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Performance of Finisher Broilers Fed Wet Mash with or Without Drinking Water During Wet Season in the Tropics

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Abstract: Finisher broilers were fed conventional dry and wet mash with varying amounts of water addition (1.0, 1.5, 2.0 parts of water to 1 part of feed) with and without drinking water. Feed intake was higher (P<0.05) in all wet-fed groups but one than birds that received the conventional dry mash. Live weight gain and carcass yield was better (P<0.05) in all wet-fed groups than dry mash feeding. However, feed conversion efficiency (FCE) was highest in birds that received 1 part of water to 1 part of feed with drinking water, their result is comparable to those on conventional dry mash feeding and significantly (P<0.05) better than other wet-fed groups. No significant (P>0.05) differences were observed in weights of the liver, spleen, intestine, abdominal fat, proventriculus, full-gizzard and caeca. This study recommends 1 part of water to 1 part of feed with drinking water for finisher broilers when raised on wet mash during wet season in the tropics.

Key words: Finisher broilers, dry mash, wet mash, water

INTRODUCTION

Wet mash feeding has been practiced for many decades in backyard poultry keeping using waste food scraps, peelings from cooked yam, and potato and many other available materials mixed up to give a sloppy mash. According to Yalda and Forbes (1996) poultry have traditionally been fed on wet mashes. This practice has however not been adopted under large-scale intensive production because it has not been thought to confer any definite advantage. Increasing evidence from research (Abasiekong, 1989; Yalda and Forbes, 1995; Coskun and Kutlu, 1997; Awojobi and Meshioye, 2001; Ogbonna *et al.*, 2001; Awojobi *et al.*, 2007) is pointing to the tendency that wet mash may have advantages over dry mash feeding. Research findings so far have shown that wet feeding significantly improved body weight gain per unit food by increasing the proportion of food that is absorbed from the digestive tract. Significant increase in daily feed intake, carcass yield and dramatic improvement in digestibility has been reported. Awojobi and Meshioye (2001) observed superior performance of wet-fed finisher broilers over dry mash feeding for feed intake, live weight gain and feed conversion efficiency but comparable performance for carcass yield. The experiment, which was conducted during wet season in the tropics, used 1 part of water to 1 part of feed. The birds on wet feeding also had drinking water. These researchers suggested further studies to examine higher amounts of water addition and also comparison of wet feeding with and without drinking water. Yalda and Forbes (1995) had earlier reported that birds given wet mash without drinking water compared favourably with those having drinking water. According to them, the provision of drinking water does not confer any advantage on the use of wet mash.

This study therefore investigated the live performance and carcass characteristics of finisher broilers raised on conventional dry mash feeding and varying amounts of water addition in wet mash feeding with and without drinking water.

MATERIALS AND METHODS

Seventy (70) six-weeks old broilers were used for this experiment. They had been raised on deep litter for four weeks and acclimatized in battery cage for two weeks. They were fed commercial broiler starter containing 22% CP, 4.5% EE, 4.5%CF and 2800Kcal/kg *ad libitum*.

From six weeks of age, they were fed a commercial broiler finisher containing 19% CP, 4.5% EE, 4.0% CF and 2850Kcal/kg. They were randomly allocated to seven experimental treatments equalized for the average initial live weight. Each treatment was replicated five times with two birds per replicate. The experimental treatments are:

- DRY: Conventional dry mash feeding with drinking water (Control).
- $WET^{+}_{1.0}$ Wet mash feeding (1 part of water to 1 part of feed) with drinking water.
- $WET^{+}_{1.5}$ Wet mash feeding (1.5 parts of water to 1 part of feed) with drinking water.
- $WET^{+}_{2.0}$ Wet mash feeding (2.0 parts of water to 1 part of feed) with drinking water.
- $WET^{-}_{1.0}$ Wet mash feeding (1 part of water to 1 part of feed) without drinking water.
- $WET^{-}_{1.5}$ Wet mash feeding (1.5 parts of water to 1 part of feed) without drinking water.
- $WET^{-}_{2.0}$ Wet mash feeding (2.0 parts of water to 1 part of feed) without drinking water.

The wet mash was prepared at the time of feeding. Feeding was *ad libitum*.

