EFFECT OF AQUEOUS EXTRACTS OF GARLIC AND ALMOND LEAVES ON THE GROWTH AND BODY MORPHOLOGICAL INDICES OF WEANED RABBITS

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Abstract

The aim of this study is to evaluate the performance of rabbit fed with garlic and almond leave extracts on the growth performance of rabbit. In this study, an experimental design was adopted and a total of 12 rabbits at 4 weeks old were used. The rabbits in each replicate were weighed at the beginning of the experiment and weekly thereafter. A known quality of feed was given to each rabbit while leftover of feed was weighed to determine daily feed intake and consequently weekly feed intake. The body length was measured at the end of each week. All data collected were subjected to analysis of variance (ANOVA) in a completely randomized design using the SPSS (V10) software package. The final weight and weight gained were significantly ($p<0.05$) influenced by administration of garlic and almond leave extracts, with rabbits administered the combination of garlic and almond leave extracts having the significantly highest final weight and weight gained. From the results, the study concluded that administration of garlic and almond leaves extracts had significantly ($p<0.05$) influence on rabbit growth performance. The result from this study showed that to enhance an improved growth performance of rabbit, the administration of the combination of garlic and almond leave extracts can be adopted.

Keywords: garlic, Almond, Administration

Introduction

The domestic rabbits have been recommended as a good alternative source of dietary protein for the increasing human population in developing countries due to their short-cycled production characteristics (Ogunjimi, 2007). To ensure adequate supply of animal protein to the rapidly growing population of Nigeria, the output of animal products has to be increased especially by short-cycle animals such as rabbits (Ozor and Madukwe, 2001). Rabbits can also be produced from the enormous forages and feed materials that freely abound in the tropics having better advantage over poultry and pigs that require feed sources which are in direct competition with man (Ozor and Madukwe, 2005). The least cost diet formulation is considered a target so as to achieve a reduction in cost of animal production.
Most countries in West Africa especially Nigeria are richly blessed with forests containing arrays of different herbs, shrubs and trees. The leaves, stems, bark and roots of these plants are used by local populace due to their thin income and inadequate medical facilities across the country.

Some of the existing therapeutic agents or drugs were developed based on chemical compounds isolated from plants (Yang *et al.*, 2012). However, these plants and many more may have not been exhaustively explored which brings us to the ideas of possibilities of creating or discovering new products or antiviral agents from plants as the use of medicinal plants in treatment of animal and human diseases has become more prominent.
In Nigeria and many other African countries, rural and urban communities have continued to use or consult local herbs/medicine-men for remedies to a variety of diseases. Such plants include garlic (*Allium sativum*) and almond (*Terminalia catappa*).

Garlic and its constituents have been widely recognized as agents for prevention and treatment of cardiovascular diseases (Eilat-Adar *et al.*, 2013), as well as for inhibition of tumors development, reduction of tumor mass and decrease the number of mitotic cells within tumors (Wallace *et al*., 2013). Previous studies have shown that garlic preparations possess many biological activities including antiparasitic (Salama *et al*., 2014), antifungal (Suleiman and Abdallah, 2014), antibacterial (Shaheen *et al*., 2015) and antioxidative (Asdaq, 2015) activities.
Almonds contains high levels of fiber, arginine, magnesium, polyphenolic compounds, vitamin E, and monounsaturated fatty acids (MUFA), and consumption of more nut and peanut butter lowering risk of excess fat deposition (Jiang *et al*. 2011).

Varieties of herbs and spices have been successfully tried in animal production as growth promoters and immune-stimulants. Hence this research investigated the effect of garlic and almond on the growth performance of rabbits. In view of this, the study investigated the growth performance of rabbits fed diet containing garlic and almond leave.

Methodology

Experimental Location

The Experiment was carried out at the rabbitry unit of The Federal Polytechnic Ilaro, Ogun state, Nigeria. It is located in the humid tropical zone of south – western Nigeria and lies in altitude of above sea level and falls within latitude $6^0$53'43"N 2^0 58'37"E (GPS display 2022)

Experimental Sample Preparation

Fresh garlic was sourced from the market at Ilaro, Ogun State, Nigeria. And fresh leaves of the almond was collected from the school premises. Both the garlic and almond leave were washed and air dried separately, 4kg from each of the test samples were weighed, chopped and soaked into 100 litres of clean water in different containers for 72 hours. The solutions were shake vigorously at 24 hours interval after which extraction was done using sieve and muslin cloth to get fine filtrate. The filtrate were served to the animals according to their treatment.

