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Effect of replacement of maize with graded levels of mango seed kernel powder on growth performance in Giriraja birds

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Abstract

An experiment was conducted to study the effect of replacement of maize with graded levels of mango-seed kernel powder on growth performance in Giriraja birds during 1 to 8 weeks of age. A total of 150 one day old Giriraja chicks were distributed into five treatment groups with three replicates in each group and ten chicks in each replicate. Basal diet (T₁) prepared following ICAR (2013) and the experimental diets were prepared by replacing maize with mango-seed kernel powder at 2.5 per cent in T₂, 5 per cent in T₃, 7.5 per cent in T₄ and 10 per cent in T₅, respectively. The results revealed that non significant ($P>0.05$) difference in body weight, feed intake, feed efficiency and survivability among control and treatment groups. Based on the above results it was concluded that maize can be replaced with mango-seed kernel powder up to 10 per cent in a diet without any adverse effects on growth performance in Giriraja birds.

Keywords: body weight, feed intake, Giriraja birds, survivability

Introduction

Shortage of maize as a source of energy for feeding poultry may be serious cause of concern. Maize being the staple Indian diet and also finding its use in many industrial uses is causing undue pressure on poultry industry. The above situation is likely to cause escalation in the prices of feed for poultry industry. The deficit of feed resources has reflected in improved feeding system, more efficient use of available feeds and use of many unconventional feeds. There is a need to maximize production comparatively at a lower cost. These problems can be solved efficiently by the use of unconventional feeds in poultry diet.

Mango seed kernels are the by products available after mango have been consumed by the human being or are left unutilized after preparation of jams, pickles etc. from the fruit canning industry. The rough estimates show that the availability of kernel may be around one million tonnes per year in India and 20 thousand tonnes per year in Gujarat (Anon, 2002) ^[1]. Mango seed kernels are poor source of protein and have 1.2% digestible crude protein. However, it is an excellent source of energy containing about 13% ether extract (El Alaily *et al.*, 1976) ^[3] and 77% NFE providing 74% total digestible nutrients (Patel *et al.*, 1971) ^[8].

Kout-Elkloub *et al.* (2019) ^[6] observed in an investigation was undertaken to study the effects of feeding mango seed kernel (MSK) as partially substituting of yellow corn on productive performance of Gimmizah cockerels. A total number of 100 Gimmizah cockerels aged 28 days were distributed into four groups. Each group was represented by five replicates from 4-16 week of age. The first group (control) fed the basal diet. The second, third and fourth groups were fed the basal diet with the substitution of yellow corn with MSK with 10, 15 and 20%, respectively. Body weight and body weight gain were increased when used 10% level of MSK. It could be concluded that MSK can be used up to 10% without any adverse effect on performance of Gimmizah cockerels during the growing period.

Diarra *et al.* (2010) ^[2] observed that the performance of finishing broiler chickens fed graded levels of boiled mango kernel meal as a replacement for maize was investigated in a 35-day experiment. One hundred and twenty 28-day old Anak broiler chickens were individually weighed and randomly assigned to four groups/treatments of similar weight (589.70 g ± 0.16 SE) containing three replicates of ten birds each. Four diets in which boiled mango kernel meal replaced maize at 0.00, 20.00, 40.00, and 60.00% and clean drinking water were fed for the period of the experiment (35 days). The results showed that daily feed intake significantly ($P<0.05$) improved on the 60% mango kernel diet compared to the other three treatments.

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Farag (2001) ^[4] found no difference in feed conversion ratio of different groups of bird fed MSK processed by different methods like boiling, autoclaving or Irradiation.

Kayode *et al.* (2012) ^[5] found in an experiment in which Mango Kernel Cake (MKC) was fermented using a mixed-culture of *Aspergillus Niger* and *Penicillium chrysogenum* for 168 hrs. The MKC was autoclaved to terminate the fermentation processes and air dried before use at graded levels in broiler diets. Six diets were formulated as follows: Diet A had 0% MKC (control) while diets B, C, D, E and F were mixed-culture fermented MKC replacing maize at 20, 40, 60, 80 and 100% respectively. There was a 4.16% mortality among birds fed on diet F.

