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Effect of Replacement of Maize with Graded Levels of Mango Seed Kernel Powder on Gut Microbial Count in Giriraja Birds

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A B S T R A C T

An experiment was conducted to study the effect of replacement of maize with graded levels of mango-seed kernel powder on gut microbial count 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 (T_1) prepared following ICAR (2013) and the experimental diets were prepared by replacing maize with mango-seed kernel powder at 2.5 per cent in T_2, 5 per cent in T_3, 7.5 per cent in T_4 and 10 per cent in T_5, respectively. The results revealed that non significant ($P > 0.05$) difference in *E. Coli* count and *Lactobacillus* count compared to control and other 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 gut microbial count in Giriraja birds.

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). 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) and 77 % NFE providing 74 % total digestible nutrients (Patel *et al.,* 1971).

Rajan *et al.,* (2011) concluded that each crude extracts and fractions of *M. indica* have significant antimicrobial activity against the isolated pathogen *S. dysenteriae*. The antibacterial activity may be due to the phytochemical constituents of the mango seed kernel. The phytochemical tannin could be the reason for its antibacterial activity.

Kout-Elkloub *et al.,* (2019) 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 physiological parameters 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 (5 cockerels per rep.) from 4-16 weeks 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. Bacterial count in the intestine were decreasing by increasing MSK levels.

Materials and Methods

A total of one hundred and fifty, day old Giriraja chicks will be procured from the Department of Poultry Science, Veterinary College, Hebbal, Bengaluru. Chicks will be weighed; wing banded and allocated to five experimental groups each consisting of three replicates with ten chicks each. Basal diet (control) T_1 will be 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 T_2, will be 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 T_3, will be fed with basal diet (control) along with 5 % mango seed kernel powder by replacing maize up to 56 days. For the treatment groups T_4 will be fed with basal diet along with 7.5 % mango seed kernel powder by replacing maize up to 56 days.

For the treatment groups T_5 will be fed with basal diet along with 10 % powder up to 56 days. Birds will be vaccinated against Newcastle disease and Infectious bursal disease as per the schedule. Feed and water will be provided *ad libitum*. Birds will be reared under standard managemental practices. Microbiological parameters were assessed in terms of the *Lactobacillus count* and *E. coli* count.

At the end of the experiment, two birds from each replicate in T_1 to T_5 treatment groups respectively were slaughtered. Intestinal contents from the small intestine were taken aseptically. The intestinal contents were collected in sterile container and further subjected to enumeration of gut microbes as per spread plate method (Postgate, 1969).

Specific media such as MacConkey agar was used for *E.coli* count, whereas *Lactobacillus* was assessed on brain heart infusion agar by pour plate method (Mackie and McCartney, 1996). Ten-fold serial dilution of intestinal contents were used to assess the bacterial count. The bacterial counts were expressed as

log_{10} colony forming units/gm of the sample from intestinal content (Weir, 1990).

Results and Discussion

Gut microbial count

The results of the effect of feeding mango-seed kernel powder on gut (intestinal) microbial load (log_{10} CFU/g) on 56th day in Giriraja birds are presented in Table 1.

Escherchia coli

At the end of 56th day, the intestinal *E. coli* counts (log_{10} CFU/g) in groups T_1, T_2, T_3, T_4 and T_5 were 7.09, 7.10, 7.07, 7.11, and 7.09, respectively. Statistical non-significant difference (P > 0.05) was observed in the intestinal *E. coli* counts among the treatments and also compared to control.

Lactobacillus spp.

At the end of 56th day, the intestinal *Lactobacillus* counts (log_{10} CFU/g) in groups T_1, T_2, T_3, T_4, and T_5 were 6.68, 6.73, 6.70, 6.69 and 6.64, respectively. Statistical non-significant difference (P > 0.05) was observed in the intestinal *Lactobacillus* counts among the treatments and also compared to control. There was no significant difference (P > 0.05) on gut microbial count 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).

In similar to the present study Rajan *et al.*, (2011) concluded that each crude extracts and fractions of *M. indica* have significant antimicrobial activity against the isolated pathogen *S. dysenteriae*.

The antibacterial activity may be due to the phytochemical constituents of the mango seed kernel. The phytochemical tannin could be the reason for its antibacterial activity.

In similar to the present study Kout-Elkloub *et al.,* (2019) 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 physiological parameters of Gimmizah cockerels.

Table.1 Effect of replacement of maize with graded levels of mango seed kernel powder on gut microbial load (log_{10} CFU/g) (Mean ± SE) in Giriraja birds

Experimental group	Description of the treatment	*E. coli* count	*Lactobacillus* count
T1	**Basal diet**	7.09 ± 0.043	6.68 ± 0.049
T2	**2.5 % mango seed kernel powder in basal diet with replacement of maize**	7.10 ± 0.034	6.73 ± 0.050
T3	**5 % mango seed kernel powder in basal diet with replacement of maize**	7.07 ± 0.034	6.70 ± 0.063
T4	**7.5 % mango seed kernel powder in basal diet with replacement of maize**	7.11 ± 0.031	6.69 ± 0.062
T5	**10 % mango seed kernel powder in basal diet with replacement of maize**	7.09 ± 0.030	6.64 ± 0.084

A total number of 100 Gimmizah cockerels aged 28 days were distributed into four groups. Each group was represented by five replicates (5 cockerels per rep.) from 4-16 weeks 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. They observed no significant difference in the count of bacteria in the

intestine. Effect of replacement of maize with graded levels of mango seed kernel powder in Giriraja birdson *E. Coli* count and *Lactobacillus* count in the gut showed no significant (P > 0.05) difference among different treatment groups compared to control group at the end of the experiment (56th day).

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