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BLOOD CHEMISTRY AND CARCASS YIELD OF COCKERELS FED MELON HUSK DIETS

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Target Audience: Nutritionists, poultry farmers.

ABSTRACT

The objective of this study was to investigate the serum metabolites and carcass yield of cockerels fed melon Husk (MH) diets. A total of 120 day-old Harco cockerels were fed four experimental diets in which maize was replaced with MH at 0, 10, 20 and 30 % levels. Cholesterol, total protein and other serum metabolites were generally higher on the control diet than on MH diets. There was inverse relationship between total protein, albumin, uric acid and levels of MH in the diet. The values decreased with increase in the level of MH in the diet.

Dressed weight was superior with a value of 55.58 % on 20 % MH diet. The heart and liver of birds fed on control diet were heavier than those fed on MH diets. However, gizzards and intestines recorded highest weights respectively on 30% MH diet.

Similar trend was observed in caecal weight which recorded the highest value of 1.75% on 30% MH diet.

Maize can be replaced with 20% MH in starter diet of cockerel without adverse effects on blood constituents and carcass yield.

Key words: Blood chemistry, carcass yield, cockerels, melon husk diets.

DESCRIPTION OF PROBLEM

Effects of dietary treatments on blood constituents have been documented in previous studies (1, 2). This is because blood carries nutrients and oxygen to body cells. Consequently , biochemical and haematological estimations are sometimes used as valuable aids for diagnosis particularly in veterinary medicine. Report of tissue damage in layers following dietary rapeseed meal has been investigated (3).

Information on the use of Melon husk (MH) in poultry diet is scanty However some other similar crop residues such as cocoa husk, maize husk and cowpea husk have been fed satisfactorily to livestock. Water melon is a widely cultivated plant in Nigeria because the seeds are used as condiment in stew and soup. After harvesting, melon husk are usually allowed to rot away on the farm. Harnessing such crop residues which is not directly utilisable by man will assist in reducing feed cost in poultry production

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The aim of this study was to investigate the blood constituents and carcass yield of cockerels fed MH diets in which maize was replaced with MH at 0, 10, 20 and 30% levels.

MATERIALS AND METHODS

A group of 120 day-old Harco cockerels were collected from a commercial hatchery in Abeokuta, Ogun State, Nigeria for the study. The birds were brooded for 5 days and later allocated randomly to 4 experimental starter diets. Each diet was replicated three times with 30 birds per treatment. The maize in the diet was replaced with MH at 0, 10, 20 and 30% levels . The gross composition of experimental diets is presented in Table 1.

Gross energy was determined with a ballistic bomb calorimeter while metabolisable energy (ME) was estimated with formula (4) in which : ME (kcal/kg) = 37 x % crude protein + 81 x % fat + 35.5 x % NFE.

Table 1: Composition (%) of experimental diets

	Replacement levels of MH			
Ingredients	0%	10%	20%	30%
Maize	41.50	37.35	33.20	29.05
Melon husk	--	4.15	8.30	12.45
Soyabean meal	18.00	18.50	19.00	19.10
Palm kernel cake	18.10	18.00	22.00	27.00
Wheat Offal	15.10	14.60	10.10	5.00
Fish Meal	0.20	0.20	0.20	0.20
Blood Meal	3.25	3.25	3.25	3.25
Bone Meal	2.50	2.50	2.50	2.50
Oyster Shell	1.00	1.00	1.00	1.00
Premix	0.20	0.20	0.20	0.20
Salt	0.25	0.25	0.25	0.25
Total	100.00	100.00	100.00	100.00
Calculated Analysis				
CP (%)	20.26	20.34	20.51	20.56
CP (%)	5.47	6.58	7.83	9.12
ME (kcal/kg)	2688.53	2657.96	2639.60	2620.98

Feed and water were provided *ad libitum* while birds were vaccinated against Newcastle, Mareks and Gomboro diseases. At the end of 8 weeks blood samples were collected from the wing vein of 5 birds per replicate for laboratory analysis of cholesterol, total protein, albumin, creatinine and uric acid. The birds were later slaughtered and dressed for the determination of organ weights. Data obtained were subjected to analysis of variance while significant means were tested using Duncan's New Multiple Range Test (5).

RESULT AND DISCUSSION

The chemical composition of melon husk used in this study is shown in Table 2. Dietary treatments had no significant effects ($P<0.05$) on all parameters monitored in the blood (Table 3). Cholesterol levels ranged between 135.33 and 149.00mg/dl. The highest cholesterol concentration was obtained on the control diet while the lowest value of 135.33mg/dl was obtained on 30 % replacement of maize with MH. This probably indicated that MH is lower in cholesterol level than maize. Similar findings of lower cholesterol concentrations in cockerels fed with cocoa husk diets have been reported (6).

Table 2: Chemical composition of Melon Husk

Composition	%
Dry Matter	90.08
Crude Protein	9.52
Crude Fibre	29.00
Ash	15.70
Nitrogen free extract	28.03
Ether Extract	17.75
Gross Energy (kcal/g)	2.91
ME (kcal/g)	2.50

Total protein and albumin values showed inverse relationships. The values decreased with increase in the level of MH in the diet. The highest total protein of 4.40mg/dl was recorded on the control diet while lowest value of 3.77mg/dl was obtained on 30% MH diet. Total protein was reported as an indication of the protein reserve in an animal in an earlier study (7).

