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Effect of Enzyme Supplementation on the Performance of Broiler Finisher Fed *Microdesmis puberula* Leaf Meal

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Abstract: A thirty-five day feeding trial was conducted to evaluate the performance of broiler finishers fed *Microdesmis puberula* leaf meal supplemented with "Safzyme^{R}" (a cellulolytic enzyme). *Microdesmis puberula* is a choice tropical browse plant. Three broiler finisher diets were formulated to contain 0.0, 12.5% *Microdesmis puberula* leaf meal without enzyme. and 12.5% *Microdesmis puberula* leaf meal with 0.10% enzyme. One hundred and twenty (120) four-week-old Hubbard broiler chicks were divided into three groups of forty (40) birds each and randomly assigned to the three treatment diets in a completely randomized design (CRD). Data were collected on feed intake, body weight gain and feed conversion ratio. There was significant difference ($p<0.05$) in feed intake between birds on 0.0% leaf meal diet and birds on 12.5% leaf meal diet. Daily body weight gain of birds on leaf meal with enzyme diet did not significantly differ ($p>0.05$) from birds on leaf meal diets without enzyme supplementation. Birds on 0.0% leaf meal diet recorded the highest daily body weight gain. Feed conversion ratios of all treatment groups were comparable. The result suggests that 0.10% of the enzyme supplementation in diets containing 12.5% *Microdesmis puberula* leaf meal did not improve the performance of finisher broilers.

Key words: *Microdesmis puberula* leaf meal, cellulolytic enzyme, broilers performance

Introduction

Although poultry production represents one of the quickest means of correcting the anomaly of protein inadequacy, the rising cost of finished feed, which is 70 - 80% of the cost of production among others, is a major setback (Opara, 1996). The prices of such conventional protein feed ingredients such as groundnut cake, soyabean meal and fish meal have soared so high in recent times that it is becoming uneconomical to use them in poultry feeds (Esonu *et al*., 2001).

There is therefore need to look inwards for other alternative cheap sources of feed ingredients, which are not consumed by humans for the formulation of balanced ration for ruminants. One possible source of cheap feedstuff is the leaf meal of some tropical legumes and browse plants. Leaf meals do not only serve as protein source but also provide some necessary vitamins, minerals and also some oxycarotenoids, which cause yellow colour of broiler skin, shank and egg yolk (Esonu *et al*., 2001; D'Mello *et al*., 1987).

Some trials have been conducted to determine the response of birds and other non-ruminant animals to the inclusion of leaf meals from *Leauceana leucocephala* (Mateo *et al*., 1970; Vohra *et al*., 1972; D'Mello and Acamovic, 1989), *Gliricidia sepium* (Whiteman *et al*., 1985; Onwudike, 1995), *Cajanus cajan* (Udedibie and Igwe, 1989). *Microdesmis puberula* is highly preferred by goats in southeastern states of Nigeria. It is known in Igboland as 'Mkpiri" or "Mgbugbo" and in Yorubaland as "idiapata". It is a perennial browse plant having a dry matter of 85.73%, crude protein, 17.33%, Ash, 9.6%, crude fibre, 15.05%, ether extract, 3.35% and NFE, 24.05% (Esonu *et al*., 2001).

Table 1: Composition of *Microdesmis puberula* leaf meal

Nutrients	%DM
Dry matter (in air-dry meal)	84.90
Crude protein	17.30
Crude fat	6.52
Ash	12.20
Crude fibre	24.80
Nitrogen free extract	24.00
Gross Energy (MJ/kg)	18.70
Minerals	
Calcium	1.61
Magnesium	1.66
Sodium	2.00
Potassium	0.39
Phosphorus	0.24
Iron	1.90

The study herein reported was designed to evaluate the efficacy of cellulolytic enzyme supplementation on the performance of broiler finisher birds fed diets containing *Microdesmis puberula* leaf meal.

Materials and Methods

Microdesmis puberula leaves were harvested from the bushes around the Federal University of Technology, Owerri, Nigeria. The leaves were chopped for faster and effective drying and sun-dried for 3 days until they

Table 2: Composition of the treatment diets

Ingredients	Dietary levels (%)		
	Non-enzyme supplementation		Enzyme supplementation
	0.0	12.5	12.5
Maize	50.00	50.00	50.00
Soyabean meal	20.00	20.00	20.00
Fish meal	8.00	8.00	8.00
Leaf meal	0.00	12.5	12.5
Brewer's dried grain	5.00	2.00	2.00
Palm kernel meal	5.00	1.50	1.50
Whet offal	7.00	1.50	1.40
Bone meal	3.50	3.50	3.50
Enzyme	0.00	0.00	0.10
Salt	0.25	0.25	0.25
Vitamin premix*	0.25	0.25	0.25
Methionine	0.25	0.25	0.25
Lysine	0.25	0.25	0.25
Calculated chemical composition (% in DM)			
Crude protein	20.00	20.00	20.00
Crude fibre	4.12	6.87	6.88
Ether extract	3.88	4.67	4.66
Calcium	1.43	1.90	1.90
Phosphorus	0.58	0.59	0.59
ME (MJ/kg)	12.88	12.76	12.76

*To provide the following per kg of diet: Vitamin A, 10,000 iu; Vitamin D_3, 2000 iu; Vitmin E, 5 iu; Vitamin K, 2mg; riboflavin, 4.20mg; Nicotinic acid, 20mg; Folic acid, 0.5mg; Choline 3mg; Mg, 56mg; Fe, 20mg; Cu, 10mg; An, 50mg; Co, 125mg; Iodine, 0.8mg.

become crispy while still retaining the greenish colouration. The dried leaves were milled using hammer mill to produce a leaf meal. A sample of the leaf meal was then subjected to proximate analysis according to AOAC (1995). Mineral analysis was carried out by the methods of Grueling (1966) while gross energy was determined with a Gallenkamp adiabatic oxygen bomb calorimeter (Table1).

