

PERFORMANCE OF BROILER STARTER ON CHICKENS FED HIGH FIBRE DIETS SUPPLEMENTED WITH ESSENTIAL MICROBES

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ABSTRACT

The performance of broilers fed high fibre diets supplemented with probiotics was examined using a total number of one hundred and eighty (180) day old Cobb 500 breed of broilers. The birds were randomly assigned to six (6) dietary treatments replicated three (3) times. Each replicate comprises of ten (10) birds. The experiment was a 2x3 factorial laid in complete randomized designed, which comprised of 2 levels (0 and 2mls) of essential microbes and 3 levels (2.5, 5 and 7.5%) of fibre at starter phase. Birds were given the same quantity of feed measured in grams, for the treatments combination T1, T2, T3, T4, T5 and T6 respectively. The result for the effect of main and interactive effect of probiotics and fibre on growth performance of broiler starter birds indicate that effective microorganism activated solution (EMAS) did not show significant ($P < 0.05$) differences on initial weight (IW), final weight (FW), weight gain per day (WG/D), average feed intake (AFI), feed conversion ratio (FCR), protein intake (PI), protein efficiency ratio (PER) and energy efficiency ratio (EER), except that of fibre that indicates significant ($P < 0.05$) increase in the AFI (41.2, 43.4 and 42.0g/birds) and FCR (1.53, 1.62 and 1.67).

Keywords: Performance, Microbes, High fibre, Broiler Chickens

INTRODUCTION

The poultry industry in the developing countries like Nigeria is faced with the challenges of meeting the demand of protein for the consumption of a geometrically rising population. Yakubu *et al.* (2010) suggested that the quickest potential for bridging protein supply-demand gap lies in the production of highly prolific animals that are efficient converters of feed to flesh and have short generation interval such as broilers. In the light of this and the inherent challenges faced by the industry in the area of meetings critical needs of feeds which constitute over 70% of production cost and legislation against the use of antibiotics (Casewell *et al.*, 2003), many advances in poultry productivity have been made through the use of nutritional supplements and that of probiotics compound into poultry feeds and water.

The use of probiotics is one method receiving considerable recent attention as a natural alternative to chemicals in enhancing animal productivity and improving product safely feeding of viable microorganisms (Brashears *et al.*, 2005). Similarly, the advantages of direct fed microbial consumption in humans have been documented (Mackowiak, 2013). However, their application and efficiency in livestock operations have only recently been pursued.

The influence of probiotics in fibre digestion has also been documented (Pérez-Burillo *et al.*, 2019). The essence of this study therefore is to see the viability of supporting farmers who usually mix the concentrate feeds with high fibre materials in an attempt to reduce cost of feeds supplied. Therefore, this study seeks to evaluate the effect of probiotics in the digestion of high fibre diets by broilers.

Materials and Methods

Study Location

The study was conducted at **IBAS farm Keffi**. The area is located in the Guinea Savanna zone of the North Central Nigeria. It is found in latitude $08^{\circ} 35'N$ and longitude $08^{\circ} 33'E$. The mean monthly maximum and minimum temperature is 35.06° and $20.16^{\circ}C$ respectively while the mean monthly relative humidity and rainfall is 74.6% and 168.9mm respectively (NIMET, 2019).

Experimental Birds and Management

A total of one hundred and eighty (180) day old Cobb 500 breed of broilers from Chikun Farm Kaduna, Kaduna state were used for this experiment. The birds were randomly assigned to 6 dietary treatments replicated 3 times. Each replicate comprises of 10 birds. Prior to the arrival of the birds, disinfectant (Morigad) was used to disinfect the pen. All the experimental birds were weight (to determine the initial weight) and they were provided with feed and water *ad-libitum*. Routine management practice was carryout throughout the period of the experiment. And at the age of 2 and 3

weeks the chicks were vaccinated against Gumboro disease and new castle disease (NCD) respectively.

