86	147.38 ± 3.25	370.77 ± 14.74	674.45 ± 9.15 ^{bc}	1139.95 ± 9.25 ^{ab}	1519.98 ± 44.65 ^{b}	1926.80 ± 66.43 ^{b}
D	47.32 ± 0.47	154.33 ± 2.78	380.65 ± 17.03	807.45 ± 25.39 ^{a}	1224.99 ± 33.50 ^{a}	1636.54 ± 23.48 ^{a}	2107.40 ± 54.23 ^{a}
CD	NS	NS	NS	58.911	95.733	91.636	158.146
CV%	2.569	3.983	6.067	4.361	4.491	3.210	4.316

Note: Means with different superscripts within the column differ significantly

Table 4: Average weekly cumulative weight gain (g/b) of broilers fed different levels of moong dal waste with enzyme

Treatments	Age (weeks)					
	1st	2nd	3rd	4th	5th	6th
A	106.80 ± 4.98	343.78 ± 10.47	610.47 ± 18.00 ^{c}	989.08 ± 35.86 ^{c}	1320.76 ± 12.24^{c}	1759.90 ± 28.19 ^{b}
B	105.53 ± 1.10	338.47 ± 9.58	682.97 ± 16.08 ^{b}	1080.13 ± 30.96 ^{bc}	1492.75 ± 21.14 ^{b}	1895.25 ± 35.62 ^{b}
C	99.72 ± 2.39	323.10 ± 13.94	626.78 ± 8.97 ^{bc}	1092.29 ± 10.00 ^{ab}	1472.31 ± 44.12 ^{b}	1879.14 ± 66.24 ^{b}
D	107.02 ± 3.23	333.33 ± 17.44	760.13 ± 25.55 ^{a}	1177.67 ± 33.71 ^{a}	1589.23 ± 23.90 ^{a}	2060.08 ± 54.63 ^{a}
CD	NS	NS	59.156	96.198	90.996	158.386
CV%	5.363	6.846	4.689	4.710	3.290	4.431

Note: Means with different superscripts within the column differ significantly

Feed Intake

Average cumulative feed consumption (g/b) of broilers fed with different levels of moong dal waste with enzyme showed in Table 5. At the end of 6th week of age, the statistical analysis showed non-significant differences among treatment groups. The birds from treatment group D receiving diet containing 15% moong dal waste showed numerically higher cumulative feed consumption. The mean cumulative feed consumption in this week showed non-significant differences among different treatment groups. Reduce body weight therefore was a consequence of reduce feed intake, as body weight was a reflection of muscle or protein synthesis in broilers. All factors affecting reduced feed consumption and apply for reduce body weight. The birds from treatment group D receiving diet containing 15% moong dal waste showed numerically higher cumulative feed consumption.

Khan *et al.* [17] also reported that birds fed with enzyme supplemented diet recorded higher feed intake than non-enzyme supplemented groups. Singh *et al.* [13] also observed feed intake significantly higher in sprouted moong bean supplemented groups. Bharthidhasan *et al.* [10] also reported that in 250g enzyme supplemented group recorded significant increase in feed intake over other groups. Rizwanuddin [9] also recorded significant increase in feed consumption in the birds supplemented with 10% toor dal waste among all other dietary treatments.

Table 5: Average cumulative feed consumption (g/b) of broilers fed with different levels of moong dal waste with enzyme

Treatments	Age (weeks)					
	1st	2nd	3rd	4th	5th	6th
A	125.43 ± 7.38	458.10 ± 13.02	900.78 ± 20.24 ^{bc}	1598.66 ± 35.66	2282.423 ± 50.68	3199.13 ± 82.61
B	133.133 ± 1.29	453.78 ± 5.82	960.35 ± 21.63 ^{ab}	1592.12 ± 11.03	2355.383 ± 4.36	3253.836 ± 23.30
C	141.850 ± 3.65	454.03 ± 7.52	884.33 ± 31.82 ^{c}	1610.22 ± 54.66	2334.436 ± 64.64	3255.643 ± 89.06
D	142.933 ± 3.49	455.28 ± 0.93	1025.03 ± 3.46 ^{a}	1717.70 ± 6.65	2456.796 ± 24.74	3514.843 ± 77.98
CD	NS	NS	71.115	NS	NS	NS
CV%	5.764	3.071	4.007	3.535	3.156	3.830

Note: Means with different superscripts within the column differ significantly

Feed Conversion Ratio (FCR)

The weekly feed conversion ratio was numerically better in birds receiving diet with 15% moong dal waste with enzyme has been observed from Table 6. The analysis of variance for cumulative feed conversion ratio showed non-significant differences among all treatment groups. The numerically better cumulative feed conversion ratio was observed in treatment group D receiving 15% moong dal waste. Interestingly, groups receiving moong dal waste with enzyme showed numerically better feed conversion ratio as compared to control group. The better cumulative feed conversion ratio is observed in group receiving 15% moong dal waste with enzyme, whereas control group showed poor weekly feed conversion ratio. Thus, the results showed that moong dal waste supplemented groups showed better feed conversion ratio. Similarly, Rizwanuddin *et al.* [9] observed that birds fed with 10% toor dal waste with enzyme found significantly better feed conversion ratio as compared to control and other

treatment groups. Arif *et al.* [18] studied the effect of different processing methods of pigeonpea on growth performance of broilers and observed the feed conversion ratio was significantly affected by dietary treatments. Bharthidhasan and Gnanaraj [3] who reported that inclusion of moong dal waste up to 40% in desi chicken yielded comparable feed conversion ratio to control. Arce *et al.* [19] reported that DDGS and enzyme mixture supplemented group showed no significant effect on feed conversion ratio.

