EFFECT OF TURMERIC, GARLIC, GINGER POWDER AND THE BLENDS ON GROWTH PERFORMANCE OF RABBITS

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ABSTRACT
Garlic, ginger and turmeric as phytogenic additives and natural growth promoters can be potential alternatives for common artificial growth promoters like antibiotics. Thus, this study was conducted to evaluate the effect of turmeric, garlic, ginger powder and their blends on growth performance of weaner rabbit. Forty-eight weaner rabbits (8 weeks) were randomly allotted into eight dietary groups designated T1 to T8 in a completely randomized design. The T1 contained 0% phytobiotic, T2, T3 and T4 contained 0.6% turmeric (Tr), garlic (Ga) and ginger (Gn) powder, T5, T6 and T7 contained combination of 0.3% each of Tr+Ga, Tr+Gn and Ga+Gn while T8 contained 0.2% each of the three phytobiotics. Data were collected for all the growth parameters and feed efficiency ratio. Result showed significant ($p< 0.01$) effect of phytobiotics on final body weight of the rabbits. Group fed 3gGaGn utilized diet better with complementary final weights of 2057.00g, total weight gain (1109g) and average daily weight gain (13.21g) when compared to rabbit group fed 6gGn (1339.50g) and 3gTrGa (1318.67g) as well as lowest total weight gain and average daily weight gain of 444.47g and 5.29g respectively. Rabbits fed 6gGa and 3gTrGn consumed larger average quantity of feed per day (65.42 and 65.18) respectively compared to other dietary groups. Nevertheless, rabbit group fed 6gGn consumed significantly ($p<0.01$) lower quantity of feed (50.82g) daily while rabbits fed 3gGaGn utilized feed more efficiently with efficiency of 0.21. It was concluded that rabbits fed blend of 3gGaGn had higher growth indices as well as better feed efficiency ratio, the blend is therefore recommended to reap beneficial effects that is greater than the sum of their separate effects.
Key words: Rabbit, Turmeric, Garlic, Ginger, Blend

INTRODUCTION

Rabbit production has the potential to improve protein consumption and income of many poor households (Spore, 2007). The meat offers excellent nutritive and dietetic properties with relatively high protein of quality biological value and only 7.4% fat (Combes and Dalle Zotte, 2005). Rabbit provides an inexpensive improved technological lean, highly digestible food with fine grained appetizing meat with relatively low saturated fatty acid and cholesterol content thus, it is relatively safe and suitable for special diets (McNitt *et al*., 2011). Garlic, ginger and turmeric as phytogenic additives and natural growth promoters can be potential alternatives for common artificial growth promoters like antibiotics (Demir *et al.,* 2003).These plant herbs are used as dietary additive in livestock because of their antioxidant, antimicrobial properties and they also serve as natural growth promoters (NGP) (Jo *et al*., 2003; Mancini, *et al*. 2017), however, there is dart of information on the cumulative effects of these phytobiotics on growth performance of rabbit. Also due to variation in the composition of their constituents as reported by (Visput 2019), there is need for combination to enhance stability, establish complementary action for optimal improvement on growth performance, feed intake and feed efficiency and this therefore necessitates the present study.

MATERIALS AND METHODS

The experiment was conducted at Cuniculture facility of Federal College of Agriculture Livestock Farm, Institute of Agricultural Research and Training, Ibadan, Oyo State, Nigeria. A total of 48 eight weeks old weaner rabbits were used for the study and were randomly allotted into eight dietary groups designated T1 to T8 in a completely randomized design (CRD) with each treatment having three replicates of two rabbits each. T1 (control) is with 0% phytobiotic, treatment 2, 3 and 4 contained a blend of 0.6% each of turmeric (Tr), garlic (Ga) and ginger (Gn) powder respectively while T5, T6 and T7 contained a blend of 0.3% each of Tr+Ga, Tr+Gn and Ga+Gn while T8 contained a blend of 0.2% each of the three test ingredients (Tr, Ga and Gn). Phytobiotics powders were added at different graded levels as treated diets while the feeding trial lasted 12 weeks. Data collected were

analysed using analysis of variance (ANOVA) as contained in SAS (2002). Significant means were separated using Duncan Multiple Range Test as contained in SAS (2002).

RESULTS AND DISCUSSION

The effect of phytobiotic additive on the growth performance of the experimental rabbits is presented in Table 1 and the results showed significant ($p<0.01$) differences on the growth parameters measured across the treatment groups. Phytobiotics significantly ($p < 0.01$) affected the final body weight of the rabbits. Rabbit group fed experimental diet 3gGaGn utilizes the diet better and had complementary better final weights of 2057.00g when compared to rabbit group fed 6gGn and 3gTrGa with comparable lowest final weight gain of 1339.50g and 1109.30g respectively. Similarly, rabbit group fed experimental diet 3gGaGn significantly ($p<0.01$) gained more weight both in the total and average daily weight (1109.30g and 13.21g respectively) than all other treatment groups while 3gTrGa had the lowest total weight gain and average daily weight gain of 444.47g and 5.29g respectively. Rabbit group fed 6gGa and 3gTrGn consumed significantly ($p<0.01$) larger average quantity of feed per day (65.42 and 65.18) respectively, however, a comparable lower daily feed intake was recorded in rabbits from the other four dietary groups. Nevertheless, rabbit group fed 6gGn consumed a significantly ($p<0.01$) lower quantity (50.82) of feed on a daily basis while rabbits maintained on 3gGaGn was able to utilize feed consumed efficiently when compared with animals in other treatment groups and it has a feed efficiency of 0.21 which was significantly ($p<0.01$) higher than other rabbit groups, meanwhile, rabbits maintained on 3gTrGa had the least (0.10) feed efficiency ratio.