Daily feed intake and weekly body weight changes were measured. Feed conversion efficiency was also calculated. At ten weeks of age the birds were deprived of feed and allowed free access to drinking water for 18 hours. Thirty-five birds (1 bird per replicate) whose final live weights were close to the mean of each treatment were sacrificed and eviscerated. The internal organs: liver, gizzard, heart, intestine, proventriculus, spleen and abdominal fat were expressed as percentage of live weight. The dressing percentage was also calculated. Efficiency of performance was also evaluated in terms of Production Number (PN) as described by Euribrid (1994).

$$PN = abw \times \% \text{ live} / (Days \times Fc)\ 10$$

Where abw = average body weight

% live = percent live

Days = duration of experiment

Fc = Feed conversion

The data collected were subjected to analysis of variance for a completely randomized design as described by Steel and Torrie (1980) and significant means were separated using the Duncan's multiple range test.

RESULTS AND DISCUSSION

The data analysis for the four weeks experimental period showing the live performance characteristics of finisher broilers fed wet mash with and without drinking water is presented in Table 1. The final live weight gain, feed intake and feed conversion efficiency showed significant variation between treatments. The final live weight and weight gain were significantly ($P<0.05$) higher in birds that received wet mash (with and without drinking water) than those on conventional dry mash feeding. This agrees with the findings from earlier studies on broilers fed wet mash with and without drinking water by Yalda and Forbes (1995). However, Yalda and Forbes (1995) observed no significant differences among the different levels of water additions, which is contrary to the findings in this research. Birds on $WET^{-}_{1.5}$ had a significantly ($P<0.05$) higher final live weight than all the other treatments. Results on final live weight are comparable in birds on $WET^{+}_{2.0}$ and $WET^{-}_{2.0.}$ Similar observation has been reported for cockerels by Awojobi *et al*. (2007). However, birds on $WET^{+}_{1.0}$ had a better ($P<0.05$) final live weight than those on $WET^{-}_{1.0.}$ This is an indication that the eventual water intake from the feed by birds on $WET^{-}_{1.0}$ was below their minimum requirement. Weight gain was highest in birds on $WET^{-}_{1.5}$ and values were significantly higher ($P<0.05$) than for those on DRY and $WET^{-}_{1.0.}$ Feed intake was significantly higher ($P<0.05$) in all water additions than the control with the exception of birds on $WET^{+}_{1.0.}$ Higher feed intakes in wet-fed birds have been reported by Abasiekong (1989), Yalda and Forbes (1995), Ogbonna *et al*. (2001), Awojobi and Meshioye (2001) and Awojobi *et al*. (2007). Increased activation of endogenous enzyme (Fry *et al*., 1958) and induced hyperphagia as observed in rats (Ramirez, 1991) has been implicated as contributory factors to increased feed intake in wet-fed birds. Among wet-fed birds, feed intake was highest ($P<0.05$) in birds on $WET^{-}_{1.5}$. This is followed by $WET^{-}_{2.0}$ whose value was significantly ($P<0.05$) higher than the remaining wet-fed groups. Awojobi *et al*. (2007) has reported higher feed intake in cockerels fed wet mash without drinking water. The higher feed they opined became necessary to meet their water requirement. Feed conversion was best in birds on $WET^{+}_{1.0}$ and the value was significant ($P<0.05$) higher than all other wet-fed treatment but comparable to the control. Invariably, contrary to the reports of Yalda and Forbes (1995), the amount of water addition probably matters, perhaps in tropical climatic conditions. Production number was significantly highest ($P<0.05$) in $WET^{+}_{1.0.}$ This is followed by the control which differs significantly from other treatments. No mortality was recorded throughout the experiment. This showed that wet feeding with and without drinking water was not detrimental to the survivability of finisher broilers.

Table 2 shows the carcass characteristics and organ weights of broilers used for the experiment. Dressing percentage was significantly ($P<0.05$) higher in all wet-fed groups than the control. This agrees with the findings of Yalda and Forbes (1995). Awojobi and Meshioye (2001) however observed a non-significant higher dressing percentage in broiler finishers fed wet mash (1 part of feed to 1 part of water with drinking water) than the control. Among the wet-fed birds, dressing percentage was comparable though higher in wet-fed birds with drinking water. The highest dressing percentage was observed in birds on $WET^{-}_{1.0}$ Yalda and Forbes (1995) reported comparable dressing percentage in wet-fed birds whether with or without drinking water. The weights of the spleen, intestine, liver, abdominal fat, proventriculus, full-gizzard and caeca were not significantly ($P>0.05$) affected by wet feeding. Awojobi and Meshioye (2001) however observed significant increase in abdominal fat deposit in birds fed wet mash. Empty gizzard weight was higher in birds on $WET^{-}_{2.0}$ than the control but comparable to other treatments. This is contrary to the higher gizzard weights in the control birds reported by Awojobi and Meshioye (2001) and Awojobi *et al*. (2007) for broilers and cockerels respectively. Heart weight was heavier ($P<0.05$) in $WET^{+}_{1.0}$ than the control, which is similar to earlier reports by Awojobi and Meshioye (2001). The heart weight in $WET^{+}_{1.0}$ is comparable to $WET^{-}_{1.0}$ and $WET^{-}_{2.0}$ and is significantly higher ($P<0.05$) than that of other treatments. The pattern of heart weight changes did not follow a particular trend.