Materials and Methods

A total of one hundred and fifty, day old Giriraja chicks were procured from the Department of Poultry Science, Veterinary College, Hebbal, Bengaluru. Chicks were weighed; wing banded and distributed to five experimental groups each consisting of three replicates with ten chicks each. Basal diet (control) T₁ was prepared using maize and soya bean meal as per the ICAR (2013) standards with medication as per the requirements from day one to 56 days of experimental period. For the treatment groups T₂, was fed with basal diet (control) along with 2.5% Mango seed kernel powder supplementation by replacing maize from day one to 56 days and for the treatment groups T₃, was fed with basal diet (control) along with 5% mango seed kernel powder by replacing maize up to 56 days. For the treatment groups T₄ was fed with basal diet along with 7.5% mango seed kernel powder by replacing maize up to 56 days. For the treatment groups T₅ was fed with basal diet along with 10% powder up to 56 days. Birds were vaccinated against Newcastle disease and Infectious bursal disease as per the schedule. Feed and water were provided *ad libitum*. Birds were reared under standard managemental practices. Weekly body weight and cumulative body weight were recorded till the end of the trial. Weekly feed consumption and cumulative feed consumption were recorded till the end of the trial. Feed conversion ratio at the end of every week and at the end of the trial were calculated. The chick's survivability was calculated from day one to end of the trail.

Results and Discussion

The results of the effect of feeding mango seed kernel powder on weekly cumulative body weight (g/bird) of Giriraja birds is presented in Table 1. There was no significant difference ($P>0.05$) in body weight of birds in the groups fed with graded levels of mango seed kernel powder compared to the control group until the end of the experiment (56th day).

Kout-Elkloub *et al.* (2019)^[6] were also observed the same results in an investigation which was undertaken to study the effects of feeding mango seed kernel (MSK) as partially substituting of yellow corn on productive performance of Gimmizah cockerels. Body weight and body weight gain were increased when used 10% level of MSK and concluded that MSK can be used up to 10% without any adverse effect on performance of Gimmizah cockerels during the growing period.

The present study is in contrary with Orayaga *et al.* (2015)^[7] observed that effect of feeding various levels of Mango fruit reject meal (MFRM) in finisher meal broiler found that Mango fruit reject meal supported growth performance of finisher broiler at 10% level, and can be a feed resources in finisher broiler diets.

The results of the effect of feeding mango-seed kernel powder on average weekly cumulative feed intake (g/bird) in Giriraja birds are presented in Table 2. There was no significant difference ($P>0.05$) in feed intake of birds in the groups fed with graded levels of mango seed kernel powder compared to the control group until the end of the experiment (56th day).

The present study results are also in agreement with results of Kout-Elkloub *et al.* (2019)^[6] observed in an investigation was undertaken to study the effects feeding mango seed kernel (MSK) as partially substituting of yellow corn on productive performance and feed intake of Gimmizah cockerels. They concluded that MSK can be used up to 10% without any adverse effect on feed intake of Gimmizah cockerels during the growing period.

The present study results are also disagreeing with results of Diarra *et al.* (2010)^[2] observed that the performance of finishing broiler chickens fed graded levels of boiled mango kernel meal as a replacement for maize was investigated in a 35-day experiment. The results showed that daily feed intake significantly ($P<0.05$) improved on the 60% mango kernel diet compared to the other 3 treatments.

The results of effect of feeding mango seed kernel powder on weekly cumulative feed conversion ratio (FCR) in Giriraja birds are presented in Table 3. There was no significant difference ($P>0.05$) in feed conversion ratio of birds in the groups fed with graded levels of mango seed kernel powder compared to the control group until the end of the experiment (56th day).

Similar results were also observed in experiment conducted by Farag (2001)^[4] who found no difference in feed conversion ratio of different groups of bird fed MSK processed by different methods like boiling, autoclaving or irradiation.

Contrary to present study results Kout-Elkloub *et al.* (2019)^[6] observed in an investigation undertaken to study the effects feeding mango seed kernel (MSK) effect as partially substituting of yellow corn on productive performance and physiological parameters of Gimmizah cockerels. They found that feed conversion was significantly improved overall period for 10% MSK.

The results of effect of feeding mango-seed kernel powder on per cent survivability in Giriraja birds are presented in Table 4. There was no significant difference ($P>0.05$) in survivability of birds in the groups fed with graded levels of mango seed kernel powder compared to the control group until the end of the experiment.

