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Replacing the maize by enzymatic treated *Bajra* in broiler diet

Arun Kumar

ABSTRACT : The poultry do not have enzyme to break down fibre completely and need a such enzyme which has a capability to break down in energy without any harmful impact on body growth, blood metabolities and meat quality. In order, the biotechnology aspect to improve feed value by the use of enzyme in poultry feed. The aim of present study was to use the crude fibre rich cereal *Bajra* instead of maize with enzyme where the availability of maize is short. The experiment was conducted at poultry farm of C.S.A. University of Agriculture and Tech., Kanpur with 30 day-old-chicks. Chicks were selected and divided randomly into five groups for different treatment namely G_1, G_2, G_3, G_4 and G_5 consisting of 6 bird in each and maize were replaced with *Bajra* by 10 per cent, 20 per cent, 30 per cent and 40 per cent for G_2, G_3, G_4 and G_5, respectively and G_1, treated as control group.

KEY WORDS : Enzyme, Poultry, *Bajra*

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INTRODUCTION

The biggest single expense in any system of poultry production is feed accounting upto 70 per cent of total production cost per bird. Poultry produces enzymes naturally to aid the digestion of feed nutrients. However, they don't have enzyme to break down fibre completely and need exogenous enzymes in feed to aid digestion. Enzymes are biological catalyst composed of amino acids with vitamins and minerals. They bring about biochemical reactions without themselves undergoing change. The benefits of using enzyme in poultry diets include not only enhanced bird performance and feed conversion but also less environmental problems due to reduced output of excreta.

Feeding enzymes to poultry is one of the major nutritional advances in the last fifty years. The theory of feed enzymes is simple that the plants contain some compound that either the animal cannot digest or which hinder its digestive system, often because the animal cannot produce the necessary enzyme to degrade them. Nutritionists can help the animal by indentifying these indigestible compound and feeding a suitable enzyme. The poultry industry readily accepts enzymes as a standard dietary component. The use of enzyme active on non-starch polysaccharides (NSP), the structural polysaccharides of plant wall and storage polysaccharides of some legume seeds is now an essential part of the industry.

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MATERIAL AND METHODS

In this study day old 30 commercial broiler chicks (vencob) were selected from the stock available at dairy form of C.S.A. University of Agriculture Tech., Kanpur in Feb., 2005. The whole experimental period feeding,

watering and other managerial schedules were followed. The above selected chicks were weighed individual and divided randomly into five groups for different treatment namely G_1, G_2, G_3, G_4 and G_5 consisting of 6 birds in each. The birds are kept in individual cage house. Feed and water trough were washed daily. Treated feed and fresh drinking water was offered daily in all groups. During 0-3 weeks starter broiler mash and after 3 weeks finisher broiler mash was provided to the birds. The following feeding regimes were followed during experimental period.

Control group (G_1) - Starter broiler mash (with maize)

Treatment group (G_2) - Starter broiler mash (10 maize is replaced by enzymatic treated *Bajra*).

(G_3) - Starter broiler mash (20% maize is replaced by enzymatic treated *Bajra*).

(G_4) - Starter broiler mash (30%) maize is replaced by enzymatic treated *Bajra*).

(G_5) - Starter broiler mash (40% maize replaced by enzymatic treated *Bajra*)

The enzyme cocktail which was used in treatment for *Bajra* named TFFBP zyme which was blend of amylase, protease, phytase, pectinase, cellulase and betagluconase. The enzyme mixture mix with starter broiler mash and finisher mash @ 500g/tonne of feed.

Composition of ration:

After completion of experiment for five weeks blood sample was taken for different haematological and

Table A: Level of different ingredients in the broiler mashes (starter) in different groups

Ingredients	Level of inclusion (%)				
	Groups Ist	Groups IInd	Groups IIIrd	Groups IVth	Groups Vth
Maize	50.00	45.00	40.00	35.00	30.00
Bajra	-	5.00	10.00	15.00	20.00
Rice polish	20.40	20.40	20.40	20.40	20.40
Fish meal	8.00	8.00	8.00	8.00	8.00
Deoiled G.N.C.	20.00	20.00	20.00	20.00	20.00
Bone meal	0.75	0.75	0.75	0.75	0.75
Lime stone powder	0.50	0.50	0.50	0.50	0.50
Salt	0.25	0.25	0.25	0.25	0.25
Min. and vit mix.	0.10	0.10	0.10	0.10	0.10
T.F.F. BP zyme	0.05	0.05	0.05	0.05	0.05
Total	100.05	100.05	100.05	100.05	100.05

Table B : Level of different ingredients in the broiler mashes (finisher) in different groups