Source of experimental materials

The essential microbes (EM) were procured from Songhai farm in Port Novo, Benin Republic. All others ingredient such as Maize, Soybeans, Wheat Offals, fish meal, bone meal, premix, methionine, salt and lysine were procured from Star Mega Feed Meal Ltd at one Man village Karu Local Government Area of Nasarawa State Nigeria.

Experimental design and diets

The experiment was a 2 x 3 factorial laid in Completely Randomized Designed. Which comprises of 2 levels (0 and 2ml) of Essential Microbes and 3 levels (2.5, 5, and 7.5%) of fibre at starter phase. The birds were given the same quantity of feed measured in grams; water was given *ad – libitum*. Records of feed consumption, weight gain and feed conversion ratio were taken. The starter diets were fed for 4 weeks (1 – 28days). Experimental diets were formulated to be isocaloric and isonitrogenous having 2850 kcal and 22% crude protein (CP). The experimental feed were formulated using least cost feed formulation software (feed win).

Gross composition of experimental diet for broiler starter

Ingredients	T1(2.5%cf)	T2 (2.5% cf)	T3 (5%cf)	T4 (5%cf)	T5 (7.5%cf)	T6 (7.5%cf)
Aflatoxin binder	4.85	4.85	0.05	0.05	0.05	0.05
Blood meal	6.00	6.00	1.00	1.00	3.00	3.00
Bone meal	2.50	2.50	3.50	3.50	1.60	1.60
Fish meal	5.50	5.50	4.00	4.00	5.00	5.00
Ground nut cake	0.00	0.00	4.00	4.00	5.00	5.00
Limestone	0.00	0.00	0.22	0.22	0.50	0.50
Lysine	0.00	0.00	0.00	0.00	0.00	0.00
Maize	52.00	52.00	41.90	41.90	37.00	37.00
Maize bran	0.00	0.00	5.55	5.55	0.15	0.15
Methionine	0.15	0.15	0.13	0.13	6.00	6.00
Molasses	0.50	0.50	0.00	0.00	0.20	0.20
Palm kernel cake	0.00	0.00	3.00	3.00	6.00	6.00
Palm oil	1.00	1.00	0.70	0.70	1.60	1.60
Premix	0.20	0.20	0.25	0.25	0.25	0.25
Rice bran	0.00	0.00	2.06	2.06	10.00	10.00
Salt	0.30	0.30	0.30	0.30	0.25	0.25
Sorghum	11.00	11.00	0.00	0.00	1.00	1.00
Soya beans toasted	16.00	16.00	26.64	26.64	15.00	15.00
Soya oil	0.00	0.00	0.00	0.00	0.00	0.00
Wheat bran	0.00	0.00	6.70	6.70	7.00	7.00
TOTAL	100	100	100	100	100	100
Essential microbe	0 ML	2ML	0ML	2ML	0ML	2ML
Nutrient and Energy composition						
ME/Kcal/Kg	3000.	3000.	3000.	3000.	3000.0	3000.0
	20	20	80	80	0	0
Crude protein (%)	21.45	21.45	22.00	22.00	21.50	21.50
Crude fibre (%)	2.50	2.50	5.00	5.00	7.50	7.50
Ether extract (%)	7.70	7.70	8.45	8.45	8.25	8.25
M+C (%)	0.91	0.91	0.89	0.89	0.90	0.90
Calcium (%)	1.20	1.20	1.00	1.00	0.82	0.82
Phosphorus (%)	0.81	0.81	0.80	0.80	0.77	0.77
Lysine (%)	1.30	1.30	1.20	1.20	1.16	1.16
Methionine (%)	0.53	0.53	0.51	0.51	0.52	0.52

RESULTS AND DISCUSSIONS

Main and interactive effect of essential microbes and fibre on growth performance of broiler starter birds. The results for the main and interactive effect of essential microbes and fibre on growth performance of broiler starter birds are presented in Table 2. The result indicated that effective microorganism activated solution (EMAS) did not show significant ($P>0.05$) differences on the growth performance of broilers starter for initial weight, final weight, weight gain per day, average feed intake, feed conversion ratio, protein intake, protein efficiency ratio and energy efficiency ratio. The result for the effect of fibre indicates significant ($P<0.05$) increase in the average feed intake (41.2, 43.4 and 42.0g/bird) and feed conversion ratio (1.53, 1.62 and 1.67). Birds fed on 5% fibre (43.4g/bird) had the highest feed intake values followed by 7.5% fibre birds than the 2.5% fibre birds. However the resultant feed conversion ratio was lower at 2.5% fibre compared with 5 and 7.5% fibre.