Similar results were also observed in experiment conducted by Kayode *et al.* (2012)^[5] feeding fermented Mango Kernel Cake (MKC) was fermented using a mixed culture of *Aspergillus Niger* and *Penicillium chrysogenum* for 168 hrs. There was no significant difference in survivability among treatment and control.

Table 1: Effect of replacement of maize with graded levels of mango seed kernel powder on weekly cumulative body weight (g/bird/week) (Mean \pm SE) in Giriraja birds.

Experimental group	Description of the treatment	1 st Week	2 nd Week	3 rd Week	4 th Week	5 th Week	6 th Week	7 th Week	8 th Week
T1	Basal diet	95.97 \pm 2.44	205.87 \pm 7.05	368.33 \pm 15.04	484.66 \pm 15.05	697.16 \pm 21.66	962.20 \pm 20.62	1258.3 \pm 31.57	1740.00 \pm 22.06
T2	2.5% mango seed kernel powder in basal diet with replacement of maize	98.93 \pm 2.84	212.77 \pm 5.62	361.23 \pm 10.17	487.33 \pm 13.44	700.96 \pm 18.90	939.03 \pm 23.16	1206.90 \pm 31.27	1793.67 \pm 40.05
T3	5% mango seed kernel powder in basal diet with replacement of maize	97.33 \pm 3.02	204.30 \pm 10.93	361.43 \pm 13.53	498.63 \pm 17.50	674.03 \pm 23.52	979.06 \pm 20.38	1254.83 \pm 38.58	1829.87 \pm 14.03
T4	7.5% mango seed kernel powder in basal diet with replacement of maize	94.63 \pm 3.08	208.47 \pm 5.41	360.10 \pm 9.47	493.5 \pm 13.31	683.00 \pm 18.14	938.70 \pm 20.65	1239.30 \pm 34.97	1730.97 \pm 30.77
T5	10% mango seed kernel powder in basal diet with replacement of maize	97.77 \pm 2.30	203.90 \pm 5.47	316.90 \pm 2.30	480.5 \pm 15.28	680.33 \pm 23.28	981.86 \pm 17.87	1213.6 \pm 33.54	1783.67 \pm 18.77

Table 2: Effect of replacement of maize with graded levels of mango seed kernel powder on weekly cumulative feed intake (g/bird/week) (Mean \pm SE) in Giriraja birds.

Experimental group	Description of the treatment	1 st Week	2 nd Week	3 rd Week	4 th Week	5 th Week	6 th Week	7 th Week	8 th Week
T1	Basal diet	79.10 \pm 2.34	309.37 \pm 1.09	604.94 \pm 5.11	1110.42 \pm 3.21	1746.86 \pm 72.49	2684.29 \pm 66.39	3585.00 \pm 121.36	4398.61 \pm 181.15
T2	2.5% mango seed kernel powder in basal diet with replacement of maize	74.15 \pm 1.20	312.27 \pm 1.88	611.28 \pm 3.61	1119.31 \pm 31.59	1724.08 \pm 55.22	2698.75 \pm 42.22	3594.63 \pm 93.03	4411.10 \pm 71.69
T3	5% mango seed kernel powder in basal diet with replacement of maize	81.29 \pm 1.63	317.28 \pm 4.80	619.02 \pm 2.41	1102.07 \pm 4.83	1731.72 \pm 4.44	2679.23 \pm 6.79	3604.61 \pm 44.50	4421.72 \pm 71.68
T4	7.5% mango seed kernel powder in basal diet with replacement of maize	84.06 \pm 1.84	304.75 \pm 4.28	609.06 \pm 2.12	1121.39 \pm 6.92	1720.76 \pm 55.35	2669.31 \pm 40.70	3581.87 \pm 67.53	4390.75 \pm 235.61
T5	10% mango seed kernel powder in basal diet with replacement of maize	80.65 \pm 2.40	307.97 \pm 1.47	607.56 \pm 4.68	1098.74 \pm 1.33	1719.78 \pm 2.73	2671.29 \pm 91.45	3589.47 \pm 48.61	4394.11 \pm 167.34

Table 3: Effect of replacement of maize with graded levels of mango seed kernel powder on weekly cumulative feed conversion ratio (Mean \pm SE) in Giriraja birds.

