GROWTH RESPONSE OF YANKASA SHEEP TO DIFFERENT LEVELS OF CONCENTRATE SUPPLEMENTATION

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ABSTRACT

In a study that lasted for 120 days, 20 weaned Yankasa ram lambs aged 6 months and weighing between 10.5 and 14.5 kg with an average of 12.75 kg were offered a basal *Digitaria smutsii* hay diet at 2% of body weight. This was supplemented with a concentrate mixture made to supply 14.6% crude protein and 2.6 Mcal ME per kg and offered to treatment groups A, B, C and D at 1, 2, 3, and 4% of body weight respectively. There were five replicates and the animals were fed individually. Results indicated that the differences in Average Daily Gain was significant ($P < 0.05$) between all the treatments; the value increased with increased level of feeding. The cost of effecting one unit of liveweight increase was not significantly different ($P < 0.05$) between treatments, A, B, and C, but it was significantly lower ($P < 0.05$) than for treatment D. The low growth response of lambs fed the concentrate at 1% of body weight and the higher cost per unit gain of lambs offered the supplement at 4% of body weight suggested that concentrate supplementation at 2 and 3% of body weight was adequate for optimum liveweight gains in the Yankasa sheep breed.

INTRODUCTION

Optimum growth in relation to cost is an important consideration in sheep production. Publications have been made on nutrient requirements of sheep (ARC, 1965; 1980). Experiments on feed consumption capacity and growth response of Yankasa sheep to different feeds have been conducted using different ration formulations that included whole grains (Adu and Brinckman, 1977). The use of whole grains in ruminant feeding is becoming unpopular due to competition with man and comparatively higher cost. Moreover, ruminants are endowed with the natural capability of utilizing lower quality feed

such as agro by-products because of the digestive activity of the rumen micro-organisms (Hungate *et al*, 1964; Church, 1971).

However, despite these facts, there appears to be a dearth of information on the growth response of Yankasa sheep to different levels of an all-agro-byproducts concentrate supplementation. This study was therefore aimed at investigating the growth performance of Yankasa rams offered a concentrate supplement at different levels.

MATERIALS AND METHODS

Twenty weaned Yankasa ram lambs aged 6 months with an average initial weight of 12.75 kg were randomly divided into four treatment groups, named, A, B, C and D. The lambs were individually fed a concentrate mixture (Table 1) and a basal *Digitaria smutsii* hay for 120 days. The hay was offered at 2% of body weight as dry matter (DM) intake while the concentrate was fed at 1, 2, 3, and 4% body weight to lambs on treatments A, B, C and D respectively.

The residues of concentrate and hay offered were recorded separately each morning before feeding. The weights of the lambs were recorded separately, fortnightly, and the amount of feed offered was adjusted accordingly. Water was provided *ad libitum*.

Metabolism studies were conducted with three lambs randomly selected from each treatment group and transferred into metabolism stalls equipped with separate faeces and urine collection facilities. A preliminary period of 14 days was allowed to allow the lambs to adjust to the metabolism stalls before faeces and urine collection for 7 days. At the end of the collection period, samples of feed, faeces and urine were analysed for proximate constituents (A.O.A.C., 1975).

The data from the experiment were subjected to analysis as described by Steel and Torie (1960) for comparing differences between treatments.

RESULTS AND DISCUSSION

The calculated composition and chemical

TABLE 1: CALCULATED COMPOSITION OF THE EXPERIMENTAL CONCENTRATE.

	Proportion %	Calculated Crude	
		ME (Kcal/kg)	Protein supplied
Wheat offal	47.0	1288.74	5.20
Cotton seed cake	20.0	577.20	7.50
Molasses	20.0	519.60	-
Brewer's dried grain	10.0	227.30	1.90
Bone meal	1.5	14.88	-
Salt (NaCl)	1.0	-	-
Premix	0.5	-	-
Total	100.0	2627.72	14.60

* Composition of premix (ZOO DRY VM/702)

1 kg ZOO DRY VM /702 contains:

- Vit A -10,000,000 I.U.
- Vit D3- 1,000,000 I. U.
- Vit E- 10,000 Mg
- Magnesium (Mg)- 100,000 Mg
- Manganese (Mn)- 50,000 Mg
- Iron (Fe)- 80,000 Mg
- Zinc (Zn) - 45,000 Mg
- Copper (Cu)- 6,000 Mg
- Iodine (Io)- 2,500 Mg
- Cobalt (Co)- 800 Mg

analysis of the experimental diet are shown in Tables 1 and 2, respectively.

Table 3 shows the feed intake, liveweight gain, average daily gain, efficiency of feed conversion and cost of feed per kg liveweight gain. DM intake was significantly different ($P < 0.05$) between all the treatments with treatment A recording the lowest and treatment D, the highest value. Daily DM intake in treatments C and D was about 4% of body weight of the animals. This was slightly higher than the values

reported by Akinsoyinu *et al.*, (1976) and Adu and Brickman (1977). Factors such as type of feed and method of feed processing are responsible for the difference. This trial fed a ration of lower nutrient density hence the slightly higher intake.

