Effect of Graded Levels of Baker's Yeast (*Saccharomyces Cerevisiae*) In Water on Carcass and Organ Characteristics of Broiler Chickens

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ABSTRACT

A total of 450 day-old Anak broiler chicks (mixed sexes) were used to determine the effect of yeast (Sachharomyces cerevisiae) as water additive on the carcass characteristics of broiler chickens. The study was conducted at the Teaching and Research Poultry Farm of Michael Okpara University of Agriculture, Umudike, Abia State, Nigeria. Five graded levels (0, 0.5, 1.0, 1.5 and 2.0 g per litre of drinking water) of yeast were investigated in drinking water. The experimental design was completely randomised design (CRD). Parameters measured were broiler starter and finisher performance, and broiler finisher carcass and organ characteristics. Results showed that starter broiler and finisher administered with 0.5 g yeast in drinking water had significantly (P<0.05) higher daily weight gain (23.72 and 56.13 g), final live weight (611.11 and 2182.66 g) and better feed conversion ratio (2.33 and 2.20) respectively, than those given 0 g and 2.0 g yeast in drinking water. The inclusion of 0.5 g per kg yeast in water significantly (P<0.05) improved daily weight gain (51.66 g) and final live weight (1908.85 g). Carcass and organ characteristics were not negatively affected (P<0.05). The conclusion was that yeast should be used to supplement in drinking water for broiler starters and finishers with inclusion levels up to 1.5 g per litre of water to enhance growth performance, carcass and organ characteristics.

Keywords: Performance, yeast additive, graded levels, Carcass and organ characteristics

INTRODUCTION

Rising costs of poultry feeds and the scarcity of conventional concentrates have forced animal nutritionists to seek cheaper alternatives and readily available protein and energy sources (Jegede *et al*., 1994). However, as the cost of the major feed ingredients continues to rise, there is still the need to maximize productivity (Uzegbu *et al*., 2007). Yeast (*Saccharomyces cerevisiae*), a probiotic and a fermentator could be used to improve feed quality and or enhance feed nutrient utilization of broilers. *Saccharomyces cerevisiae* is considered one of the live microorganisms that when administered through the digestive tract has a positive impact on the host health through its direct nutritional effects (Patterson and Burkholder, 2003).

Paryard and Mahmoudi (2008), had reported that inclusion of different levels of *Sachharomyces cerevisiae* in broiler chick diets significantly improved dressing percentage, breast, leg, liver, heart, gizzard and abdominal fat percentage of broilers. Feeding *Saccharomyces cerevisiae* improved breast and leg meat of broiler chicks. The dressing percentage and the proportions of the carcass, edible giblets and offals were not affected when birds were fed diets supplemented with yeast (Kumprechtova *et al.,* 2000; Naik *et al.,* 2000; Abdel-Azeem, 2002; Kwsar and El-Latif, 2007). Konca (2008) reported that neither mannan-oligosaccharides (MOS) nor yeast had any significant effect on carcass and cut part yields (breast, thigh, and wing), liver, heart, gizzard, intestinal system and abdominal fat.

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Blair *et al.* (2004) had also reported that supplementation with Mannon Oligosaccharides did not affect carcass yields as well as abdominal fat in broilers. Loddi *et al*. (2002), Peliciano *et al*. (2003), Alcicek *et al*. (2004), Karaoglu and Durdag (2005) and An *et al.* (2008) reported that supplementation of broiler diets with probiotics had no significant effect on carcass **.** Rutz *et al.* (2006) observed in broilers fed yeast extract (nucleotide source) a numerical improvement in carcass, as well as in drum, thigh, wing and breast yields.

MATERIALS AND METHODS

This study was conducted with 450 Anak broiler chicks of one week of age. The chicks were bought from Zartech Farm Limited Ibadan while vaccines, drugs and feed ingredients were bought from GOFON' S Vetrinary Services, Owerri, Imo State. The day-old chicks were brooded and reared (one week for adaptation) on floors spread with wood shavings (before putting them in their respective treatments for another 3 weeks of brooding) – the conventional deep litter house. The finisher phase was on deep litter, reared for another 4 weeks. Water was provided ad *libitum* during the brooding and rearing periods. Parameters studied were performance during the starter and finisher phases, and carcass characteristics of broiler finishers. Feed consumption and weight gain was taken daily. At the end of the trial period of 7 weeks, 3 birds were randomly caught and placed in metabolic cages in their respective treatments and were slaughtered in the University's Food and Nutrition laboratory after 1 week for carcass and organ parameters.

