



E-ISSN: 2278-4136  
P-ISSN: 2349-8234  
JPP 2018; 7(6): 762-764  
Received: 18-09-2018  
Accepted: 19-10-2018

**SB Aswar**

Department of Poultry Science,  
Post Graduate Institute of  
Veterinary and Animal Sciences,  
Maharashtra Animal and Fishery  
Science University, Nagpur Krishi  
Nagar, Murtizapur Road, Akola,  
Maharashtra, India

**MA Gole**

Department of Poultry Science,  
Post Graduate Institute of  
Veterinary and Animal Sciences,  
Maharashtra Animal and Fishery  
Science University, Nagpur Krishi  
Nagar, Murtizapur Road, Akola,  
Maharashtra, India

**SJ Manwar**

Department of Poultry Science,  
Post Graduate Institute of  
Veterinary and Animal Sciences,  
Maharashtra Animal and Fishery  
Science University, Nagpur Krishi  
Nagar, Murtizapur Road, Akola,  
Maharashtra, India

**KK Khose**

Department of Poultry Science,  
Post Graduate Institute of  
Veterinary and Animal Sciences,  
Maharashtra Animal and Fishery  
Science University, Nagpur Krishi  
Nagar, Murtizapur Road, Akola,  
Maharashtra, India

**Dr. MR Wade**

Department of Poultry Science,  
Post Graduate Institute of  
Veterinary and Animal Sciences,  
Maharashtra Animal and Fishery  
Science University, Nagpur Krishi  
Nagar, Murtizapur Road, Akola,  
Maharashtra, India

**PS Bankar**

Department of Animal Genetics  
and Breeding Post Graduate  
Institute of Veterinary and Animal  
Sciences, Maharashtra Animal and  
Fishery Science University,  
Nagpur Krishi Nagar, Murtizapur  
Road, Akola, Maharashtra, India

**Correspondence****SB Aswar**

Department of Poultry Science,  
Post Graduate Institute of  
Veterinary and Animal Sciences,  
Maharashtra Animal and Fishery  
Science University, Nagpur Krishi  
Nagar, Murtizapur Road, Akola,  
Maharashtra, India Krishi Nagar,  
Murtizapur Road, Akola,  
Maharashtra, India

## Effect of feeding moong dal waste with enzyme supplementation on immune response and nutrient utilization in broilers

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

**Abstract**

The present experiment was conducted on 240 straight run day-old broiler chicks of 'Vencobb 400' strain from 0-42 days. The chicks were randomly distributed in to four treatment groups. Each treatment had three replicates with 20 birds in each. The birds in control group (A) offered basal diet adequate in all nutrients as per BIS (2007). The birds in dietary treatment groups B, C and D were offered diet with moong dal waste at 5%, 10% and 15% level with enzyme, @ 400g/ ton of feed, respectively. All the diets were iso-caloric and iso-nitrogenous. The differences in HI titer for ND on 21<sup>st</sup> and 42<sup>nd</sup> day were found to be non-significant among all the treatment groups. However, numerically higher titer value was observed in group D receiving 15% moong dal waste with enzyme compared to control group A and other dietary treatment groups. The highest percent nitrogen retention was observed in treatment group D receiving 15% moong dal waste with enzyme as compared to all treatment groups. The results indicated that, the 15% moong dal waste with enzyme was found to be better in nutrient utilization over control and better in immune response in broiler chicken.

**Keywords:** Moong dal waste, enzyme, nutrient utilization, immune response, broilers

**Introduction**

In poultry industry, feed alone accounts for 70% of the total cost. The sources of protein for poultry feed are expensive and they constitute about 30-35% of their diet. The over dependence on the use of soybean as major source of protein in poultry feed has led to competition with man for this ingredient and consequently high-cost of poultry feeds [1]. There is challenge for nutritionists to exploit alternative protein feedstuffs that are locally available, relatively cheaper and can meet the nutrient requirements of poultry. The moong bean (*Vigna radiata* (L.) R. Wilczek) alternatively known as green gram. In India, moong bean is grown on about 3.70 million ha with annual production of 1.57 million tones [12]. India is the largest producer of moong bean and accounts for 54% of world production and 65% of World area under cultivation [7]. 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 [14]. 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 [11]. Various anti-nutritional factors such as trypsin inhibitors, chymotrypsin inhibitor, tannins and lectins are present in moong bean. Enzyme supplementation can break down anti-nutritional substances found in feed raw materials, thus augmenting the digestive capacity of the animal, improving availability of the feed nutrients, and increasing release of nutrients in the upper part of the gastrointestinal tract [4]. In view of the above facts the present investigation was planned to study the effect of feeding moong dal waste with enzyme supplementation on immune response and nutrient utilization in broiler chickens.

**Materials and methods****Experimental design and management of birds**

The experiment was carried out on 240 straight run Vencobb 400 day old broiler chicks for a period of 42 days. The experimental broilers chicks were allotted 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. The birds in dietary treatment groups B, C and D offered diet containing 5%, 10% and 15% moong dal waste with supplementation of enzyme (Ronozyme Max Act (GT), DSM, Mumbai) at recommended dose 400 g/ton of feed, respectively. The standard and uniform managerial practices were followed for all treatment groups during the experimental period.

