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CARCASS CHARACTERISTICS, HAEMATOLOGY AND BIOCHEMICAL RESPONSES OF WEANER RABBITS FED WITH VARYING LEVELS OF SUN-DRIED SHEEP RUMEN CONTENT

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ABSTRACT
An eight-week experiment was conducted at Bauchi State College of Agriculture, Rabbitry unit to determine carcass characteristics, haematology and biochemical responses of weaner rabbits fed with varying levels of sundried sheep rumen content. Fifty mongrel's weaner rabbits were allotted to five dietary treatments replicated five times with two rabbits per replicate in complete randomized design. Five diets were formulated with sun-dried sheep rumen content replacing wheat offal at 0, 25, 50, 75 and 100% designated as diet 1, 2, 3, 4 and 5 respectively. Feed and water were supplied ad libitum. Parameters were measured were carcass yield, weight of organs, gut characteristics and blood profile. Results showed that, there were no significance differences ($p>0.05$) in all the parameters except caecal length (225-254cm), white blood cell (10.00-12.56x10^3dl) and total cholesterol (1.63-3.33mol/L) that were significantly different ($p<0.05$). Therefore, it can be inferred from this research that, sun-dried sheep rumen content should be included in the diet of weaner rabbits without affecting their carcass traits and health condition.

Keywords: Carcass, haematology, serum, rumen content and wheat offal

INTRODUCTION
The prolific nature of rabbits, coupled with their short gestation period and generation interval, makes them the animals of choice for multiplication and short way of increasing animal protein intake. The problem of inadequate protein supply in developing countries can be alleviated by increased rabbit production. High demands for animal protein and scarcity of resources have necessitated more research on livestock with short generation intervals. Rabbit production is suitable because as non-ruminant herbivores, rabbits do not compete directly with man for cereal and legume grains. Rabbit is also favoured over other livestock species because of its high fecundity, low cost of investment, short generation interval and ability to utilize diverse forages (Apori *et al*., 2014). Nutritionally, rabbit meat has a higher protein (20-21%), lower calories (1749kcal/kg) and lower fat content (10-11%) when compared with meat from most livestock species and is recommended for consumption for person with cardiovascular illness. There is need to intensify research into alternative feed sources that are affordable and available to cut down cost of production. There is presently global concern for the proper disposal of waste, hence the conversion of agro waste to feed as a means of reducing environmental hazard has been suggested. Rumen content is one of these wastes that pose a problem to the environment. It is an abattoir by product obtained from cattle, sheep and goats as well as camel (Maigandi *et al*., 2004). Sheep rumen content has not been reported to contain anti nutritional factor and it may not only serve as feed but recycling it enhance proper disposal and reduce environment problems.

MATERIALS AND METHODS
The experiment was conducted at Bauchi State College of Agriculture, Bauchi Rabbitry Unit, located at Yelwan Makaranta along Bauchi – Dass Road. The rumen contents were collected from Bauchi main abattoir and were spread on concrete floor and sun-dried until a constant was achieved. The dry rumen contents were ground and samples were then taken to the laboratory for proximate analysis to determine the nutrients composition. The proximate composition of sun-dried sheep rumen contents and the diets were analyzed as described by AOAC (2011). Fifty (50) mongrel weaner rabbits of mixed sexes between 5 and 7 weeks of age were randomly allotted to five dietary treatments replicated five times with two rabbits per replicate in a completely randomized design.

Five diets were formulated where sun-dried sheep rumen contents replaced wheat offal at 0, 25, 50, 75 and 100% levels coded as diets 1, 2, 3, 4 and 5 respectively (Table 1). One rabbit per replicate was randomly selected, weighed and starved overnight (12hrs). The fasted weight was recorded in the morning before slaughter. The organs such as lung, kidney, liver and heart were removed from individual carcasses in all the treatment groups and weighed using a sensitive weighing scale and expressed as the percentage of live weight. Three rabbits from each treatment were randomly selected where 5mls of blood was collected from the ear vein into labeled sterile vacuum tube containing Ethylene Diamine Tetra Acetic Acid (EDTA) an anti-coagulant for haematological analysis and another 5mls of blood was collected without anti-coagulant for serum biochemical analysis. All haematological parameters were analyzed by sysmex XP-300 automated 3-part differential analyser. All data collected were subjected to analysis of variance, where difference exist among means Duncan Multiple Range Test was used to separate the means.

Table 1: Composition of Experimental Diets

	Diets				
Ingredients	1(0%)	2(25%)	3(50%)	4(75%)	5(100%)
Maize	36.5	36.5	36.1	35.8	35.4
Soybean meal	10.8	10.8	11.2	11.5	11.9
Wheat offal	30.0	22.5	15.0	7.5	0
SDSRC	0	7.5	15.0	22.5	30.0
Bone meal	2.00	2.00	2.00	2.00	2.00
G/nut haulms	20.00	20.00	20.00	20.00	20.00
Premix*	0.25	0.25	0.25	0.25	0.25
Salt	0.25	0.25	0.25	0.25	.25
Lysine	0.1	0.1	0.1	0.1	0.1
Methionine	0.1	0.1	0.1	0.1	0.1
TOTAL	**100**	**100**	**100**	**100**	**100**
Determined Composition (%)				**SDSRC**	
Crude Protein	18.09	17.69	17.73	17.72	18.10 14.25
Crude Fibre	9.55	9.84	9.58	9.59	9.53 8.50
Ether Extract	5.19	5.10	5.13	5.10	5.26 1.29
Ash	6.94	7.10	6.84	6.89	7.43 5.71

RESULTS AND DISCUSSION

The results in Table 2, for live weight, carcass weight and dressing percentage were not significantly affected ($p>0.05$) by the level of SDSRC inclusion. The gut characteristic was also not affected by the dietary treatments except the caecal length (27.80-35.80cm) ($p<0.05$).