Table 1: Live performance characteristics of broilers fed wet mash with or without drinking water

	Treatments							
	DRY	$WET^{+}_{1.0}$	$WET^{+}_{1.5}$	$WET^{+}_{2.0}$	$WET^{-}_{1.0}$	$WET^{-}_{1.5}$	$WET^{-}_{2.0}$	
Characteristics	1	2	3	4	5	6	7	±SEM
Initial live weight (g)	558.25	567.5	563.75	564.5	558.5	569.5	567.5	33.1
Final live weight (g)	1647.4^{d}	1830.5^{b}	1792.5^{c}	1868.7^{b}	1807^{c}	1947.5^{a}	1859^{b}	52.5
Weight gain (g)	1089.15^{c}	1262.95^{ab}	1288.75^{b}	1304.25^{ab}	1248.5^{b}	1378^{a}	1291.5^{ab}	36.7
Feed Intake (g)	5915.8	4953.7^{g}	9311.6^{d}	10016.2^{c}	8904.0^{e}	14701.8^{a}	12515.3^{b}	119.4
Feed conversion efficiency	0.18^{ab}	0.26^{a}	0.13^{b}	0.13^{b}	0.14^{b}	0.09^{b}	0.10^{b}	0.03
Production Number (PN)	109.3^{b}	166.4^{a}	83.1^{c}	88.6^{c}	92.10^{c}	69.4^{d}	66.4^{d}	4.8
Mortality	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-

[a b c d e f g]Means with different superscript in a row differ significantly (P < 0.05)

Table 2: Mean carcass characteristics and organ weights (expresses as % live weight) of broilers fed wet mash with or without drinking water

	Treatments							
	DRY	$WET^{+}_{1.0}$	$WET^{+}_{1.5}$	$WET^{+}_{2.0}$	$WET^{-}_{1.0}$	$WET^{-}_{1.5}$	$WET^{-}_{2.0}$	
Variable	1	2	3	4	5	6	7	±SEM
Dressing %	60.02^{c}	64.60^{ab}	64.40^{ab}	65.43^{ab}	66.90^{a}	66.30^{ab}	66.00^{ab}	1.40
Spleen	0.44	0.13	0.10	0.13	0.11	0.14	0.14	0.12
Intestine	3.30	4.00	3.40	3.70	4.10	4.00	3.60	0.48
Heart	0.50^{b}	0.60^{a}	0.44^{b}	0.50^{b}	0.54^{ab}	0.50^{b}	0.54^{b}	0.02
Abdominal fat	1.30	2.00	1.70	1.70	1.90	1.62	1.62	0.28
Liver	1.80	1.93	1.77	1.74	1.86	2.03	1.84	0.12
Proventriculus	0.29	0.37	0.30	0.36	0.29	0.34	0.29	0.02
Empty gizzard	1.60^{b}	1.78^{ab}	1.78^{ab}	1.87^{ab}	1.68^{ab}	1.75^{ab}	2.10^{a}	0.13
Full gizzard	2.20	2.35	2.51	2.50	2.40	2.30	2.70	0.26
Caeca	0.50	0.56	0.53	0.55	0.61	0.55	0.60	0.05

a b Means with different superscript in a row differ significantly (P < 0.05)

Conclusion: The results of this research demonstrated higher (P<0.05) feed intake, weight gain and dressing percentage in wet-fed bids than conventional dry feeding. However, feed conversion efficiently was lower in all wet-fed birds except $WET^{+}_{1.0}$. In fact birds on $WET^{+}_{1.0}$ had a non-significant (P>0.05) better feed conversion efficiency than the control. $WET^{+}_{1.0}$ also had a significantly (P<0.05) higher dressing percentage than the control. On account of feed conversion efficiency and carcass birds on $WET^{+}_{1.0}$ is better than the control and will probably translate to more economic gain to the farmer. From the finding of this result, 1 part of water to 1 part of feed is recommended for wet mash feeding of finisher broilers during wet season in the tropics. When wet feed is to be used without drinking water this research also favours the use of 1 part of water to 1 part of feed.

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