Three experimental broiler finisher diets were formulated such that they contained *Microdesmis puberula* leaf meal at 0.0 and 12.5% without enzyme and 12.5% *Microdesmis puberula* leaf meal with 0.10% enzyme (Safzyme^{R} - a cellulolytic enzyme). One hundred and twenty (120), 4-week-old Hubbard broiler chicks were divided into three groups of forty (40) birds each and randomly assigned to the three treatment diets in a completely randomized design (CRD). Each treatment was further divided into four replicates of ten birds each. Feed and water were provided *ad-libitum*. The birds were weighed at the beginning and thereafter on a weekly basis. Feed intake was recorded daily. Other routine poultry management procedures were maintained. The feeding trial lasted for 35 days. Data collected were subjected to analysis of variance (Snedecor and Cochran, 1978). Where significant treatment effects were detected from the analysis of variance, means were compared using Duncan's new Multiple Range Test as outlined by Obi (1990).

Results

The chemical composition of *Microdesmis puberula* leaf meal is shown in Table 1 while the nutrient composition of the experimental diets is shown in Table 2. Data on performance of broiler finisher birds on the various dietary levels of the leaf meal are presented in Table 3. Feed intakes of the treatment groups with leaf meal were significantly ($p<0.05$) higher than the control (0.0% leaf meal). Daily body weight gains of birds on leaf meal diets were not significantly different ($p>0.05$). Birds on the diet without leaf meal (control) recorded the highest daily weight gain, which was significantly higher ($p<0.05$) than that recorded by birds on enzyme supplemented diet, the lowest of all the treatment groups. There was no significant ($p<0.05$) difference in feed conversion ratio among the treatment groups. The intensity of the yellow colour of the shank, beak and skin of the broilers on *Microdesmis puberula* leaf meal was more pronounced than for birds on 0.0% leaf meal.

Discussion

The increased feed intake of the birds on the diets containing the leaf meal is understandable, leaf meals contain high fibre which tend to increase the total fibre content of the diet and dilute other nutrients. Birds must therefore eat to meet their energy requirement to sustain rapid growth and development hence the increased feed intake. This result disagrees with earlier reports from D'Mello *et al.* (1987); Ash and Akoh (1992); Opara (1996); Omekam (1994); Esonu *et al.* (2002). The comparable body weight gain of the groups on leaf meal diets (both enzyme supplemented and non-enzyme supplemented) is interesting. It could probably be that the enzyme Safzyme^{R} did not enhance the digestibility and utilization of cellulose and other nutrients in the leaf meal as anticipated. It would also appear that utilization of *Microdesmis puberula* leaf meal by birds is relatively high at the level offered in this study in view of the comparable body weight of birds in the control (0.0%) and 12.5% leaf meal without enzyme. Again this observation disagrees with earlier reports by Ash *et al.*, 1992; Cheeke *et al.*, 1983 and from this station (Esonu *et al.*, 2002; Opara, 1996; Udedibie and Igwe, 1989). However, the efficiency of utilization is lower for diets with leaf meal as the control diet (0.0% leaf meal) recorded the highest weight gain.

The intensity of yellow colour of the shank, beak and skin of the broilers increased in birds on the leaf meal diets.

Table 3: Effect of *Microdesmis puberula* leaf meal and enzyme supplementation on the performance of broiler finisher birds

Parameters	No enzyme	No Enzyme	With Enzyme	SEM
	0.05% Leaf meal	12.5% Leaf meal	12.5% Leaf meal	
Initial body weight (g)	460.00	450.00	470.00	5.78
Final body weight (g)	2140.00	2050.00	2065.00	27.87
Body weight gain (g)	1680.00^{a}	1600.00^{ab}	1595.00^{b}	27.57
Daily body weight gain (g)	48.00^{a}	45.71^{ab}	45.57^{b}	0.79
Daily feed intake (g)	145.00^{a}	162.80^{b}	161.40^{b}	5.72
Feed conversion ratio	3.02^{a}	3.56^{a}	3.54^{a}	0.18

a,b means within rows with different superscripts are significantly ($p<0.05$) different. SEM = Standard error of mean

This is an indication of efficient absorption and utilization of the pigmenting xanthophylls present in the leaf meal. The results of this trial suggests that supplementation of diets containing *Microdesmis puberula* leaf meal at 12.5% dietary level with enzyme (Safzyme^{R} - a cellulolytic enzyme) at 0.10% level could not improve the nutritive value of the leaf meal.

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