There was no particular trend in creatinine concentration. A lower range of 0.87-1.00mg/dl creatinine was observe in the present study. Higher range of 1.33-3.42mg/dl creatinine was reported (6) when cockerels were fed on cocoa husk diets. Uric acid level decreased with increase in the level of MH in the diet. This may suggest that the protein and amino acid profile of MH is of poor quality. Blood urea is believed to be inversely related to the quality of protein (8).

Results of carcass yield and organ weights are shown in Table 4. Dressed weight was superior on 20% MH diet with a value of 55.38 % while the poorest dressed weight of 51.93% was obtained on 30 % MH diet. Previous investigators (9) observed that the yield of carcasses of birds on high-fibre diets was sligthly lower than that of birds fed low-fibre diets.

There appeared to be a close relationship between liveweight of cockerels and abdominal fat. Birds with the highest liveweight of 491.37g had the highest abodominal fat content of 0.16% on 10% MH diet. However , lower values of abdominal fat were observed on 20% and 30% MH diets which contained crude fibre content of 7.83% and 9.12% respectively. The type of feed tends to

influence protein and fat contents of cockerels (10). Abdominal fat can be reduced in birds. Abdominal fat was reduced by feeding birds with high crude protein grower or finisher diets (11). In a related study, the use of less expensive protein source was suggested to reduce abdominal fat in birds (12).

Table 3: Serum Metabolites of cockerels fed melon Husk diets.

Parameters	Replacement levels of MH				
	0%	10%	20%	30%	correlation coefficient
Liveweight (g)	422.87± 50.50	491.37±22.80	451.43 ± 7.40	414.37 ± 16.60	—
Cholesterol (mg/dl)	149.00± 3.79	144.67± 3.53	147.67 ± 2.19	135.33 ± 11.22	-0.08*
Total Protein (mg/ dl)	4.40 ± 1.16	4.17± 0.88	4.13 ± 1.76	3.77 ± 2.96	0.23*
Albumin (mg/dl)	2.60 ± 0.58	2.50± 0.58	2.43 ± 0.88	2.27 ±2.03	0.20*
Creatinine (mg/dl)	1.00 ± 0.06	1.00± 0-.00	0.87± 0.03	0.90 ± 0.06	0.43*
Uric acid (mg/dl)	2.18 ± 0.88	2.10 ± 0.58	2.00± 0.88	1.83 ±1.45	0.77*

Means in the same row are not significantly different (P> 0.05).

The results of organ weights expressed as percentage of liveweight were not statistically significant (P<0.05) . The heart and liver of birds on control diet were heavier than those fed with MH diets. The highest values recorded for the heart and liver on control diets were 0.73% and 3.05% respectively. In a study of fatty liver syndrome, it was indicated that liver weight is influenced by the nature of fat in the diet (13). Further studies on weights of supply organs confirmed that heart, liver, lungs and kidney were not affected by food restriction (14, 15).

Table 4: Carcass Yield and Organ weights of cockerels fed Melon Husk diets

Parameters	Replacement levels of MH			
	0%	10%	20%	30%
Liveweight (g/bird)	422.87+50.50	491.37±22.80	451.43+ 7.40	414.37+16.60
Dressed weight (%)	54.95 ± 0.90	55.06 ± 1.30	55.38 ± 1.90	51.93 ± 2.50
Abdominal fat (%)	0.14 ± 0.08	0.16 ± 0.02	0.03 ± 0.00	0.08 ± 0.04
Heart (%)	0.73 ± 0.05	0.69 ± 0.02	0.69 ± 0.02	0.69 ± 0.05
Liver (%)	3.05 ± 0.53	2.50 ± 0.14	2.58 ± 0.14	2.73 ± 0.13
Gizzard (%)	3.87 ± 0.48	3.75 ± 0.59	3.43 ± 0.16	4.13 ± 0.38
Small intestine (%)	7.36 ± 0.52	7.72 ± 0.83	7.91 ± 1.27	9.63 ± 1.11
Large intestine(%)	0.69 ± 0.11	0.86 ± 0.10	0.78 ± 0.14	1.26 ± 0.29
Caeca (%)	1.28 ± 0.06	1.47 ± 0.10	1.40 ± 0.10	1.75 ± 0.08

Means in the same row are not significantly different (P>0.05).

The highest gizzard weight of 4.13% was obtained on 30% MH diet which contained the highest fibre content. Report of increase in gizard weight of laying hens fed with fibrous sunflower meal product has been documented (16).

Weights of small and large intestines were heavier for birds fed on MH diets than those fed with control diet. This could be associated with the method of clearance of feed from the intestinal tract. Chickens with heavier relative gut weight have been found to have slower gastro- intestinal tract clearance than those with lighter digestive tract (17) A related study (18) concluded that weight and length of intestinal tract of birds in which the level of food intake is controlled for long periods is increased at 6-7 weeks of age. However contrary views were expressed (19, 15) that as chickens mature, the digestive tract decreases in weight relative to body weight.

Caecal weight was heavier on MH diets that on control diet. This could be a symptom of hypertrophic reaction to the fibre content of MH diets. In a previous investigation (20), 7 % cocoa husk was recommended in the starter diet of cockerel where 25 % of wheat offal was replaced with cocoa husk. The result of the present study indicated that best result of dressed weight and very little abdominal fat were recorded on 20% replacement of maize with MH. This implies the inclusion of 8% MH in the starter diet of cockerel without abdominal characteristics in the blood constituents .

CONCLUSION AND APPLICATIONS

The findings of this study indicate that maize in the starter diet of cockerel can be replaced with 20 % MH without adverse effects on blood constituents and carcass yield.

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