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Effect of Driselase-1 (Enzyme Mixture) on the Growth Performance of Broiler Chicks at Starter Phase

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Abstract: The main objective of the present study was to evaluated the effects of different levels of locally avaiable Driselase-1 (amylolytic, proteolytic and cellulolytic enzymes mixture), when added in the starter rations of broiler chicks. The effectiveness of such enzymes was measured in terms of gain in body weight, dry matter intake (DMI) and feed efficiency. One hundred and ninty two day old chicks were randomly distributed into 4 main groups, A, B, C and D, where each main group was further divided into 4 sub groups contained 12 birds each. Four experimental diets viz, I, II, III and IV were randomly allotted to these groups. All the four diets were containing 1 kg (basal feed ingridients) added with 0, 1, 2, and 4 g/kg Driselase-1. Each ration was offered *ad libitum*. The experiment lasted for 21 days. The data were statistically analyzed using Completely Randomized Design. Enzuyme treatment highly ($P<0.01$) effected the gain in body weight and feed efficiency, but slightly ($P<0.05$) effected the DMI of the experimental birds. Ration IV resulted the highest improvement in the pre-mentioned parameters compared with Rations. I, II and III. it was concluded that enzyme addition successfully improved the over all performance of the experimental birds. Further research work is needed to use higher level of such enzymes mixture in broiler finisher ration. It is also suggested that the effect of Fdriselase-12 should be tested on commercial layer. Moreover, the economics of the experimental rations should be calculated.

Key words: Driselase-1, Enzyme mixture, performance, starter and phase

Introduction

The science of enzymes is called enzymology, which began about 150 years ago with the discovery that starch could be converted into fermentable sugars by an extract from malt, which was named as amylase (Pettersson and Aman, 1989). On compositional basis, 90% of the enzymes contain protein (Onilude and Oso, 1999). They are used as catalyst (to accelerate or to speed up the rate of bio-chemical reactions). Moreover, they are also specific in their action (Mikulski, 1999). They are used as catalyst (to accelerate or to speed up the rate of bio-chemical reactions). Moreover, they are also specific in their action (Mikulski, 1999). There are many factors, which can directly or indirectly influence the enzyme action, such as substrate and enzymes concentrations. Inhibitors, temperature and pH etc (Abdulkarim, 1999; Kumar, 1997; Marsman, 1995).

The mechanism of enzyme action is, firstly to form a complex between itself and the substrate, secondly, to cuase the break down in the molecular structure of the substrate, without changing itself. The early usage of enzymes in industrial and agricultural fields was slow, because of the lacking of understanding of enzyme kinetics and their requirements for minimum and maximum activities in applied situation.

A review of the literature shows that no local research work has been carried out on using Driselase-1 enzymes (amylase, protease and cellulase mixture) in the broiler feeds.

It was hypothesized that if a mixture of amylase, protease and cellulase enzymes (Driselase-1, recently introduced in Pakistan from Han Dong Co. Ltd. Korea) added in broiler ration, would increase the rate of digestion of starch, protein and cellulose. Which in turn, would improve the overall performance of broiler chicks. Therefore, the experimetn was carried out to investigate the effect of different levels of amylolytic, proteolytic and cellulolytic enzymes mixture on gain in body weight, feed consumption and feed efficiency during starter phase.

Materials and Methods

The study was conducted at Akbar Poultry Farm Munda, Timergara, Lower Dir.

One hundred and ninty two day old broiler chicks were randomly distributed into 4 main groups, A, B, C and D, where each main group was further divided into 4 sub groups cotnained 12 birds each. Four experimental diets viz, I, II, III and IV were randomly allotted to these groups (Table 1). All the four diets were containing 1 kg (basal feeding ingridients) added with 0, 1, 2 and 4 g/kg Driselase-1 (Table 2). Each ration was offered *ad libitum*. The experiment lasted for 21

Table 1: Experimental design

Treatments (rations x groups)		Replicates			
Rations	Groups	1	2	3	4
I	A	12	12	12	12
II	B	12	12	12	12
III	C	12	12	12	12
IV	D	12	12	12	12

Table 2: Composition of the starter experimental ration

Ingredients	Ration I	Ration II	Ration III	Ration IV
Driselase-1 (g)	0	1	2	4
Wheat bran (g)	200	200	200	200
Corn (g)	400	400	400	400
Fish meal (g)	50	50	50	50
Soybean meal (g)	100	100	100	100
Rice (g)	40	40	40	40
Vegetable oil (g)	50	50	50	50
Blood meal (g)	20	20	20	20
Corn gluten meal (60%) (g)	100	100	100	100
Di-calcium Phosphate (g)	19	19	19	19
Lime Stone (g)	12.5	12.5	12.5	12.5
Salt (g)	2	2	2	2
Vitamin Minerals Premix (g)	5	5	5	5
Lysine (g)	0.06	0.06	0.06	0.06
Methionine (g)	1.44	1.44	1.44	1.44
Total	1000	1000	1000	1000
Nutrient composition ME (Kcal/kg)	2895.9	2895.9	2895.9	2895.9
Crude protein	22.82	22.82	22.82	22.82
Crude fiber	7.72	7.72	7.72	7.72

days. The data were collected for feed intake, gain in body weight and feed efficiency. The data were statistically analyzed with the standard procedures of analysis of variance, using Completely Randomized Design (Table 1), while the mean values were compared by least significance difference (LSD) as described by Steel and Torrie (1981). The Statistical package (SAS, 2001) was used to perform the above analysis on computer.