Data collected were subjected to T-Statistics using SPSS (2006) tool.

RESULT AND DISCUSSION

Starter broilers fed 0.5 g yeast in drinking water had improved daily weight gain and final live weight at the 4th week compared to those fed 0 and 2.0 g yeast in drinking water suggesting that yeast inclusion level is appropriate at 0.5% and should not get to 2.0 g. Paryad and Mahmoudi (2008) who reported that 1.5% yeast supplementation in broiler ration improved body weight gain and feed conversion ratio. The results obtained are equally in line with those of Shareef and Al-Dabbagh (2009) and Oyedeji *et al*., (2010) that 1.0, 1.5 and 2.0% yeast in the broiler diet significantly influenced feed consumption, feed conversion ratio and body weight gain. However, the results do not disagree with that of Gheisari and Kholeghipour (2004), who reported that both granular and powdery forms of live yeast had no growth effects on male broiler chicks probably due to the mixed sexed broiler we used.

Table 1. Performance of broiler starter chicks fed graded level of baker's yeast in water (2 – 4 weeks)

Parameters	*Graded levels of Yeast (g/l)*					*SEM*
	0.0	*0.5*	*1.0*	*1.5*	*2.0*	
Initial Live weight (g)	115.33	113.00	110.33	112.67	131.33	3.59
Final Live weight (g)	538.89^{b}	611.11^{a}	594.44^{ab}	583.33^{ab}	547.22^{b}	10.25
Daily Weight Gain (g)	20.17^{b}	23.72^{a}	23.05^{ab}	22.41^{ab}	20.60^{b}	0.49
Daily Feed Intake (g)	55.15^{c}	55.67^{bc}	57.56^{ab}	57.23^{ab}	58.26^{a}	0.39
Feed Conversion Ratio	2.78^{c}	2.33^{a}	2.50^{ab}	2.55^{ab}	2.86^{c}	0.07
Daily Protein Intake(g)	12.12^{c}	12.33^{bc}	12.75^{ab}	12.67^{ab}	12.91^{a}	0.09
Protein Efficiency Ratio	1.64^{b}	1.94^{a}	1.81^{ab}	1.77^{ab}	1.60^{b}	0.04

a, b, c: Means within the same rows with the same are not significantly (P>0.05) different.
SEM = Standard error of mean. Av = average.

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From Table 2, yeast application in water for broiler finisher improved all performance parameters studied against birds that were not given yeast in water. However, broilers fed 0.5 g yeast in water had significantly (P<0.05) higher daily feed intake, daily weight gain and final live weight than those given 1.5 and 2.0 g yeast in drinking water. Rutz *et al*. (2006) verified broiler performance improvement when fed yeast extracts and attributed the performance to the beneficial effects of the nucleotides present in yeast extract and to the presence of glucans/mannan/ fructo- oligosaccharides in yeast.

Table 2. Performance of broiler finisher fed graded levels of baker's yeast in water (5 – 8 weeks)

Parameters	*Graded levels of Yeast (g/l)*					*SEM*
	0.0	*0.5*	*1.0*	*1.5*	*2.0*	
Initial Live weight (g)	538.89^{b}	611.11^{a}	594.44^{ab}	583.33^{ab}	547.22^{b}	10.26
Final Live weight (g)	1957.0^{b}	2182.66^{a}	2152.33^{a}	1986.00^{b}	1906.67^{b}	33.53
Daily Weight Gain (g)	50.67^{abc}	56.13^{a}	55.64^{ab}	50.10^{bc}	48.55^{c}	1.04
Daily Feed Intake (g)	114.54^{c}	123.30^{a}	120.64^{ab}	116.00^{bc}	116.17^{bc}	1.03
Feed Conversion Ratio	2.27	2.20	2.17	2.32	2.39	0.04
Daily Protein Intake(g)	23.02^{c}	24.78^{a}	24.25^{ab}	23.32^{bc}	23.35^{bc}	0.21
Protein Efficiency Ratio	2.20	2.26	2.30	2.15	2.08	0.04

a, b, c: Means within the same rows with the same are not significantly (P>0.05) different.
SEM = Standard error of mean. Av = average.

