PERFORMANCE AND WATER INTAKE OF BROILER CHICKENS ON DIFFERENT WATER TASTES

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Abstract

One hundred and twenty day-old broiler chicks (Arbor acre) were used to investigate the effects of different water tastes on the weight gain, feed intake and water consumption pattern in broiler chickens. There were 4 treatment groups (tasteless, sweet, bitter and sour tasting water). Ten birds were allocated to each replicate and each treatment was replicated 3 times. Results indicated that water tastes significantly (P<0.05) influenced the total weight gain, total feed intake, total water intake, daily feed intake and daily water intake. Birds on sour and sweet tasting water had the highest significant (P<0.05) values (2.21±0.12 and 2.20±0.14kg/b/d), (102.23±2.75 and 100.25±5.12kg/b/d), (5.09±0.14 and 4.91±0.25kg/b), (10.34±0.51 and 10.67±0.43ml/b) and (210.98±10.42 and 217.72±8.86ml/b/d) than their counterparts on bitter tasting water for all the aforementioned parameters. It was concluded that broiler chickens had flair for sour and sweet tasting water but disliked bitter tasting water.

Key words: Broiler chickens, water tastes, performance.

Introduction

Poultry production provides an opportunity of meeting animal protein supply from livestock industry in Nigeria. For maximum efficiency in growth and development, the chickens must be well fed a diet containing all the required nutrients.

Water, the simplest of all substances in food, is the most important nutrient. Unfortunately, water is generally neglected in nutritional studies (Osuhor *et al.*, 2001). In its pure form, it is odourless, tastelessand transparent and it is essential to the developmental growth and survival of all animals (Swick, 2003). Water is needed in adequate quality and quantity. The quality depends to a large extent on the source and condition under which the water is provided.

Review of literature while not yielding a unanimous result of the effect of flavor, is conclusive that bird has well defined taste mechanism (Damron and Day, 1988). The difference between the two dozens taste organs identified in the chicken and a count of 9000 for human or 25000 for cow (El-Boushy and Kennedy, 1987) has cast some doubts on poultry tasting ability. This study therefore, investigates the effects of different water tastes (tasteless, sweet, bitter and sour) on the performance of broiler chickens.

Materials and Methods

One hundred and twenty day-old broiler chicks (Arbor acre) were randomly divided into 4 treatment groups (tasteless, sweet, bitter and sour tasting water).Ten birds were allocated to each replicate and each treatment was replicated 3 times. The experiment lasted seven weeks.

The different water tastes (bitter, sweet, sour and tasteless) used in this experiment was constituted in the following ways:

1. Sour tasting water: This was achieved using the principle involved in the pap making process, whereby the fermented water in ground maize was carefully decanted and used as sour taste water.
2. Bitter tasting water: For this, 250g of chloroquine tablet was added to 500 ml of water to obtain the desired bitter taste.
3. Sweet tasting water: For this, 12.5g of granulated sugar was measured and dissolved in 500 ml of water. This gave the desired sweet taste.
4. Tasteless water: Being the control, nothing was added to the water.

Feed was supplied *ad-libitum*. Water intake was determined daily and feed intake weekly. The volume of water served to the birds daily was measured using a measuring cylinder before pouring it into their respective water troughs. Proper litter management and other sanitary measures were carried out throughout the period of the experiment. The gross composition and calculated nutrients of the experimental diets are presented in Table 1.

Results

The general performance of broiler chickens or different water tastes is shown in Table 2. Analysis of results revealed that water tastes significantly (P<0.05) influenced the total weight gain, total and daily feed intake and total and daily water intake. However, water tastes significantly (P<0.05)

influenced the average water intake in these birds.

