



SHORT COMMUNICATION

Replacement of Maize by other Cereals on Performance of Pratapdhan Chicks

C.M. Yadav* and H.L. Bugalia

Krishi Vigyan Kendra, Bhilwara, Maharana Pratap University of Agriculture and Technology,
Udaipur-313001, Rajasthan, India

ABSTRACT

An experiment was conducted to study the effect of replacing maize quantitatively at 50 per cent level with broken rice, bajra, jowar or barley in isocaloric and isonitrogenous ration on day-old Pratapdhan chicks. Two hundred and fifty day-old unsexed Pratapdhan chicks were randomly divided into 5 equal groups, each group was sub-divided into five groups for 8 weeks. Significantly higher body weight and weight gain was observed in broken rice fed groups as compared to other treatments groups. Body weight and weight gain of maize, broken rice and bajra fed groups were significantly higher as compared to jowar and barley fed groups. The FCR at 8 weeks of age in different treatments ranged from 3.01 to 3.09 and differences were statistically non-significant. Apparent dry matter digestibility was 50.75, 54.44, 52.82, 51.15 and 52.44%, protein efficiency ratio was 1.27, 1.21, 1.26, 1.21 and 1.28, and efficiency of energy utilization was 9.56, 9.35, 9.25, 9.85 and 9.58 kcal/g weight gain, in the five respective groups. Feed cost per unit gain of body weight was minimum (₹ 16.42) in T₂ groups. It was concluded that maize could be replaced with either broken rice, bajra or jowar at 50 percent level in the pratapdhan chick ration.

Key words: Broilers, Cereals, Feed conversion ratio, Growth, Maize

Maize is the principal energy source used in poultry diets in most of the countries because of its high-energy value, palatability, presence of pigments and essential fatty acids. Maize production in India was 27 million tonnes during 2017-18 (FICCI, 2017). Among cereals, maize has been recognised as the best feed ingredient in poultry diet, but its availability has always been limited and the cost of maize has gone very high in recent years. In order to reduce feed cost, it is desirable to explore the possibility and suitability of feeding other cereals viz., bajra, jowar, rice and barely, which are available at relatively cheaper rate as compared to maize. Hence, the present study was planned to find out the effect of replacing maize by some other cereals viz., bajra, broken rice, jowar or barley on performance of Pratapdhan chicks.

Freshly hatched, apparently healthy, 250 day-old, unsexed Pratapdhan chicks were randomly divided into 5 equal groups in an experiment based on completely randomized design. Each treatment groups had a replicate of 10 birds each. They were offered either maize based control diet (T₁) or one of the experimental diets. Maize was replaced quantitatively at 50 per cent

level with either broken rice (T₂), bajra (T₃), jowar (T₄) or barley (T₅) for 8 weeks (Table 1). All the chicks were vaccinated against Ranikhet and Marek's diseases after hatching. The chicks were reared under uniform conditions of housing, lighting and other managerial practices.

A daily record of the feed consumption was maintained. The chicks were weighed individually at the start of experiment and subsequently at weekly intervals. The feed conversion ratio (FCR) was calculated by using the following formula –

$$\text{FCR} = \frac{\text{Total amount of feed consumed (g)}}{\text{Body weight gain (g)}}$$

$$\text{Performance index} = \frac{\text{Body weight gain (g)}}{\text{FCR}}$$

$$\text{PER} = \frac{\text{Weight gain (g)}}{\text{Protein consumed (g)}}$$

$$\text{Efficiency of energy utilization} = \frac{\text{Total ME intake (M cal)}}{\text{Body weight gain (g)}}$$

Two balance trial of three-day each were conducted to determine DM digestibility and efficiency

*Corresponding author: s E. mail: cmyadav_jaipur@yahoo.com

Table 1. Ingredient composition of experimental ration (kg/100 kg feed)

Ingredients	Starter Ration (0-6)					Finisher Ration (6-8 weeks)				
	T ₁	T ₂	T ₃	T ₄	T ₅	T ₁	T ₂	T ₃	T ₄	T ₅
Maize	46	23	23	23	23	56	28	28	28	28
Broken rice	-	23	-	-	-	-	28	-	-	-
Bajra	-	-	23	-	-	-	-	28	-	-
Jowar	-	-	-	23	-	-	-	-	28	-
Barley	-	-	-	-	23	-	-	-	-	28
Rice polish	16	11	14	12	13	15	9	14	13	12
Groundnut cake	31	34	28	30	29	24	27	22	24	25
Fish meal	5	4	7	7	7	3	2	3	2	2
Groundnut oil	-	3	3	3	3	-	4	3	3	3
Mineral mixture	2	2	2	2	2	2	2	2	2	2

*Vets A, B₂ D₃ 0.020; *T.M-50 0.010; *Neftin -200 0.050; *Amprol plus 0.050

of nitrogen and energy (ME) utilization, first one during last three days of the first month and the second one during last three days of the second month. During these periods, birds were transferred to metabolic cages. Samples of feed ingredients and formulated ration were analysed according to AOAC (2005). Samples of dropping were analysed for DM and protein. Data obtained were analyzed as per Snedecor and Cochran (1989).

The results indicated that the ration in which maize was replaced with broken rice at 50 per cent level gave significantly ($P < 0.05$) higher body weight and weight gain at 8 weeks of age as compared to other treatment group. Present results are in agreement with the findings of Rama Rao *et al.* (2004) who reported significant improvement in body weight gain in broilers

fed pearl millet as the principal source of energy compared to those fed maize. Raju *et al.* (2004) reported no effect on body weight and feed consumption on total replacement of maize with sorghum, pearl millet and ragi along with enzyme supplementation in broilers up to 5 weeks of age.