The birds were offered *ad-lib* fresh and clean drinking water throughout the experiment. The immunization against Ranikhet Disease (B1 strain) and Infectious Bursal Disease (IBD Intermediate strain) vaccination was carried out on 7th and 14th day, respectively, followed by booster doses on 21st day and 28th day through drinking water.

### Procurement of ingredients

The feed ingredients of ration i.e. Maize, Soybean, Dicalcium phosphate, limestone powder, Toxin binder, Coccidiostat, Choline chloride, Vitamin premix, trace minerals, synthetic lysine and methionine and salt were procured from M/s. Shree Krupa poultry Feed, F-38, M.I.D.C., Amravati. The moong dal waste purchased from dal mill of Akola. Soybean oil is purchase from local market. Moong dal waste was subjected to chemical analysis in the laboratory of IPMT, Uralikanchan, Pune. On the basis of chemical analysis the ration were formulated for pre-starter, starter and finisher diet. The deficient amino acids were balanced by adding synthetic amino acids. The enzyme (Ronozyme Pro Act GT) was procured from M/s. DSM, Nutritional Products India Pvt. Ltd., Mumbai-400 098, Maharashtra, India. The rations were formulated as per BIS (2007) for pre-starter, starter and finisher phases. All the diets were isocaloric and iso-nitrogenous.

### Data Collection

The birds under the experimental trials were assessed for the antibody titer against the New Castle Disease (ND). Two birds from each replicate and a total of six birds from each treatment group were randomly selected for the blood collection at the end of 3rd and 6th week of age. The blood samples were collected from wing vein from each bird. The serum was separated by centrifugation at 3000 RPM for 20 minutes and decanted into clean, sterile plastic vials and stored under deep freeze at  $-18^{\circ}$  to  $-20^{\circ}$  °C. These serum samples were used for Haemagglutination Inhibition (HI) test to detect the antibody titer against New Castle by Beta procedure [2]. This was performed to evaluate, the humoral immune response of bird to viral antigen (NCDV Lasota strain) by beta procedure (constant virus diluted serum), utilizing 4HA unit of Lasota virus. The HA unit of NCDV (Lasota strain) were determined by the standard procedure by using micro HA- HI plate. The obtained ND titres were transformed to  $\text{Log}_2$  values prior to statistical analysis.

A metabolic trial will be conducted for three consecutive days at the end of 6th week of experiment. For metabolic trial two birds from each replicate and six birds from each treatment group will be taken randomly and caged individually giving pre-experimental period of two days. During metabolic trial, record of feed offered, leftover will be maintained on daily basis. A representative sample of feed offered, leftover on everyday will be collected for dry matter determination. All the excreta from each group will collected on polythene sheet over a period of 24 hours. A representative sample (1/10) of

excreta will be taken for nitrogen estimation in 10%  $\text{H}_2\text{SO}_4$  solution to avoid the nitrogen loss. The excreta collected from each group will be oven dried at  $80^{\circ}$  °C for 72 hours till the constant weight for dry matter determination. The dried samples of three consecutive days will be pulled and then thoroughly mixed, powdered and used for nitrogen analysis as per [3].

### Statistical Analysis

The differences among treatment groups were determined by analyzing the data generated, by using Completely Randomized Design [13].

### Results and Discussion

#### Immune Response

The antibody titer against Newcastle Disease  $\text{log}_2$  values at 3rd and 6th week of age in broilers fed with different levels of moong dal waste with enzyme was presented in (Table 3). At the end of 3rd and 6th week of age the antibody titer values where numerically higher in treatment groups D receiving diet 15% moong dal waste with enzyme as compared to control group and other treatment groups.

**Table 1:** Antibody titers against ND ( $\text{log}_2$  values) of 3rd and 6th week of age in broilers fed with different levels of moong dal waste with enzyme

Treatment Groups	3 <sup>rd</sup> week	6 <sup>th</sup> week
A	5.17 ± 0.48	3.33 ± 0.84
B	5.33 ± 0.42	4.00 ± 0.82
C	5.33 ± 0.49	4.00 ± 0.58
D	5.67 ± 0.49	4.17 ± 0.70
CD	NS	NS
CV%	21.550	46.939

NS – non significant

The statistical analysis for antibody titer for ND at 3rd and 6th week of age showed non-significant ( $P > 0.05$ ) differences in all treatment groups. The higher mean value of HI titer was observed in all moong dal waste supplemented groups. The present findings are in accordance with [10] who reported significantly higher ( $P < 0.05$ ) antibody titer in 10% pigeon pea supplemented group. These results are in line with the study reported numerically higher antibody titer value in treatment groups receiving diet at 5 and 10% DDGS with or without enzyme as compared to control group [8]. Similarly corn-moong bean based diet showed higher titres against NDV vaccine as compared to corn- soybean meal based diet [9].