From Table 3, birds fed yeast in water had significantly (P<0.05) higher dressing percentage than those in the control (0.0 g yeast in water). This disagrees with Konca (2008) who reported that neither mannan-oligosaccharides (MOS) nor yeast had any significant effect on carcass and cut part yields (breast, thigh, and wing), liver, heart, gizzard, intestinal system and abdominal fat. However, there were no significant (P>0.05) differences in dressing percentage of broiler finishers fed 0.0 g – 2.0 g yeast in drinking water. This could be attributed to increased yeast intake which produced negative effect. This followed the final live weights of chicks and broiler finisher patterns as in Tables 1 and 2. Percentage breast and wing were significantly (P<0.05) reduced by 1.0 g in water compared to birds fed 0 g and 1.5 g yeast in water. Percentage back-cut was significantly (P<0.05) higher in 0.5 g yeast fed in water more than 0 g, 1.0 and 2.0 g yeast.

Table 3. Carcass characteristics of broilers fed graded levels of baker's yeast in water

Parameters	*Graded levels of Yeast (g/l)*					*SEM*
	0.0	*0.5*	*1.0*	*1.5*	*2.0*	
Final Live weight (g)	1957.67^{b}	2184.67^{a}	2297.33^{a}	2174.33^{a}	2270.33^{a}	22.80
Slaughter weight (g)	2066.67	2250.00	2233.33	2200.00	23000	21.37
Dressed weight (%)	62.17^{b}	68.41^{a}	69.37^{a}	64.51^{ab}	69.13^{a}	0.97
Breast (%)	36.05^{ab}	34.57^{abc}	31.66^{c}	36.75^{a}	33.39^{bc}	0.60
Thigh (%)	22.33	21.50	21.37	21.98	22.02	0.39
Drumstick (%)	24.50	23.07	22.01	23.32	24.66	0.39
Wing (%)	20.46^{b}	18.5^{c}	18.27^{c}	20.19^{b}	24.41^{a}	0.61
Shank (%)	13.22^{ab}	12.46^{b}	13.02^{ab}	13.52^{ab}	14.97^{a}	0.35
Back Cut (%)	27.09^{b}	29.23^{a}	26.58^{b}	27.34^{b}	27.37^{b}	0.32

a, b, c: Means within the same rows with the same are not significantly (P>0.05) different.
SEM= Standard error of mean.

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From Table 4, broilers fed 1.5 g yeast in water had significantly (P<0.05) higher proventriculus compared to those fed 0 g yeast. On the other hand, 1.0 g yeast in water significantly (P<0.05) reduced gizzard and liver weights than other levels of yeast in water. It was also observed that there were no significant differences among the broiler finishers fed graded levels of yeast in water in the percentage of pancreas, kidney, heart, spleen, lung, small intestine and caecum.

The agrees with Kwsar and El-Latif (2007) who reported that edible giblets and offals were not affected when birds were fed diets supplemented with yeast as had been reported earlier (Kumprechtova *et al.,* 2000; Naik *et al.,* 2000; Abdel-Azeem, 2002). However, increased weight of proventriculus could be attributed to increased digesta due to increased feed intake in broiler chicken that received yeast in water. Reduced gizzard weights could be attributed to increased chemical digestion by yeast that resulted to reduced mechanical digestion in the gizzard while reduced liver weight could be attributed to reduced stress on the liver and this indicates that yeast has no negative effect on broiler performance.

Table 4. Organ characteristics of broilers fed graded levels of baker's yeast in water

Parameters	*Graded levels of Yeast (g/l)*					*SEM*
	0.0	*0.5*	*1.0*	*1.5*	*2.0*	
Proventriculus (%)	8.22^{c}	9.51^{b}	9.34^{b}	10.20^{a}	9.69^{b}	0.15
Gizzard (%)	10.66^{a}	9.51^{b}	9.34^{c}	10.20^{ab}	9.69^{b}	0.15
Liver (%)	10.41^{a}	9.56^{b}	8.65^{c}	10.37^{ab}	9.69^{ab}	0.20
Pancreas (%)	2.75	3.20	3.07	3.34	3.03	0.09
Kidney (%)	5.61	5.01	5.00	4.96	5.14	0.15
Heart (%)	4.08	4.12	4.23	4.13	4.51	0.07
Speen (%)	2.36	2.33	2.13	2.40	2.12	0.08
Lung (%)	4.08	5.16	5.00	5.25	4.41	0.16
Small Intestine (%)	16.64	16.10	15.37	17.58	14.70	0.42
Caecum (%)	6.46	5.25	5.28	6.02	5.90	0.16

a, b, c: Means within the same rows with the same are not significantly (P>0.05) different. SEM = Standard error of mean.

CONCLUSION

Yeast could be used to improve carcass and organ characteristics of broiler chickens. The conclusion was that yeast should be used to supplement either the drinking water of starter and finisher broilers with inclusion levels up to 1.5g per litre to enhance growth performance, carcass and organ characteristics.

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