Ingredients	Level of inclusion (%)				
	Groups Ist	Groups IInd	Groups IIIrd	Groups IVth	Groups Vth
Maize	50.00	45.00	40.00	35.00	30.00
Bajra	-	5.00	10.00	15.00	20.00
Rice polish	25.40	25.40	25.40	25.40	25.40
Fish meal	7.00	7.00	7.00	7.00	7.00
Deoiled G.N.C.	16.00	16.00	16.00	16.00	16.00
Bone meal	0.75	0.75	0.75	0.75	0.75
Lime stone powder	0.50	0.50	0.50	0.50	0.50
Salt	0.25	0.25	0.25	0.25	0.25
Min. and vit mix.	0.10	0.10	0.10	0.10	0.10
T.F.F. BP zyme	0.05	0.05	0.05	0.05	0.05
Total	100.05	100.05	100.05	100.05	100.05

biochemical constituent measurement.

– *Haemoglobin* : Haemoglobin was estimated in samples of blood wilh the help of photoelectric haemoglobinometer.

– Total leucocyte count (T.L.C.)-Automated method was applied for analysis of TLC.

– Packed cell volume (P.C.V.) was determined by centrifusing heparinized blood in a capillary tube (also known as a microhaematocrit tube) at 10,000 RPM for five minute. This separated the blood into layers. The volume of packed red blood cells divided by the total volume of the blood sample gave the PCV. Since a tube is used, this could be calculated by measuring the lengths of the layers.

– Differential leucocyte count (D.LC.)-A dry unfixed blood smear on the slide was strained for two minutes with undiluted wright's stain. After two minutes the stain was diluted with two volumes of distilled water mixed well and allowed to stand in the diluted strain for 10 minutes. The slide was washed and dried at room temperature. The cells were counted using oil emersion lens of the microscope (100x). The value was presented in percentage.

– Red blood corpuscles (R.B.C.)-A measured

Table 1 : Effect of different treatment blood parameters as maize replaced by *Bajra*

Sr. No.	Particulars	Groups					C.D. (P=0.05)
		G_1	G_2	G_3	G_4	G_5	
1.	Haemoglobin (g/100 ml)	8.95± 0.02	8.97± 0.02	9.17± 0.05	9.23± 0.01	9.17 ± 0.05	0.06
2.	Packed cell volume (PCV)%	29.43± 0.15	29.64± 0.06	30.22± 0.11	31.28 ± 0.05	31.43 ± 0.15	0.20
3.	R.B.C. (Count) million/cu mm	2.94± 0.02	3.18± 0.06	3.21± 0.04	3.47± 0.01	3.66 ± 0.03	0.06
4.	Total leucocyte count (TLC) (thousand/cu mm)	24.52± 0.05	24.57± 0.05	25.64± 0.02	25.76± 0.03	25.71 ± 0.01	0.06
5.	Lymphocyte (%)	57.26± 0.20	57.15± 0.05	56.87± 0.01	56.84± 0.04	56.76 ± 0.03	0.18
6.	Neutrophils (%)	35.00± 0.12	35.12± 0.01	35.37± 0.02	35.25± 0.10	35.27 ± 0.02	0.10
7.	Eosinophils (%)	1.73± 0.01	1.71± 0.05	1.63± 0.01	1.62± 0.02	1.57± 0.01	0.05
8.	Basophil (%)	1.69± 0.01	1.74± 0.01	1.77± 0.01	1.82± 0.01	1.83± 0.01	0.02
9.	Monocyte (%)	4.32± 0.23	4.15± 015	4.36± 0.02	4.47± 0.21	4.57± 0.02	NS
10.	Total serum protein (g/100 ml)	4.41± 0.01	4.60± 0.01	4.46± 0.01	4.65± 0.02	4.47± 0.04	NS
11.	Glucose (mg/100 ml)	196.00± 2.64	183.00± 4.58	182.00± 1.00	176.00± 3.60	190.66± 1.52	NS
12.	Cholesterol (mg/100 ml)	129.12± 3.20	127.24± 0.28	126.11± 0.11	124.07± 0.05	122.03± 0.07	2.62
13.	Serum calcium (mg / 100 ml)	13.56± 1.05	13.47± 0.94	13.45± 0.02	13.41± 0.02	13.38± 0.01	NS
14.	Serum phosphorus (mg/100 ml)	5.92± 0.92	5.87± 0.02	5.89± 0.02	5.79± 0.01	5.76± 0.02	NS

NS= Non-significant

Table 2 : Effect of different treatment on carcass quality parameters as mazie replaced by *Bajra*