#### Nutrient Utilization

The analysis of variance for the nutrient utilization in broilers showed non-significant ( $P < 0.05$ ) differences among all treatment groups (Table 4). There was a non-significant difference for dry matter intake, dry matter excreted, nitrogen intake, nitrogen excreted, nitrogen retention and DMM in all treatment groups.

**Table 2:** Nutrient utilization in broilers fed with different levels of moong dal waste with enzyme

Particulars	Treatment groups				CD	CV%
	A	B	C	D		
Dry matter intake (g/bird/day)	89.68 ± 7.82	80.46 ± 3.99	80.07 ± 4.14	83.16 ± 5.82	NS	16.632
Dry matter excreted (g/bird/day)	34.87 ± 1.40	34.06 ± 0.87	34.11 ± 0.68	33.74 ± 2.19	NS	10.127
Nitrogen intake (g/bird/day)	2.94 ± 0.26	2.74 ± 0.14	2.69 ± 0.14	2.80 ± 0.20	NS	16.494
Nitrogen excreted (g/bird/day)	1.02 ± 0.09	0.94 ± 0.06	0.92 ± 0.05	0.96 ± 0.11	NS	20.857
Nitrogen retention (%)	65.13 ± 1.40	65.94 ± 0.87	65.89 ± 0.68	66.26 ± 2.19	NS	5.262
Dry matter metabolizability (DMM) (%)	69.97 ± 1.68	70.15 ± 1.39	72.27 ± 1.94	70.94 ± 1.38	NS	5.594

NS- non significant

This result indicated that from overall protein content in from vegetable protein either soybean meal or moong bean provided similar digestibility. The highest percent nitrogen retention was observed in treatment group D receiving 15% moong dal waste with enzyme followed by treatment group B receiving diet having 5% moong dal waste with enzyme as compared to all treatment groups but the difference was statistically non-significant in all treatment groups. The present findings are in accordance with study [8] reported that, groups with enzyme supplementation with of 5 and 10% corn DDGS showed numerically improved nitrogen retention as compared to control group but the differences are non-significant. It was also observed that supplementation of 10 and 15% toor dal waste with enzyme showed numerically higher % nitrogen retention as compared to other groups [10].

### Conclusion

The results of the present experiment suggested that the inclusion of moong dal waste up to 15% levels in broiler diets with enzyme was found to be beneficial in terms of immune response and nutrient utilization in broiler chickens.

### Acknowledgements

The authors are highly grateful to Director of Research, MAFSU, Nagpur and Associate Dean, Post Graduate Institute of Veterinary and Animal Sciences, Akola for providing necessary facilities and for his help at various stages of the experiment. The authors are also thankful to M/s. DSM, Nutritional Products India Pvt. Ltd., Mumbai, Maharashtra, India for providing the enzyme preparation

### 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 29<sup>th</sup> Annual Conference of the Nigeria Society for Animal production (NSAP), Sokoto, Nigeria, 2004, 1265-267.
2. Allan WH, Lancaster JE, Toth B. Newcastle Disease Vaccines. FAO, Rome, Italy, 1978.
3. AOAC. Official Methods of Analysis. 16th edn. Association of Official Analytical Chemists. Arlington, Virginia, USA, 2013.
4. Bedford MR, Cowieson AJ. Exogenous enzymes and their effects on intestinal microbiology. *Anim. Feed Sci. Technol.* 2012; 173:76-85.
5. BIS, Bureau of Indian Standards, Poultry Feeds Specification (5th Revision). IS: 1374, Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi-11, 2007.
6. Department of Agriculture, Forestry and Fisheries (DAF and F) Mung bean production guideline. Republic of South Africa, 2010.
7. GOI. Department of Agriculture and Co-operation) Agricultural Statistics at Glance, 2017.
8. Khose KK, Manwar SJ, Dhore RN, Kuralkar SV, Waghmare SP. Effect of feeding of corn distillers dried grains with solubles and enzyme supplementation on immune response and nutrient utilization. *Inter. J of Sci, Env and Tech.* 2017; 6(6):3460-3468.
9. Murwani R. Effect of Corn or Sorghum in combination with soybean meal or Mung Bean on the Titre Antibody to NDV vaccine in Broiler Chickens. *International Journal of Poultry Sci.* 2008; 7(5):497-501.
10. 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.

11. Sharasia PL, Garg MR, Bhandari BM. Pulses and their by-products as animal feed. Rome, FAO (Food and Agricultural Organization), 2017.
12. Sharma OP, Bambawale OM, Gopali JB, Bhagat S, Yelshetty S, Singh SK, *et al.* Field guide: Mung bean and Urd bean. Government of India, Department of Agriculture and Co-operation, NCIPM, ICAR, New Delhi, India, 2011.
13. Snedecor GW, Cochran WG. *Statistical Methods.* 6th Edn IOWA State University Press, Ames, Iowa, USA, 1994.
14. Vaidya SV. *The Indian Feed Industry.* AGRIPPA, FAO Rome, 2001.