Experimental Design

A total of twelve (12) mixed breed of both female and male weaned rabbit at 4 weeks old were gotten from the reputable farm. They were randomly weighed and distributed into four (4) treatment with three (3) replicates. Treatments were allotted thus as Treatment 1: Received water as control, Treatment 2: Received garlic aqueous extract while Treatment 3: Received almond leaves aqueous extract and Treatment 4: Received both almond and garlic extract

The feed and drinking water were offered *ad libitum* to the experimental animal. The pens, water trough and feed trough were cleaned, washed as well as disinfected at regular interval and the environment was often clean to maintain good hygiene. The animals were kept for two weeks to adapt to the experiment environment, lasted for 35 days.

Data Collection

Growth Performance Charateristics

The rabbits in each replicate were weighed at the beginning of the experiment at weekly interval. Thereafter the weight gained at each intake were obtained as a difference in the body weight of rabbit weekly. A known quantity of feed were given to each rabbit while the leftover of feed were weighed to determined daily feed intake and consequently weekly feed intake. The feed conversation ratio of each rabbit were determined by calculating the ratio of feed intake to weigh gain. The volume of water were offered and the left over was measured in (ml) volumetric flasks and the differences in volume were recorded as water intake in daily basic

Body Length Measurement

At the end of each week, parts such as the head shoulder, ear length, heart girth, body length, leg length and thigh length were measured with the use of a tape rule to determine difference amongst treatments.

Statistical Analysis

All data collected were subjected to statistical analysis in a complete randomized design CRD using SPSS (Statistical package for the social science 2010). Software package significant differences among treatment means were separated using Duncan multiple range.

Results and Discussion

Effect of garlic and almond leaves extracts on Growth Performance of rabbits

The effect of administration of garlic and almond leaves extracts on growth performance of rabbit are as presented in Table 1

The final weight and weight gained were significantly influenced by administration of garlic and almond leaves extracts, with rabbits administered with the combination of garlic and almond extracts having significantly highest

final weights and weight gained (2000.00g and 1076.67g respectively), while rabbits in the control group had the least value of final weight and weight gained as1530g and 460g respectively.

Feed conversion ratio was significantly influenced by the administration of garlic and almond extracts. Rabbits administered the combination of garlic and almond extract had the best feed conversion ratio (3:11).

Table 1: Effect of garlic and almond extracts on growth performance of rabbits

Parameters	T1	T2	T3	T4	SEM
Initial Weight (g)	1070.00	1170.00	1090.00	923.33	41.44
Final Weight (g)	1530.00^{b}	1936.67^{a}	1886.67^{a}	2000.00^{a}	64.30
Weight Gain (g)	460.00^{b}	766.67^{ab}	796.67^{ab}	1076.67^{a}	71.56
Weekly Weight Gain (g)	92.00^{b}	153.33^{ab}	159.33^{ab}	215.33^{a}	14.31
Total Feed Intake (g)	3438.33	3736.33	3561.67	3291.00	84.48
Weekly Feed Intake (g)	687.67	747.27	712.33	658.20	16.90
Water Intake (ml)	8457.67	7433.33	10067.33	7549.33	451.54
Weekly Water Intake (ml)	1691.53	1486.67	2013.47	1509.87	90.31
Daily Water Intake (ml)	241.65	212.38	287.64	215.70	12.90
Feed Conversion Ratio	7.50^{a}	4.95^{b}	4.54^{bc}	3.11^{c}	0.50

^{abc} *means in the same row with the different superscripts are significantly different* ($p<0.05$)

T1: Control, T2: Garlic extract, T3: Almond leave extract, T4: Combination of garlic and almond leave extract. SEM: Standard error of mean

Effect of garlic and almond extract on weekly Body length Performance of rabbits

The effect of administration of garlic and almond extract on weekly body length performance of rabbit is presented in Table 2-5. No significant effect was observed in week one of the experiment when rabbits were given garlic and almond extract as shown in table 2.

Leg length was significantly ($P<0.05$) influenced by the administration of garlic extract with rabbit offered the combination of garlic and almond leaves extract having the significantly highest leg length in week two of the experiment as shown in table 3.

Table 4 shows the effect of administration of garlic extract on the body length performance of rabbit at week three of this experiment. No significant effect was observed in the body length parameters when rabbits were fed garlic and almond leaves extract.

The effect of administration of garlic and almond extract on weekly body length performance of rabbit at week four of experiment is presented in 5. Rabbits administered the combination of fed garlic and almond extract had significantly ($P<0.05$) highest value of head-shoulder length (7.58cm), heart girth (15.50cm) and body length (18cm).

