EFFECT OF POLYZYME® ON THE GROWTH RESPONSE OF BROILER CHICKEN FED SWEET ORANGE (*Citrus sinensis*) PEEL MEAL BASED DIETS

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ABSTRACT

The study evaluated the effect of Polyzyme® an exogenous enzyme on the growth response of Broiler Chicken fed Sweet Orange (Citrus sinensis) peel meal. 300 day-old broiler chicks were used. The birds were randomly grouped into five (5) dietary treatments D1, D2, D3, D4 and D5 of 60 chicks each. Each of the dietary treatments was further divided into two, one have enzyme and the other did not have. Each treatment was replicated 3 times with 10 birds per replicate. The experiment is a two by four factorial arrangement in a completely randomized design. Data was taken on feed intake, weight gain, feed conversion ratio and mortality. There was no significant difference between the treatment means for feed in-take average weight gain (AWG) feed conversion ratio (FCR) and mortality. This result suggested that the inclusion of SOP with enzyme (Polyzyme®) in broiler chicken diet did not have any noticeable negative difference on the performance of broiler chicken. The use of polyzyme® appears to improve the performance. More research is recommended to establish the best level of inclusion.

Keywords; Broiler Chicken, Performance, Polyzyme, Sweet orange peel, Mortality.

INTRODUCTION

The need to bridge the gap between protein demand and supply in Nigeria and the Sub-Saharan Africa has remained a long standing challenge for nutritionists in particular and animal scientists in general One of the major reasons for the low level of animal protein intake in the tropics and in Nigeria in particular is because livestock production is not keeping pace with human population growth rate put at 2.6% (UNDESA, 2017). Another critical reason is the scarcity of conventional feed stuffs (energy and protein sources) for monogastric animal feeding and consequently the cost of livestock feed. In Nigeria, feed cost is estimated to be about 70% of the total cost of intensive livestock production. The search for alternative feed resources which are less competitive, affordable, and readily available and can be efficiently converted by farm animals to meat and other consumable animal products for the enhancement of animal production has therefore become of great interest (Oluremi et al., 2008).

The poultry sector in Nigeria if properly harnessed has the potential of improving the nation's economy and the health status of the poor populace by providing affordable source of protein (Akinola, 2009). Nutrition and disease are the major limiting factors in poultry production. Availability of quality feed at a reasonable cost is therefore the key to successful poultry production. Poultry especially broiler, are excellent feed converters and do not suffer social infringements on consumer acceptability like other livestock species such as pig In spite of the aforementioned benefits derived from poultry, the ever-increasing cost of products such as meat and egg makes it imperative to explore the use of alternative feed ingredient that are cheaper, locally available and of low human preference in poultry feed formulation (Ani *et al*., 2015). One of such alternatives is the sweet orange (*Citrus sinensis*) peels. A number of residue materials like peels, pulp, rag and seed are produced when fresh citrus fruits are processed into juice, concentrates and canned fruits in developed countries (Chapman et al., 2000). The use of exogenous enzyme has been considered by some researchers (Alefzadeh *et al.,* 2016), but literatures are scarce on the use of exogenous enzymes to treat sweet orange peel meal in animal feeding. This study is therefore designed to investigate the effect of exogenous enzyme (Polyzyme®) on the utilization of sweet orange peel meal by broiler chicken.

MATERIALS AND METHODS

The experimental was carried out at the Poultry Unit in the Department of Animal Husbandry, School of Animal Technology, Akperan Orshi Polytechnic, Yandev, Gboko, Benue State, Nigeria. Three hundred day-old broiler chicks was obtained from a reputable hatchery. The birds were randomly grouped into five (5) dietary treatments D1, D2, D3, D4 and D5 of 60 chicks each. Each of the dietary treatments was further divided into two, one have enzyme and the other did not have. Each treatment was replicated 3 times with 10 birds per replicate. The experiment is a two by four factorial arrangement in a completely randomized design. Data was taken on feed intake, body weight gain, feed conversion ratio and mortality. All data were analyzed using analysis of variance

(ANOVA) procedures in the SPSS version 16.0 (March 8, 2008). Where significant difference exists, means were separated according to the procedure of the Duncan's Multiple Range Test.