Results and Discussion

Gain in body weight: Table 3 shows mean gain in body weight. Feeding starter rations along with the Driselase-1 (enzyme mixture) highly significantly change the gain in body weight of the experimental birds (Table 3). Rations IV, III and II containing Driselase-1 added at 4, 2 and 1 g/kg of starter ration consistently improve the gain in body weight comparing with control, while Driselase-1 added at 1 or 2 g/kg of starter ration did not change the gain in body weight.

The literature (Mahangna, 1995; Vukic *et al.*, 1995; Vukic, 1996) shows that the avian, especially the broilers (energy to meat converter) at the initial stage of their growth. had a limited avaiability of the endogenous amylolytic. Proteolytic and cellulolytic enzymes, to digest the high inclusion of dietary starch, protein and cellulose.

Such problem could be solved by compensating the endogenous enzyumes with the exogenous source, such as Driselase-1. Therefore, it was hypothesised that increasing level of Driselase-1 in the experimental diets of the broilers, at starter phase would consistently increase the gain in live weight. Becuase, the enzymes present in the driselase-1 such as amylase, protease and cellulase would sequentially enhanced the digestibility of the dietary starch, protein and cellulose, which in turn, would increase energy. The liberated energy would help to the experimental birds to improve not only their gain in body weight, but also their overall body vital activities. The result of the present study proved that the proposed postulate was found to be true. Because, the response of the experimental birds measured in

Table 3: Datra on weight gain, feed consumption, feed efficiency ratio on different levels of enzymes in rations at starter phase

Ration/Groups	1/A	II/B	III/C	IV/D	LSD values
Mean weight gain/chick (g)	518.25^{a}	570^{b}	586^{b}	635.24^{c}	22.81**
Mean Dry matter intake/chick (g)	635.00^{a}	557.25^{b}	544.25^{b}	583.00^{ab}	54.11*
Mean feed efficiency ration	1.29^{a}	1.12^{bc}	1.07^{c}	1.13^{b}	0.05**

Means in the rows with the same superscripts are not significantly different
**highly significantly different (P<0.01)

the form of gain in body weight was successfully elevated by increasing a 2 units increase in the Driselase-1 inclusion.

The results of the present study are further supporterd by the investigations of Yoshito *et al.* (1978), Kralik, (1993), also achieved the same increase in the live weight gain of the broilers by using energy nutrients degrading enzymes mixture in the maize or wheat grains based diets. Swain (1996) also obtained similar results by the supplementation of digestive enzymes (amylase, cellulase, pectinase, lipase and protease) to diets containing rice bran, wheat bran and sunflower cake for broiler is a high fiber ration. Maximum growth (P<0.05) was observed for the diets containing enzymes.

However, there are many other factors, which can directly or indirectly effect the gain in body weight in broilers when using enzymes. Sanna (1998) studied the effect of xylanase on broiler fed starter ration containing wheat more than 80% of the basal diets. They also obtained a higher (P<0.01) gian in body weight for the chicks (consumed enzyme treated rations.

Dry Matter Intake (DMI): Mean DMI of all the four experimental diets is given in (Table 3). Dirselase-1 inclusion positively effected (P<0.05) the DMI of the experimetnal chicks (Table 3) maximum DM was consumed by group A (control) followed by groups D, B and C Such observation precisely shows that Driselase-1 addition inversely modified the DMI.

These results are in agreemtn with those reported by Szczurek et al. (1998) supplemented protease, beta-glucanase and xylanase in the wheat and soybean based broilers starter ration. Enzyme supplementation reduced the DMI, effectively. Similarly, Bougon et al. (1999) achieved upto 3.7% reduction in DMI due to adding protease and glucanase in barley based broiler starter ration.

Feed efficiency (DMI g/gain in body weight g): In Table 3 mean feed efficiency of broilers fed starter ration containing different levels of Driselase-1. Dirselase-1 supplementation highly (P<0.01) enhanced the feed efficiency of the experimental chicks (Table 3). Better feed efficiency was due to adding Driselase-1 at 4 g/kg (Ration IV) followed by 2 g/kg (Ration III) and 1g/kg (Ration II) enzyme mixture as compared to control (Ration I). This could might be happened due to maximum digestion of the energy nutrients by Driselase-1 containing enzymes. These results are in confomity with those reported by Franchini, (1998) who incorporated cellulase, amylase, pectinase, xylanase and betaglucanase in the broiler ration. Feed to gain in body weight raio was positively improved in the chicks fed enzyme treated experimental diets.

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