Table 6: Average cumulative feed conversion ratio of broilers fed with different levels of moong dal waste with enzyme

Treatments	Age (weeks)					
	1st	2nd	3rd	4th	5th	6th
A	1.17 ± 0.02 c	1.34 ± 0.02	1.48 ± 0.02	1.62 ± 0.02	1.73 ± 0.03 a	1.82 ± 0.03
B	1.26 ± 0. 01 bc	1.34 ± 0.02	1.41 ± 0.02	1.48 ± 0.03	1.58 ± 0.02 b	1.72 ± 0.04
C	1.42 ± 0.04 a	1.41 ± 0.04	1.41 ± 0.03	1.47 ± 0.05	1.59 ± 0.01 b	1.73 ± 0.03
D	1.34 ± 0.06 ab	1.37 ± 0.07	1.35 ± 0.04	1.46 ± 0.04	1.55 ± 0.02 b	1.71 ± 0.06
CD	0.125	NS	NS	NS	0.064	NS
CV%	5.102	5.469	3.662	4.545	2.106	4.178

Note: Means with different superscripts within the column differ significantly

Conclusion

Thus, the overall results revealed that, the 15% moong dal waste with enzyme supplementation resulted in increased live body weights (16.60%) over control. Hence it can concluded that, 15% moong dal waste with enzyme can be incorporated in the broiler diet to get better production performance in broilers and to increase the profit margin for the poultry farmers.

References

1. Abubakar A, Sekoni AA, Tukur HM, Hassan WA. Impact of yeast supplementation on the growth performance of pullet chicks fed diets with high levels of rice bran. Proceeding of the 29th Annual Conference of the Nigeria Society for Animal production (NSAP), Sokoto, Nigeria, 2004, 1265-267.
2. Vaidya SV. The Indian Feed Industry. AGRIPPA, FAO, Rome, 2001.
3. Bharathidhasan A, Gnanaraj PT. Feeding of moong dal waste on growth performance, feed intake, feed efficiency and cost effectiveness in growing desi chicken. An abstract, in compendium IPSA conf, held during 28th to 30th Nov.2017 at Banglore, 2017, 93.
4. FAO, Pulses and their by-products as animal feed. FAO (Food and Agricultural Organization) Rome, 2017.
5. Anonym, Optimizing Your Diet: Best Foods for Specific Vitamins, 2013. Web.mit.edu.
6. Swain BK, Naik PK, Singh NP. Unconventional feed resources for efficient poultry production. Technical bulletin. ICAR - ICAR research complex for Goa, 2014, 47.
7. BIS, Bureau of Indian Standards, Poultry Feeds Specification (5th Revision), IS: 1374, Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi-11, 2007.
8. Snedecor GW, Cochran WG. Statistical Methods. 6th Edn IOWA State University Press, Ames, lowa, USA, 1994.
9. Rizwanuddin MQ. Utilization of Toor dal waste with or without enzyme in Broiler Chicken Diet. M.V.Sc. thesis submitted to Maharashtra Animal and Fishery Sciences University, Nagpur, 2013.
10. Bharathidhasan A, Chandrasekaran D, Natarajan A, Ravi R, Ezhilvalavan S. Effect of enzyme supplementation to nutrient reduced diet on performance of broilers. Tamilnadu Journal Veterinary & Animal Sciences. 2010; 6(4):174-178
11. Lodebo. Beriso Effects of dietary inclusion of chickpeas or mung beans on the performance of male broiler chicks, 2016 http://cat.lib.unimelb.edu.au
12. Murwani R. Effect of Mung bean as Local Feed Ingredients to Substitute Soybean Meal in the Diet on the Performance of Broilers the 1st International Seminar on Animal Industry Bogor, 2009, 23-24.
13. Singh VS, Palod J, Vatsya S, Kumar RR, Shukla SK. Effect of sprouted mung bean (*Vigna radiata*) supplementation on performance of broilers during mixed *Eimeria* species infection. Veterinary Research International Journal. 2013; 1(2):41-45.
14. Creswell C David. Nutritional Evaluation of Mung Beans (*Phaseolus aureus*) for Young Broiler Chickens. Poultry Science. 1981; 60:1905-1909.
15. Brenes A, Smith M, Guenter W, Marquardt RR. Effect of enzyme supplementation on the performance and digestive tract size of broiler chickens fed wheat and barley based diets. Poultry Science, 1993; 72:1731-1739.
16. Kavitha RB, Desai J, Reddy D, Radhakrishna PM. Effect of supplementation of enzymes for non-starch polysaccharides in corn soya diet in broilers. Indian Journal Animal Nutrition. 2003; 20:63-69
17. Khan SH, Sardar R, Siddique B. Influence of Enzymes on Performance of broilers fed sunflower and corn based diets. Pakistan Veterinary Journal. 2006; 26(3):109-114.
18. Arif A, Rehman A, Saeed M, El-Hack MEA, Alagawany A, Abbas H, *et al*. Effect of different processing methods of pigeon pea (*Cajanus cajan*) on growth performance, carcass traits, and blood biochemical and hematological parameters of broiler chickens. Turkish Journal of Veterinary Animal Science, 2016, 40.
19. Arce J, Avila E, Rosales E, Charraga S, Fernández SR. Effect of adding protease and xylanase feed enzymes activities on broilers fed corn-SBM-DDGS diets. International Poultry Science, Atlanta. US. T108, 2010.
20. AOAC, Official Methods of Analysis. 16th edn. Association of Official Analytical Chemists. Arlington, Virginia, USA, 2013.