Table 2: Carcass Yield, Organ and Gut Characteristics of Weaner Rabbits Fed Varying Levels of SDSRC as Replacement for Wheat Offal

	Diets					
Parameters	1(0%)	2(25%)	3(50%)	4(75%)	5(100%)	SEM
Live weight (g)	1318.00	1235.00	1256.00	1271.40	1123.40	112.80^{NS}
Carcass weight (g)	654.00	607.40	611.00	633.60	512.40	72.95^{NS}
Dressing percentage	49.62	49.18	48.65	49.83	45.61	2.65^{NS}
Pelt (g)	100.80	107.40	89.00	90.20	86.40	13.33^{NS}
Head/legs (g)	158.20	156.20	146.50	137.00	150.60	13.07^{NS}
Heart %	0.24	0.32	0.40	0.39	0.32	0.63^{NS}

Liver %	3.46	3.42	4.02	3.48	0.32	4.75^{NS}
Lung %	0.84	0.68	0.72	0.77	0.71	0.98^{NS}
Kidney %	0.82	0.73	0.80	0.71	0.80	1.15^{NS}
Caecal weight (g)	21.20	17.80	17.50	20.40	16.60	2.32^{NS}
Large intestine weight (g)	68.40	73.20	74.53	69.00	69.40	2.47^{NS}
Small intestine weight (g)	45.80	37.60	40.50	52.00	39.00	24.87^{NS}
Large intestine length (cm)	40.00	41.20	40.00	41.60	38.40	4.42^{NS}
Small intestine length (cm)	243.20	242.40	225.00	254.00	249.00	24.87^{NS}
Caecal length (cm)	35.80^{a}	30.40^{b}	32.50^{b}	34.00^{ab}	27.80^{b}	2.10*

^{ab} - Means bearing different superscripts within a row are significantly different (*=p< 0.05)

SEM - Standard error of means NS - Not significant (p>0.05)

The white blood cell value (7.20 to 12.56×10^{3}dl) obtained though significantly higher with increased SDSRC inclusion is still within the normal physiological range for healthy rabbits and the finding is in agreement with Ibitoye *et al*. (2020). This study revealed that all experimental diets had no significant effect on the haematology of weaner rabbits, since it was observed that all the parameter fall within the normal range. Haematological components, which consist of RBC, WBC or leucocytes, MCH, and MCHC are valuable in monitoring feed toxicity, especially, with feed constituents that affect the blood as well as health status of farm animals. Serum biochemistry indices shows that the total protein content reported in this study were slightly higher than the range (4.81-5.48g/dl) reported by Odetola *et al*. (2012). The globulin concentration was lower than the values (2.55-2.77g/dl) observed by Olabanji *et al*. (2007) (Table 3).

Table 3: Haematology and Serum Biochemistry of Weaner Rabbits Fed Diets Containing Varying Levels of SDSRC as Replacement for Wheat Offal

	Diets					
Parameters	1(0%)	2(25%)	3(50%)	4(75%)	5(100%)	SEM
White blood cell (x10^{3}dl)	10.00^{ab}	12.56^{a}	7.20^{b}	12.33^{a}	12.54^{a}	1.03*
Red blood cell (x10^{6}/ul)	5.73	5.49	5.26	5.48	5.09	0.26^{NS}
Haemoglobin (g/dl)	12.20	11.25	11.45	11.70	11.04	0.37 ^{NS}
Packed cell volume (0.37 ^{NS} %)	42.48	40.86	40.00	40.43	38.56	1.33 ^{NS}
Means corpuscular volume (fl)	74.56	74.66	76.10	74.35	75.98	1.51 ^{NS}
Mean corp. haemoglobin (pg)	21.38	20.62	21.75	21.53	21.76	0.48 ^{NS}
Mean corp haem. Conc.(g/dl)	28.72	27.62	28.60	28.93	28.64	0.54 ^{NS}
Platelets (x10^{3}dl)	251.40	365.00	260.00	366.00	481.60	92.32 ^{NS}
Total Protein (g/dl)	6.56	5.90	6.03	6.03	5.88	0.36^{NS}
Albumin (g/dl)	3.86	3.45	3.33	4.01	3.77	0.44 ^{NS}
Total cholesterol (mol/L)	3.00^{a}	2.99^{ab}	1.63^{b}	1.80^{b}	3.33^{a}	0.32*
Globulin (g/dl)	2.46	2.00	1.98	2.56	1.99	0.19^{NS}

^{ab} - Means bearing different superscripts within a row are significantly different (*=P< 0.05)

CONCLUSION AND RECOMMENDATION

Based on the results obtained it can be concluded that, sundried sheep rumen content can replace 100% of wheat offal as dietary source of fibre for weaner rabbits without adverse effects on their carcass attributes, haematology and serum biochemical indices, as such farmers can process and include it in rabbit feeds.

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