Table 1: Effect of Dietary Phytobiotics on Growth Performance of Rabbits

	Experimental Diets									
Parameters	Control	6gTr	6gGa	6gGn	3gTrGa	3gTrGn	3gGaGn	2gTrGaGn	SEM	P-value
Initial weight (g)	863.30	980.20	990.00	855.70	874.20	894.50	947.70	990.00	97.32	0.820
Final weight (g)	1380.83^{cd}	1658.33^{bcd}	1841.33^{ab}	1339.50^{d}	1318.67^{d}	1704.00^{abc}	2057.00^{a}	1690.83^{ab}	104.15	0.001**
Total weight gain (g)	517.53^{d}	678.13^{bc}	851.33^{b}	483.80^{cd}	444.47^{cd}	809.50^{ab}	1109.30^{a}	700.83^{c}	91.99	0.007**
DWG (g)	7.26^{bcd}	8.07^{bcd}	10.91^{ab}	5.76^{cd}	5.29^{d}	9.64^{abc}	13.21^{a}	8.70^{abcd}	1.00	0.006**
DFI (g)	57.31^{c}	54.04^{d}	65.42^{a}	50.82^{e}	55.05^{d}	65.18^{a}	64.29^{a}	62.81^{b}	0.60	0.000**
FER	0.13^{bc}	0.15^{bc}	0.17^{b}	0.13^{bc}	0.10^{c}	0.15^{bc}	0.21^{a}	0.14^{bc}	0.96	0.002**

a,b,c,d,e Mean in the same row with different superscripts differ significantly ($P<0.05$); **: Significant difference at 1% ($P<0.01$)

KEYS: Control: Basal diet, 6gTr- Basal diet + 6g of turmeric powder, 6gGa- Basal diet + 6g garlic powder, 6gGn- Basal diet + 6g ginger powder, 3gTrGa- Basal diet + 3g of turmeric and garlic powder, 3gTrGn- Basal diet + 3g each of turmeric and ginger powder, 3gGaGn- Basal diet + 3g each of ginger and garlic powder, 2gTr GaGn- Basal diet + 2g each of turmeric, ginger and garlic powder. ADWG: Average daily weight gain; ADFI: Average daily feed intake; FER: Feed Efficiency Ratio

Improvement in growth parameters (final weight gain, total weight gain and average daily weight gain) recorded in rabbits groups fed blends of 3gGaGn might probably be due to synergetic effects of bioactive allicin, gingerols and Terpenes present in the two phytogenic feed additives that improve digestion, absorption and utilization of feed nutrients resulting in positive effects on rabbit health and consequence excellent growth. The enhanced body weight observed in this study strengthens the findings of Ademola *et al*. (2009) who reported significant increase in body weight gain of rats and broilers fed a mixture of garlic and ginger respectively. This result also corroborates the report of Rahimi, *et al.* (2011) and Issa and Omar (2012) that garlic when fed alone had no significant effect on body weight however, a resultant improved weight gain was produced when garlic was combined with ginger in 3gGaGn. The results of this trial also buttress the report of Gheisar *et al*. (2015) that supplementing broiler diet with blends of phytobiotic feed additives led to a 3.9 and 3.4% improvement in body weight gain and FCR, respectively. The relative and synergetic growth-promoting effects of garlic ginger blend reported in this present study was consistence with earlier assertion of Vispute, 2019 and that majority of the plant materials are stable, but their various constituents are photo or thermo-labile and are limited in action due to plant species, soil type, location, weather condition, harvesting procedure, storage conditions among others which may affect

their composition and potency of active ingredients and this suggests the use of more than one combination as being more efficient than just a single plant species (Jamroz, 2001). The enhanced average daily feed intake (ADFI) observed in rabbits maintained on 6g of garlic (6gGa) with the comparable value recorded in 3gTrGn diets could be as a result of garlic and ginger additives that is capable of controlling the microbiota which therefore improve digestive efficiency or I mmune status, and thus digestive health, resultantly improving the appetite of the rabbits and stimulate water and feed intake. According to Gregacevic *et al*. (2014), adding phytobiotics to monogastric feed reduces immune stress through anti-inflammatory and antioxidant activity, antimicrobial, antiviral, and anticoccidial effects.

CONCLUSION AND RECOMMENDATION

Study showed that rabbits fed combination of 3g of garlic and ginger had higher growth indices as well as better feed efficiency ratio, to reap beneficial effects that are greater than the sum of their individual effects and therefore recommended for farmers.

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