The interaction effect did not show significant ($P>0.05$) difference in the all the growth performance parameters.

The non-variation observed by bird's fed probiotics on the growth performance of broilers starter indicates that the mixture is safe for broiler production. This observation contradicts the previous work of Wondmeneh *et al.* (2014) who studied the effect of effective microorganisms (EM) on growth parameters and serum cholesterol levels in broilers and reported significant increase in the Weight gain when EM was supplemented in water. The significant increase in the average feed intake for birds fed 5% fibre (43.4g/bird) and the lower feed conversion ratio observed at 2.5% birds were due to inclusion of fibre in the diets which makes the birds to eat more to compensate the needed energy for growth. This disagreed with Agbabiaka *et al.* (2013) reported reduction the feed intake of broiler chicks when Feeding of high fibre feedstuff such as Tigernut might have resulted in gut filling in birds. However, Sundu *et al.* (2005) reports that voluntary feed intake of chickens or monogastrics have been established to be a function of dietary fibre characteristics. This is also in NAPRI (1985) who reported that replacing maize with wheat offal beyond 50% in broilers has also been reported to reduce chicken feed intake but disagreed the present research. Interaction of essential micros and fibre were in support of Sundu *et al.* (2005).

Table 2. Main and interactive effect of essential microbes and fibre on growth performance of broiler starter birds.

PARAMETER		IW	FW	WG/D	AFI	FCR	PI	PER	EER
S									
EMAS	0ml	44.52	782.96	26.38	42.16	1.62	9.31	2.83	24.61
	2ml	44.52	789.37	26.60	42.17	1.59	9.31	2.86	24.88
	SEM	0.00	27.57	0.99	0.35	0.06	0.08	0.11	0.93
FIBRE	2.5%	44.53	806.83	27.23	41.2 ^b	1.53 ^c	9.11	2.99	25.41
	5%	44.54	795.33	26.81	43.4 ^a	1.62 ^b	9.57	2.81	25.03
	7.5%	44.51	756.33	25.44	42.0 ^b	1.67 ^a	9.25	2.75	23.81
	SEM	0.00	33.77	1.21	0.43	0.07	0.10	0.13	1.14
EMAS* FIBRE	T1	44.55	860.10	29.10	42.64	1.49	9.45	3.08	27.18
	T2	44.55	817.30	27.60	42.17	1.53	9.34	2.96	25.76
	T3	44.50	715.40	23.90	39.25	1.67	8.67	2.76	22.36
	T4	44.50	753.60	25.30	39.67	1.57	8.76	2.89	23.64
	T5	44.52	773.30	26.00	44.58	1.72	9.81	2.65	24.29
	T6	44.52	797.20	26.80	44.67	1.68	9.83	2.74	25.25
	SEM	0.01	19.84	0.71	0.56	0.04	0.12	0.07	1.85
SOURCES OF VARIATION									
Emas	NS	NS	NS	NS	NS	NS	NS	NS	NS
Fibre	NS	NS	NS	*	*	NS	NS	NS	NS
Emas * fibre	NS	NS	NS	NS	NS	NS	NS	NS	NS

CONCLUSION

The results in this present research revealed no effect of probiotics and fibre in most of the parameters of growth performance in starter phase except on the feeding intake at 2.5 and 5% inclusion of fibre. However the resultant feed conversion ratio was lower at 2.5% fibre compared with 5 and 7.5% fibre. This indicates that the mixture is safe for broiler production.

RECOMMENDATION

Further research should be carryout to ascertain the effects of probiotics and dietary fibre on growth performance for both starter and finisher phase.

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