RESULTS AND DISCUSSIONS

Results of the interaction effect of dietary sweet orange peel (SOP) by enzyme (Polyzyme®) supplementation on performance indices of broiler chickens are presented in Table 1.

Table 1: Interaction Effect of Dietary Sweet Orange Peel (SOP) by Enzyme (Polyzyme®) Supplementation on Performance Indices of Broiler Chickens

SOP X/ Enzyme	Average feed intake (AVFI)	Average Weight gain (AVWG)	Feed Conversion Ratio (FCR)	Mortality (MTLTY)
0% SOP 0g (Polyzyme) T_1	5921.36^{ab}	2392.67	2.50	0.67
40g (Polyzyme) T_2	7079.23^{ab}	2398.00	2.98	1.67
10% SOP 0g(Polyzyme) T_3	5441.68^{b}	2243.00	2.44	0.33
40g(Polyzyme) T_4	6112.41^{ab}	2381.67	2.60	1.00
20% SOP 0g(Polyzyme) T_5	6067.31^{ab}	2081.67	2.96	1.33
40g(Polyzyme) T_6	6009.79^{ab}	2460.00	2.45	1.00
30%SOP (Polyzyme) T_7	6333.50^{ab}	2455.67	2.57	0.67
40g (Polyzyme) T_8	5528.31^{b}	2104.00	2.82	0.33
40% Sop (Polyzyme) T_9	6554.80^{ab}	2293.00	2.85	1.33
40G (Polyzyme) T_{10}	5790.94^{ab}	2637.33	2.20	0.00
SEM	579078.129	121199.467	0.204	1.333
P	0.110	0.106	0.082	0.141
LS	S	NS	NS	NS

SEM = Standard Error of Mean, P = Probability Value, LS = Level of Significance, S – Significant (P>0.05), NS = Not Significant (P<0.05), ab = means of the same column with different superscripts are significantly (P>0.05) different,T1 – T10 = Treatments 1 – 100% - 40% = Percentage inclusion of SOP, 0g = no enzyme inclusion,40g = 40g enzyme inclusion

There was a significant difference (P< 0.05) in the treatment means of the average feeds intake (AFI) between the treatment means. This result is in agreement with the result of Abbasi *et al* (2014) who record significance in feed intake at the finishing stage. Also Oluremi *et al* (2017) reported significant difference (P<0.05) in treatment means although an exogenous enzyme was not included in the diet. There is no significant difference (P>0.05) in the treatment means between the treatments for average weight gain (AWG) feed conversion Ratio (FCR) and mortality. Report showed that average feed consumption of group fed the diet supplemented with 1.5% DSOP in starter phase developed in a better way during the whole rearing period and incorporation up to 3% DSOP in the mixture resulted in the lower feed intake reflected by a decreasing growth and by a much higher feed conversion ratio Some other researchers have reported similar results Oluremi *et al*, 2010; Ani et al 2015)

This result suggested that the inclusion of SOP with enzyme (Polyzyme®) in broiler chicken diet did not have any noticeable negative difference on the performance of broiler chicken both at the starter and finisher levels. The use of polyzyme® appears to improve the performance. The non significant difference may be as a result of the enzyme (Polyzyme®) which is known to help non-ruminant in handling high fibre in their diets. The significant difference that occurs in the average feed intake may be as a result of the somehow offensive odour of the sweet orange peel meal. But this does not affect the performance indices, average weight gain, feed conversion ration and mortality.The non-significant difference in mortality suggests that the SOP is not harmful to the birds. As such there was no mortality that is ascribed to the inclusion of the sweet orange peels.

CONCLUSION

This result suggested that the inclusion of SOP with enzyme (Polyzyme®) in broiler chicken diet did not have any noticeable negative difference on the performance of broiler chicken. The use of polyzyme® appears to improve the performance. More research is recommended to establish the best level of inclusion.

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