The different feeding levels resulted in dif-

TABLE 2: CHEMICAL ANALYSIS OF THE EXPERIMENTAL FEEDS ON DRY MATTER BASIS

	Concentrate mixture	<i>Digitaria smutsii</i> hay
Dry matter	87.40	98.48
Organic matter	78.91	88.14
Crude protein	14.16	4.17
Crude fibre	11.42	27.30
Ash	5.87	13.02
Ether extract	4.11	2.89
Gross energy (Kcal/kg)	2.61	0.20

ferent DM intake and different performances in terms of liveweight gains. Higher level of feeding resulted in indication that all the animals were fed above maintenance level.

The cost of effecting one unit of liveweight increase was significantly ($P < 0.05$) higher for treatment D animals whereas there were no significant differences ($P < 0.05$) between treatment groups A,B and C. It is important to note that the cost of production is not expected to be constant over time considering the erratic nature of soaring prices of inputs in recent times. The cost of rearing lambs is influenced by the variable costs associated with the lambs. The total variable cost of production will normally depend on the number of lambs raised and the length of time the animals are kept.

The poor performance of lambs on treatment A was due to lower energy and crude protein available to the animals resulting in lower average daily gain and total liveweight gains. Treatment D lambs proved to be more expensive to maintain than the lambs on the other three treatments. Concentrate supplementation at 2

TABLE 3: MEAN FEED INTAKE, LIVEWEIGHT GAIN, AVERAGE DAILY GAIN, EFFICIENCY OF FEED CONVERSION AND COST PER KILOGRAM, LIVEWEIGHT GAIN OF LAMBS.

Parameter	Treatment Groups			
	A	B	C	D
Feed intake (g/head/day)				
Hay	248.7 ± 12.1 ^a	277.8 ± 13.5 ^b	352.1 ± 40.9 ^c	343.4 ± 56.1 ^c
Concentrate	123.9 ± 5.7 ^a	306.5 ± 4.8 ^b	465.7 ± 25.8 ^c	662.3 ± 81.7 ^d
Intake of concentrate as % of body weight	1.0	1.9	2.9	3.5
Total intake, g/day	372.6 ± 36.9	584.3 ± 61.8 ^b	807.3 ± 54.5 ^c	1005.7 ± 112.4 ^d
Intake per kg metabolic weight (wkg ^{0.75})	44.9 ± 6.1	58.5 ± 3.5 ^b	73.4 ± 19.1 ^c	86.4 ± 12.6 ^d
Liveweight (kg):				
Initial	12.5	12.5	13.1	12.6
Final	16.8	21.5	24.5	26.4
Gain	4.3	9.0	11.4	13.8
Average daily gain (g)	35.8 ± 3.4 ^a	72.5 ± 7.8 ^b	95.0 ± 7.7 ^c	115.0 ± 10.2 ^d
Efficiency of feed conversion (feed/gain)	9.5 ^b	8.1 ^a	8.5 ^a	8.7 ^a
Cost of feed/kg liveweight gain (N)	2.31 ^a	2.26 ^a	2.35 ^a	2.83 ^b

Means in the same row with different superscripts differ significantly at $P < 0.05$.

TABLE 4: RESULTS OF METABOLISM TRIAL WITH LAMBS FED THE EXPERIMENTAL DIET

Treatment groups	DM intake g/head/day	Faecal DM g/head/day	Dig %	N intake g/head/day	Faecal N g/head/day	Urinary N g/head/day	N balance g
A	342.1 ± 9.3 ^a	108.5 ± 15.2 ^a	68.3 ^b	7.6 ± 0.9 ^a	1.5 ± 0.1 ^a	3.3 ± 1.1 ^a	2.8 ^a
B	589.8 ± 30.6 ^b	193.2 ± 137.1 ^b	67.2 ^b	8.8 ± 1.3 ^a	1.9 ± 0.3 ^a	4.1 ± 1.3 ^b	2.8 ^a
C	861.7 ± 38.7 ^c	311.4 ± 18.5 ^c	63.9 ^a	13.1 ± 2.1 ^b	4.6 ± 0.8 ^c	5.2 ± 0.9 ^c	3.3 ^b
D	983.4 ± 26.4 ^d	360.9 ± 27.9 ^d	63.3 ^a	17.4 ± 1.8 ^c	3.2 ± 1.1 ^b	8.8 ± 2.4 ^d	5.4 ^c

Means in the same row with different superscripts differ significantly at $P < 0.05$.

and 3% of body weight appeared to be promising for optimum liveweight gains in Yankasa sheep breed.

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