Table 2: Effect of garlic and almond leaf extract on growth performance of rabbits week 1

Parameters	T1	T2	T3	T4	SEM
Weight (kg)	1.33	1.45	1.63	1.43	0.09
Head-Shoulder length (cm)	4.67	5.00	4.33	4.33	0.23
Ear length (cm)	4.93	4.37	3.97	3.93	0.22
Hearth girth (cm)	12.00	12.00	11.00	10.33	0.28
Body length (cm)	11.83	11.67	11.67	11.00	0.26
Leg length (cm)	4.67	4.17	4.00	4.00	0.11
Thigh length (cm)	4.33	4.17	4.00	4.00	0.07

T1: Control, T2: Garlic extract, T3: Almond leave extract, T4: Combination of garlic and almond leave extract. SEM: Standard error of mean

Table 3: Effect of garlic and almond leave extracts on growth performance of rabbit week 2

Parameters	T1	T2	T3	T4	SEM
Weight (kg)	1.37	1.53	1.79	1.63	0.09
Head-Shoulder length (cm)	5.83	5.83	6.67	6.83	0.24
Ear length (cm)	5.17	5.00	5.07	4.67	0.09
Hearth girth (cm)	11.67	11.50	10.50	10.67	0.27
Body length (cm)	14.17	14.67	14.00	13.33	0.28
Leg length (cm)	4.23^{b}	4.77^{a}	4.80^{a}	4.83^{a}	0.09
Thigh length (cm)	4.97	4.67	5.40	4.50	0.17

^{abc} *means in the same row with the different superscripts are significantly different* ($p<0.05$)

T1: Control, T2: Garlic extract, T3: Almond leave extract, T4: Combination of garlic and almond leave extract. SEM: Standard error of mean

Table 4: Effect of garlic and almond leave extracts on growth performance of rabbit week 3

Parameters	T1	T2	T3	T4	SEM
Weight (kg)	1.40	1.53	1.80	1.97	0.09
Head-Shoulder length (cm)	6.33	5.33	6.67	6.33	0.21
Ear length (cm)	5.33	5.33	5.00	4.83	0.11
Hearth girth (cm)	11.50	12.00	11.67	10.83	0.24
Body length (cm)	16.00	15.50	16.33	15.00	0.23
Leg length (cm)	4.00	4.50	4.33	4.17	0.10
Thigh length (cm)	4.83	4.83	5.00	4.50	0.11

T1: Control, T2: Garlic extract, T3: Almond leave extract, T4: Combination of garlic and almond leave extract. SEM: Standard error of mean

Table 5: Effect of garlic and almond leave extracts on growth performance of rabbits week 4

Parameters	T1	T2	T3	T4	SEM
Weight (kg)	1.53^{b}	1.93^{a}	1.88^{a}	2.00^{a}	0.09
Head-Shoulder length (cm)	6.50^{b}	6.83^{b}	6.83^{b}	7.85^{a}	0.10
Ear length (cm)	5.33	5.33	5.17	4.83	0.09
Hearth girth (cm)	12.50^{b}	13.50^{b}	12.50^{b}	15.50^{a}	0.33
Body length (cm)	16.00^{b}	15.67^{b}	16.50^{b}	18.00^{a}	0.23
Leg length (cm)	4.90	4.67	5.00	4.63	0.09
Thigh length (cm)	5.00	4.83	5.00	4.67	0.11

^{abc} *means in the same row with the different superscripts are significantly different* ($p<0.05$)

T1: Control, T2: Garlic extract, T3: Almond leave extract, T4: Combination of garlic and almond leave extract. SEM: Standard error of mean

Results of this study revealed that administration of garlic and almond leave extracts have significant ($P<0.05$) influence on rabbit growth performance. Rabbits administered with the combination of garlic extract and almond leave extracts have the significantly highest final weights and weight gained. There was a significant increasing trends in the final weight and weight gained as administration of these plant extracts increased without significant increase in the feed intake.

Feed conversion ratio was also significantly ($P<0.05$) improved with the administration of garlic and almond leave extracts. Rabbit administered with the combination of garlic and almond leave extracts have the best feed conversion

of 3:11. Garlic contain calories (8%), essential amino acids (methionine and lysine), saturated fatty acid (1%), polyunsaturated acid (1%), dietary fiber (6%) (Omage *et al*., 2007).

Almond leaves contains vitamin E, vitamin K, fiber, riboflavin, saturated fat (10%), polyunsaturated acid (20%), monounsaturated fat (50%) (Kubala. 2017). The presence of these nutrients in the diet of rabbits can improve their growth performance. The result of the present study corroborates the study carried out by El-Speiy *et al*. (2017), who reported that administration of garlic significantly ($P<0.05$) improved the growth performance of rabbits. Omer *et al*. (2012) also reported that inclusion of combinations of several medicinal plants positively influenced the growth performance of rabbits.

Furthermore, administration of garlic and almond leave extracts significantly increased the body length performance of rabbits. Result was in line with the study of Suleiman and Abdallah, 2014, who reported significant increase in the body parts of rabbits when administered plant extracts.

Conclusion

From this study, it could be concluded that administration of garlic and almond leave extracts significantly influenced the growth performance of rabbits.

Recommendations

To enhance growth performance of rabbit, administration of the combination of garlic and almond leave extracts are recommended.

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