



Tropentag 2012, Göttingen, Germany September 19-21, 2012

Conference on International Research on Food Security, Natural Resource
Management and Rural Development organised by:
Georg-August Universität Göttingen and University of Kassel-Witzenhausen

Effects of soyabean oil and garlic-in-water supplementation on performance, carcass traits and blood indices of broiler chickens

Jegede, Olutola Busola and Onibi, Gbenga Emmanuel

Department of Animal Production and Health, The Federal University of Technology,
Akure, Ondo State, Nigeria

Introduction

Healthy eating trend is currently in favour of natural products. One of the natural supplements that could be used to maintain and improve health of humans is garlic (Jegede *et al.*, 2012). It serves as antioxidant, anti-ageing, antihypertensive and has a strong stimulating effect on the immune system. Allicin is the major active ingredient in garlic and its repulsive odour and pungent taste makes it however, not to be widely used by humans as food. It is conceivable that the addition of garlic in drinking water of broilers could be a way of exploiting the natural potentials of garlic through broiler meat to humans since monogastrics have the ability to incorporate dietary components directly into their tissues and this is the main aim of this study.

Material and Methods

Fresh garlic bulbs were blended with water into garlic slurry every day for the experimental chickens at 1.8g/L of water. A total of one hundred and sixty 4-week old Abor acer broiler starter chicks were randomly distributed into 4 treatment groups (TG) of 10 birds (5 males and 5 females) per replicate in a 2x2 factorial experimental design in which there were 2 diets (non-soyabean oil and soyabean oil diets) with or without garlic supplementation in drinking water. Birds were placed on their respective experimental diets for 4 weeks and the weekly feed intake, water intake and weight changes were measured while the trial lasted. Two female broilers were randomly selected from each replicate, weighed and slaughtered for haematological variables, serum cholesterol determination and Carcass characteristics measurement. Minitab Statistical Package (v.10.2, Minitab Inc. USA) was used for the analysis of data collected. Where significant differences were found, the means were compared using the Duncan Multiple Range Test (DMRT) of the same package.

Results and Discussion

Results on performance (Table 1) showed that the final live weight (FLW) and total weight gain (TWG) of the birds were significantly ($P<0.01$) affected by the dietary treatments with birds on the non-garlic supplementation consistently having higher values than those fed on garlic supplemented diets. Also, broilers fed on the soyabean oil-based diet had significantly ($P<0.01$) higher FLW and TWG than those fed the non-

soyabean oil diet. However, the FCR values of birds fed soyabean oil-based diets (2.46 and 2.54) were lower than those fed non-soyabean oil-based diets (2.56 and 3.01) for non-garlic and garlic-in-water supplementation, respectively ($P<0.05$). Also in Table 1, total water intake of birds fed supplementary garlic (5.59 ± 0.02 L/bird) was significantly ($P<0.05$) lower than those fed with non-garlic supplementation (5.89 ± 0.31 L/bird).

Table 1: Performance indices of broiler fed diets containing soyabean oil with or without garlic-in-water supplementation

Diet	Non-soyabean oil		Soyabean oil		Statistical Significance		
	No	Yes	No	Yes	Diet	Garlic Suppl.	DxG
Initial live wt. (kg/bird)	0.72±0.03	0.72±0.02	0.72±0.02	0.72±0.02	NS	NS	NS
Final live wt. (kg/bird)	2.37±0.06	2.25±0.03	2.39±0.03	2.36±0.04	**	**	NS
Weight gain (kg/bird)	1.64±0.06	1.44±0.12	1.67±0.03	1.63±0.03	*	**	NS
Feed intake (kg/bird)	4.19±0.11	4.29±0.60	4.11±0.07	4.14±0.19	NS	NS	NS
FCR	2.56±0.12	3.01±0.62	2.46±0.04	2.54±0.15	NS	NS	NS
Water intake (L/bird)	5.95±0.39	5.54±0.26	5.83±0.25	5.64±0.15	NS	*	NS

Mean ± Standard deviation; NS=Not significant ($P>0.05$), *= $P<0.05$, **= $P<0.01$; LW=live weight; FCR=Feed conversion ratio; DxG=Interaction of diet & garlic supplementation.

Table 2 showed that of the carcass characteristics measured only the relative weight of the breast was significantly ($p<0.05$) affected by the diets while the relative weight of the back was highly significantly ($p<0.001$) affected by garlic supplementation. Also, garlic-in-water supplementation numerically reduced abdominal fat deposition from 19.15 to 18.92 and 19.75 to 18.38 g/kg live weight in the diets.

Table 3 also showed that the haematological variables and the serum cholesterol content of the chickens were not significantly ($p>0.05$) affected but the addition of soyabean oil to diets and garlic-in-water supplementation numerically lowered serum cholesterol level (140.9 vs 136.6; 145.8 vs 130.4 mg/dl).

Table 2: Relative carcass characteristics of broiler fed diets containing soyabean oil with or without garlic-in-water supplementation

Diet	Non-soyabean oil		Soyabean oil		Statistical Significance			
	Garlic Suppl.	No	Yes	No	Yes	Diet	Garlic. Suppl.	DxG
Dressing (%)		92.35	92.80	92.17	93.46	NS	NS	NS
Eviscerated (%)		79.27	78.57	79.76	80.73	NS	NS	NS
Back (g/kgLW)		160.78	179.40	165.01	181.50	NS	***	NS
Breast (g/kgLW)		203.04	194.00	212.59	213.81	*	NS	NS
Drumstick (g/kgLW)		104.66	99.60	100.00	99.78	NS	NS	NS
Thigh (g/kgLW)		111.10	106.47	112.61	110.76	NS	NS	NS
Abdominal fat (g/kgLW)		19.15	18.92	19.75	18.38	NS	NS	NS

Table 3: Blood indices and serum cholesterol contents of broiler fed diets containing soyabean oil with or without garlic-in-water supplementation

Diet	Non-soyabean oil		Soyabean oil		Statistical Significance		
	No	Yes	No	Yes	Diet	Garlic. Suppl.	Dx G
ESR (mm/hr)	3.00	2.56	2.50	3.00	NS	NS	NS
PVC (%)	29.38	30.75	30.13	29.00	NS	NS	NS
RBC ($\times 10^6 \text{mm}^3$)	1.93	2.10	2.01	1.96	NS	NS	NS
Hb (g/100ml)	9.79	10.31	10.08	9.66	NS	NS	NS
MCHC (%)	33.31	33.53	33.44	33.32	NS	NS	NS
MCH (pg)	50.96	49.21	50.13	49.76	NS	NS	NS
MCV (μ^3)	152.96	146.75	149.83	149.36	NS	NS	NS
Serum cholesterol (mg/dl)	140.90	136.60	145.80	130.40	NS	NS	NS

ESR=Erythrocyte sedimentation rate, PVC=Packed cell volume, RBC= Red blood cell, Hb= Haemoglobin, MCHC=Mean cell haemoglobin concentration, MCH= Mean cell haemoglobin, MCV= Mean cell volume

Conclusions and Outlook

The supplementation of soyabean oil in the diet could lead to better broiler performance and garlic-in-water could help to numerically reduce the abdominal fat deposit with a concomitant serum cholesterol reduction.

References

Jegade, O.B. and Onibi, G.E. (2012). Effects of Soyabean Oil and Garlic-in-water Supplementation on Performance and Cholesterol Content of Broiler Chickens. NSAP Proc. (37): 278-280.