Sr. No.	Particulars	Groups					C.D. (P=0.05)
		G_1	G_2	G_3	G_4	G_5	
Giblet yield (% dressed weight)							
1.	Heart	0.922 ± 0.009	0.967 ± 0.00	1.054 ± 0.004	1.064 ± 0.004	1.012 ± 0.001	0.42
2.	Gizzard	3.826 ± 0.029	3.653 ± 0.238	3.985 ± 0.317	3.951 ± 0.072	3.427 ± 0.009	NS
3.	Liver	3.129 ± 0.18	3.526 ± 0.41	3.459 ± 0.06	3.069 ± 0.006	2.965 ± 0.259	NS
Cut-up yield (% dressed weight)							
4.	Drum stick and thigh	31.72 ± 1.09	31.27 ± 0.16	31.50 ± 0.30	31.27 ± 0.15	30.91 ± 0.05	NS
5.	Wings	114.48 ±1.16	12.07 ±1.01	12.31 ±0.28	12.18 ±0.27	12.12 ±0.19	NS
6.	Neck	4.61 ± 0.05	4.61 ± 0.10	4.77 ± 0.05	4.60 ± 0.17	4.66 ± 0.03	NS
7.	Back	19.04 ± 0.07	18.57 ± 0.47	18.69 ± 0.44	18.94 ± 0.03	19.13 ± 0.09	NS
8.	Breast	25.27 ± 1.90	25.66 ± 0.16	24.53 ± 0.12	24.92 ± 0.06	25.92 ± 0.55	NS

NS= Non-significant

quantity of blood was diluted with a fluid which was isotonic with blood and prevents its coagulation. The diluted blood is spread on a counting chamber and the number of cells in a circumscribed volume was counted under the microscope.

A solution of 1 per cent farmaline (40% formaldehyde in 31.3g/lit) trisodium citrate.

– Calculation : RBC/mm^2 of blood = Number of cells in 5 square x 10000

– White blood corpuscles (W.B.C.)- The blood was diluted (20 times) with a diluted blood was placed in a neubaur counting chamber for counting.

– Calculation : WBC/mm^2 = Total number of calls in four large corner square x 50

– Total serum protfen : Protein content was analysed by conventional kjedhal method.

– Serum cholesterol : The method described by Zack (1957) was adopted for estimation of serum cholesterol.

– Blood glucose : The method of Folin and Wu (1920) was adopted for this estimation.

– Serum calcium : Sample of blood were analysed, using the titrimetric method. Calcium was precipitated directly from the serum as oxalate and the latter was titrated with potassium permegnate.

– Phosphorus in blood serum (Fiske and Subbarow, 1925).

Carcass quality:

At the end of the experiment one representative birds from each experiment was randomly selected and slaughter. The scientific method applied for dressing and processing of the experimental birds.

The per cent evisceration loss, dressing percentage, giblet yield were calculated as follows :

Per cent fasting shrinkage :

Pre-starvation weight–Past starvation weight/Pre-starvation weight x 100

Per cent blood loss :

Post starvation weight–Bled weight/Pre–starvation weight x 100

Per cent loss due to evisceration (*Live weight basis*):

= Defeathered weight = Eviscerated weight / Defeathered weight x 100

Giblet yield :

Individual giblet yield *viz.*, heart weight, gizzard weight and liver weights were recorded on the basis of per cent dressed weight.

Cut-up yield :

Individual cut-up yield *viz.*, drumstick and thigh, wings, neck, back and breast were recorded on the basis of per cent dressed weight.

Statistical analysis :

The data pertaining to various parameters were analyzed statistically. Duncan's multiple range tests was applied for testing the significance of mean difference Duncan (1955).

Results and Discussion

The results of the present study as well as relevant discussions have been presented under following sub heads:

Haematological parameters :

The average value of different blood parameters is givin in Table 1, by obserbation the table result showed that the enzymatic treated mash has a positive effect on Hb, PCV, RBC, TLC and not significant effect seems between different group on the level of glucose, calcium and phosphorus. But it had a negative effect on cholesterol level means when level of treatments *Bajra* is increasing in the diet then level of cholesterol is also decreasing. (Dhara *et al.*, 1997) is reported 22.40 per cent of SKC in the diet of Japanese quails has no adverse effect on blood parameters like PCV, Hb and total different counts of WBC. Menze *et al.* (1974) found that increasing dietary fibre levels from 4.12 to 17.7 per cent with cellulose caused a reduction in serum cholesterol.

Carcass quality:

The average value of carcass quality parameters was given in Table 2. From the above observation of present investigation. It concluded that the carcass quality characteristics vis: giblet yield and cut up yield of broiler were not significantly affected by different treatments. Mandal *et al.* (2004) found that the addition of enzyme also had no influence on carcass traits and yiled of various organs.

Conclusion:

In present study the result showed that the use of

enzymatic treated *Bajra* instead of mazie upto certain level has positive effect of different haemetological parameters eg. Hb, PVC, RBC, T.L.C and the level of glucose, calcium and phosphorus is not affected by treated mash but it has a negative effect on cholesterol. Therefore, it may be suggested that the mazie could be replaced by enzymatic treated *Bajra* upto 30 per cent for overall production with out any negative effect.

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