Chauhan (1991) reported that substitution of paddy at 50 per cent level in place of maize in broiler ration resulted in significantly higher body weight gain at 6 and 8 weeks of age as compared to control of 100 per cent maize based ration. Prabhakar *et al.* (1989) also observed optimum growth when maize was replaced at 30 per cent level by damaged rice in broiler ration. It is revealed from the results that bajra could replace maize grain by 50 per cent level without affecting the body weight and weight gain in broiler. These results are in

Table 2. Treatment means for body weight (g/chick), body weight gain (g/chick) and feed consumption (g/chicks) during 0 to 8 weeks period

Treatment	Body weight (g/chick)	Body weight gain (g/chick)	Feed consumption (kg/d)
T ₁	692 ^c	655 ^c	2.6
T ₂	807 ^d	770 ^d	2.6
T ₃	696 ^{cd}	659 ^{cd}	2.9
T ₄	747 ^a	720 ^a	2.4
T ₅	771 ^b	733 ^b	2.8
Pooled SE	21.3	21.4	0.2

^{a,b,c}Figure with different superscripts with a column differ from each other significantly ($P < 0.05$)

Table 3. Effect of dietary treatments on dry matter digestibility, protein efficiency ratio (PER) and efficiency of energy utilization in chicks

Treatments	DM digestibility (%)	Protein Efficiency Ratio	Efficiency of energy utilization kcal/g weight gain	Cost of feed per Unit (₹)
T ₁	50.752	1.27	9.56	17.82
T ₂	54.40	1.21	9.35	16.42
T ₃	52.82	1.26	9.25	17.41
T ₄	51.1	1.21	9.85	17.70
T ₅	52.44	1.28	9.58	17.68

conformity with Satyanarayana Reddy *et al.* (1991).

The maximum feed consumption of 2806 g was observed for barley-based ration followed by bajra, broken rice, maize and jowar based ration. The higher feed consumption on barley-based ration may be due to its higher fiber content. Better feed efficiency in pearl millet fed birds than maize fed birds has also been recorded (Raju *et al.*, 2003). The replacement of maize at 50 per cent level by broken rice, bajra or jowar had no effect on feed conversion ratio (Table 2). Several earlier reports also indicated that performance of chicken fed bajra and jowar based diets were similar to those fed a maize based diet (Khot *et al.*, 1990; Satyanarayana Reddy *et al.*, 1989). Replacement of maize by broken rice reduced the feed cost per kg weight gain (₹ 16.42) as compared to other treatments. Rama Rao *et al.*, (2002) reported that the feed cost was reduced by replacing the maize with pearl millet. Thus, it was concluded that maize could be replaced with either broken rice, bajra or jowar at 50 percent level in the ration of Pratapdhan chick.

REFERENCES

- AOAC. 2005. *Official Methods of Analysis*, 18thedn. Association of Official Analytical Chemists. Gaithersburg, USA.
- Chauhan, R.K. 1991. *Comparative Performance of Broilers and Cockerels fed Paddy (Jiri) based Ration for Meat Production*. M.V.Sc. thesis, Haryana Agric. Univ., Hisar, India.
- FICCI. 2017. *Production of Maize in India*. <http://www.ficci.com>.
- Khot, R.J.K., Karanjkar, L.M., Patel, P.M. and Doke, V.S. 1990. Studies on replacement of maize with sorghum (var. CSH-5) in broiler ration as a source of energy. *Poult. Advisor*. 23: 33-36.
- Prabhakar, M.R., Rao, R.J., Narasimhamurth, S.V.K., Hassan, S.B. and Haleem, M.A. 1989. Damaged rice in broiler ration. *Poult. Advisor*. 22: 21-25.
- Raju, M.V.L.N., Shyam Sundar, G., Sadagopan, V.R., Elangovan, A.V., Reddy, M.R. and Rama Rao, S.V. 2003. Sorghum, bajra and *ragi vis-a-vis* maize as energy source in broiler chicken diets. *Indian J. Anim. Nutr.* 20: 185-192.
- Raju, M.V.L.N., Shyam Sundar, G., Sadagopan, V.R., Elangovan, A.V., Reddy, M.R. and Rama Rao, S.V. 2004. Replacement of maize with jowar, bajra or *ragi* in broiler chicken diets. *Anim. Nutr. Feed Technol.* 4: 53-61.
- Rama Rao, S.V., Shyam Sundar, G., Panda, A.K., Reddy, M.R., Raju, M.V.L.N., and Praharaj, N.K. 2002. Utilization of different millets replacing maize in coloured broiler chicken diet. *Indian J. Anim. Nutr.* 19: 353-358.
- Rama Rao, S.V., Raju, M.V.L.N., Panda, A.K. and Sharma, R.P. 2004. Replacement of maize with pearl millet (*Pennisetum typhoides*) on weight and nutrient basis in broiler chicken diet. *Indian J. Poult. Sci.* 39: 15-24.
- Satyanarayana Reddy, P.V.V. and Rao V.B. 1991. Utilization of bajra (*Pennisetum typhoides*) in broiler. *Indian J. Poult. Sci.* 26: 202-205.
- Satyanarayana Reddy, P.V.V., Reddy, P.S. and Reddy, V.R. 1989. Utilization of bajra (*Pennisetum typhoides*) in broiler. *Indian J. Poult. Sci.* 24: 71-73.
- Snedecor, G.W. and Cochran, W.G. 1989. *Statistical Methods*. 8th Edn. Iowa State University Press, Ames, Iowa.

Received on 18-12-2018 and accepted on 22-04-2019