Discussion

Results obtained from this study indicated that broiler chicken had flair for tasteless (10.73±0.57 l/b and 218.92±11.66 ml/b/d), sweet (10.67±0.43 l/b and 217.72±8.86ml/b/d) and sour (10.34±0.51 l/b and 210.98±10.42 ml/b/d) taste water (Table 2). This could have been due to their respective tastes. This agrees with the report of Czarick *et al.* (2001) that birds will consume more water or feed with a sugar additive than without one. The lowest (9.41±0.26 l/b and 192.08±4.99 ml/b/d) numerical water intake obtained for birds on bitter tasting water implied that broiler chickens did not have flair for bitter taste. This agrees with the findings of Watkins (2000) which stated that in nature, most poisons are associated with bitter or alkaloids and it may be a natural response for birds to consume less water, if there is a bitter taste associated with it. Crina (1994) reported that chicks are sensitive to bitter-tasting substances and salt. The observed highest ($P<0.05$) daily feed intake (103.23±2.75g/b, 111.12±2.40g/b and 100.25±5.12g/b/d) and total feed intake (5.45±0.12kg/b, 5.09±0.14kg/b and 4.91±0.25kg/b) found in birds on sour and sweet tasting water might be due to the taste of water they were placed on. The lowest (4.81±0.13 kg/b) feed intake noticed in birds placed on bitter tasting water correlated with the lowest water intake (9.41±0.26 ml/b) and (192.08±4.99 ml/b/d) found in these birds on weekly and daily basis. This agrees with the report of Leeson and Summer (1997) which stated that water intake behavior of a bird is closely associated with its feed intake hence, any factor affecting water intake will indirectly affect feed intake. The observed weight increase found in birds on sour and sweet tasting water could be attributed to the sweet nature of the water they drank, which could have enhanced their feed intake. The more they eat, the more the probability of gaining weight. Dale and Fuller (1980) reported that 63% of growth depression could be attributed to reduced feed intake. Broiler chickens selected between water of different tastes. The birds had higher preference for sweet tasting water than bitter tasting one. This corroborates the findings of Vitazkova *et al.* (2001) which stated that research in animal nutrition and diet selection appear to assume that animals seek nutrients and avoid toxins since abnormal bitterness according to Maga (1990), tends to be equated with dietary danger.

Conclusion

The results of this study revealed that broiler chickens could select between water of different tastes. They had preferences for sweet water and disliked bitter tasting water confirming the presence of taste buds in birds.

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Table 1: Gross composition of the experimental diets (g/100g)

Ingredients	Starter	Finisher
Maize	50.50	61.00
Soyabean meal	13.50	8.40
Groundnut Cake	12.00	7.00
Palm Kernel cake	5.00	5.00
Fish Meal (72% CP)	8.00	7.00
Brewers Dried Grain	8.00	8.50
Bone Meal	1.70	1.70
Oyster Shell	0.20	0.20
Vitamin/Mineral Premix*	0.25	0.25
Salt	0.35	0.35
Lysine	0.20	0.20
Methionine	0.30	0.40
	100.00	100.00
Calculated Nutrient Content		
Metabolisable Energy (Kcal/Kg)	2866.88	2957.39
Crude Protein (g/100g)	23.38	18.98

Mean ± Standard deviation

*Composition of vitamin premix: Vitamin A (15,000,000iu); D (3,000,000iu); E (30,000iu); K (2,500mg); Thiamine, B_1 (2,000mg); Riboflavin, B_2 (6,000mg); Pyridoxine, B_6 (4,000mg); Niacin (40,000mg); Cyanocobalamin, B_{12} (20mg); D, Panthothenic acid (10,000mg), Folic acid (1,000mg), Biotin (80mg) and Trace elements as Cu (6g): I_2 (1.4g); Se (240mg); Co (240mg) Mn (96g); Zn (60g); Fe (24g) and other items as Choline Chloride (500mg). Antioxidant (125g) and Ca (120g) in 2.5 kg of premix.

Table 2: General performance of broiler chickens on different water tastes

Parameters	Tasteless	Bitter	Sour	Sweet	Stat. Sig.
Initial live weight (kg/b)	0.09±0.01	0.09±0.00	0.09±0.00	0.09±0.01	NS
Final live Weight (kg/b)	$2.32±0.04^a$	$2.17±0.10^b$	$2.31±0.11^a$	$2.29±0.14^a$	*
Total weight gain (kg/b)	$2.23±0.04^a$	$2.08±0.11^b$	$2.21±0.12^a$	$2.20±0.14^a$	*
Total feed intake (kg/b)	$5.45±0.12^a$	$4.81±0.13^b$	$5.09±0.14^a$	$4.91±0.25^a$	*
Daily weight gain (g/b)	$45.49±2.41^a$	$42.43±3.05^b$	$45.17±3.11^a$	$44.90±3.36^a$	*
Daily feed intake (g/b)	$111.12±2.40^a$	$98.23±2.66^b$	$103.23±2.75^a$	$100.25±5.12^a$	*
F.C.R	2.45±0.09	2.32±0.07	2.27±0.07	2.23±0.08	NS
Total water intake (l/b)	$10.73±0.57^a$	$9.41±0.26^b$	$10.34±0.51^a$	$10.67±0.43^a$	*
Daily water intake (ml/b)	$218.92±11.66^a$	$192.08±4.99^b$	$210.98±10.42^a$	$217.72±8.86^a$	*

Mean ± Standard deviation

NS = Not Significant (P > 0.05)

* = Significant (P< 0.05)

Means with different superscript within the same row are significantly different (P< 0.05)