Experimental group	Description of the treatment	1 st Week	2 nd Week	3 rd Week	4 th Week	5 th Week	6 th Week	7 th Week	8 th Week
T1	Basal diet	0.824 \pm 0.035	1.502 \pm 0.016	1.642 \pm 0.068	2.291 \pm 0.112	2.505 \pm 0.027	2.527 \pm 0.028	2.789 \pm 0.031	2.849 \pm 0.033
T2	2.5% mango seed kernel powder in basal diet with replacement of maize	0.749 \pm 0.072	1.467 \pm 0.024	1.692 \pm 0.098	2.296 \pm 0.024	2.459 \pm 0.088	2.459 \pm 0.031	2.873 \pm 0.028	2.978 \pm 0.040
T3	5% mango seed kernel powder in basal diet with replacement of maize	0.835 \pm 0.020	1.553 \pm 0.061	1.712 \pm 0.018	2.210 \pm 0.031	2.569 \pm 0.034	2.416 \pm 0.005	2.763 \pm 0.020	2.872 \pm 0.033
T4	7.5% mango seed kernel powder in basal diet with replacement of maize	0.888 \pm 0.045	1.461 \pm 0.045	1.691 \pm 0.037	2.272 \pm 0.058	2.519 \pm 0.039	2.536 \pm 0.018	2.843 \pm 0.030	2.890 \pm 0.003
T5	10% mango seed kernel powder in basal diet with replacement of maize	0.824 \pm 0.010	1.510 \pm 0.011	1.697 \pm 0.012	2.286 \pm 0.052	2.527 \pm 0.050	2.463 \pm 0.049	2.720 \pm 0.010	2.957 \pm 0.017

Table 4: Effect of replacement of maize with graded levels of mango seed kernel powder on Survivability (%) in Giriraja birds.

Experimental group	Description of the treatment	Survivability percentage (%)
T1	Basal Diet	93.34
T2	2.5% mango seed kernel powder in basal diet with replacement of maize	96.67
T3	5% mango seed kernel powder in basal diet with replacement of maize	93.34
T4	7.5% mango seed kernel powder in basal diet with replacement of maize	96.67
T5	10% mango seed kernel powder in basal diet with replacement of maize	96.67

Conclusion

Effect of replacement of maize with graded levels of mango seed kernel powder on growth performance in Giriraja birds showed no significant difference in body weight, feed intake, feed conversion ratio and survivability among different treatment groups compared to control group at the end of the experiment (56th day).

References

1. Anonymous. Unconventional feed resources for animals. Animal Nutrition Research Department. GAU, Anand, 2002, 5.
2. Diarra SS, Usman BA, Igwebuike JU. Replacement value

of boiled mango kernel meal for maize in broiler finisher diets. J Agric. Biological Sci. 2017;5(1):47-52.

3. El alaily HA, Anwar A, El banna I. Mango seed kernels as an energy source for chicks. British Poul. Sci. 1976;17(2):129-133.
4. Farag MD. The enhancement of the nutritive value of mango seed kernels for poultry by thermal treatment and radiation processing. Arch Tierernahr. 2001;54(1):61-79.
5. Kayode RMO, Sani A, Apata DF, Joseph JK, Annongu AA, Kolawole OM, *et al.* Performance and carcass characteristics of broiler chickens fed on fungal mixed-culture (*Aspergillus niger* and *Penicillium chrysogenum*) fermented mango kernel cake. Global Res. J

- Microbiol. 2012;2(1):67-75.
6. Kout-Elkloub M, EI Moustafa, Merfat Breakaa A, Amina EL-Saadany S, Mohamed EL Farag E. Effect of dietary mango seed kernel (*Mangifera indica*) as partial replacement of corn on productive and physiological performance of growing gimmizah cockerels. Egypt. Poult. Sci. 2019;39(4):865-879.
 7. Orayaga KT, Oluremi OA, Tuleun CD, Carew SN. The feed value of composite mango (*Mangifera indica*) fruit reject meal in the finisher broiler chickens nutrition. Afr. J Food Sci. 2015;6(6):177-184.
 8. Patel BM, Shukla PC, Patel CA. Study on feeding mango seed kernels to calves. Indian J of Nutri. Dietetics. 1971;8(6):333-336.