

# Effect of Sesame Waste (sung) as a Substitute for Wheat Bran on Growth Performance of Male Desert Goats

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## Abstract

The study was conducted at farm of Animal Production Department, Faculty of Natural Resources and Environmental Studies, University of Kordofan, El-Obied, North Kordofan State, Sudan. During June 2021 to April 2022. The study was designed to investigate the effect of sesame waste feeding on growth performance, carcass characteristics and external body measurements of male Desert kids. Sixty male Desert kids aged 4-5 months and weighed 12.0Kg were used in this study. The experimental kids were divided randomly into three groups; 20 males for each group. Group one was fed on pastures and supplemented diet (waste sesame diet) which consist of 38% waste sesame diet, at a rate of 0.5Kg/head/day. Group two was fed on pastures and supplemented (wheat bran diet) which consist of 38% wheat bran, at a rate of 0.5Kg/head/day. Third group was fed on pastures only (control) with one week adaptation period in randomized complete design experiment; data was analyzed by [1]. The results revealed that there were significant ( $p < 0.05$ ) differences in daily weight gain, where as daily weight was 4, 19.4 and 14.3g for control, wheat bran and sesame waste respectively, there was no significant ( $p > 0.05$ ) differences in daily feed intake, where as daily feed intake was 269 and 202g for wheat bran and sesame waste respectively, there was no significant ( $p > 0.05$ ) differences in slaughter, empty body, hot carcass weights and dressing %, final heart girth belly girth, height at wither and body length. Highest profits were recorded sesame waste diet compared with wheat bran diet pasture.

**Keyword:** Desert goat; growth performance; external body measurements

## Introduction

Sudan ranks first to third among all African countries in number of cattle, sheep, goats and camels with an estimated total of 105 million heads (39.8 million sheep; 31 million goats; 30.1 million cattle; and 4.7 million camels). Livestock accounts for 40% of livelihoods in Sudan and contributes about 25% to the national gross domestic product [2]. Unprecedented jump in prices of feed ingredient has affected directly in production among Sudanese livestock producers. Therefore, producers are directed to use any available agricultural residual products such as sesame waste, groundnut seed cake, date palm [3], tomato pomace [4]. However, very few studies have conducted to evaluate the effect of using sesame waste in livestock ration. Omar (2002) [5] claimed that the using of sesame oil cake at 10% and 20% improve the digestibility of protein and fiber, daily gain, feed conversion ratio and cost of feed/Kg gain in growing Awassi lambs [6]. Reported that when soybean meal and barley grain were replaced by sesame hull at level of 12.5% and 25% finishing performance of Awassi lambs improve and cost of production diminished without any detrimental effect on carcass characteristics or meat quality.

Sesame wastes are by product of sesame seed after harvesting. Total annual red meat in Sudan is estimated 8830 tones with goat contributing about 310 tones and annual live goats export to the Arab world exceed 16.500 heads [7]. Despite the growing demand for goat meat worldwide, data on the meat producing characteristics of goats are scare [8]. Therefore the study was designed to investigate the effect of sesame waste feeding on growth performance, carcass characteristics and external body measurements of male Desert kids.

## Materials and methods

### *Study area*

This work was conducted in department of animal production (longituded), Faculty of Natural Resource and Environmental Studies, University of Kordofan , North Kordofan State, Sudan.

### *Experimental animals*

Sixty male Desert goats aged 4-5 months and weighed 12.0Kg were used in this study. All male goats were identified by ear tag and injected with Anti-internal and external parasites at a rate of 5 CC Bendazole and CC Ovicem for each ones respectively and after two week the same dose were offered again and with anti-biotic Oxytetracycline at a rate of 2cc for 3 days. The experimental goats were divided randomly into three groups 20 males for each group. The group one was fed on natural pastures and supplemented diet (Song diet) which consist of 38% Song, 30%, Dura grain, 20 % ground nut cake, 10% ground nut hay 1% sodium chloride and 1% limestone) a rate of 0.5Kg/head/day (two meal at morning and evening). The group two was fed on natural pastures and supplemented diet (wheat bran diet) which consist of 38% wheat bran, 30% Dura grain, 20 % ground nut cake, 10% ground nut hay 1% sodium chloride and 1% limestone) a rate of 0.5Kg/head/day(two meal at morning and evening). The third group was fed on natural pastures only (control) with one week adaptation period and free water through the day, for twelve week.

### *Live body weight*

Was measured at the morning and before offered diet and grazing at the beginning of experiment and then weekly until the end of experiment by using spring balance 50Kg loaded.

### *External body measurements*

Were measured in the morning before feeding and grazing at the beginning of experiment weekly until the end of experiment a according as fallowed:

### *Heart girth*

Measured around the circumference of the chest just behind the foreleg and along the xiphoid depression.

**Body length**

Measured from first thoracic spinal process to the base of the tail.

**Height at wither**

Measured from the highest point between the shoulders to the tip of the claw in straight line.

**Bely girth**

Measured around the circumference of the belly just behind the last rib.

**Slaughter, dressing and weighing**

Ten kids from each group's treatment selected randomly and slaughtered, at the end of experiment. Slaughtered was performed by using a knife to cut the jugular veins and carotid arteries. Every kid was immediately hoisted by the hind leg and allowed to bleed, after removal of head and fore and hind feet, skinning and evisceration were carried out. The external and internal offal including gut content were then weighed. The hot carcass weight was recorded .the carcass was then split along the vertebral column. The weight of the carcass halves was recorded.

**Statistical analysis**

The data will be analyzed by analysis of variance.

**Results****The growth performance of male Desert goats**

The growth performance, total and daily feed intakes were shown in table 2. The initial body weights were similar among all treatment groups. However, the final body weight of males fed on pasture + supplemented wheat bran were relatively registered highest values (13.7Kg) compared with control group and males fed on pasture + supplemented sesame waste group(12.8, 13.4Kg) respectively. The total change of body weight and daily gain weight were significantly ( $P<0.01$ ) differences where supplemented wheat bran group was recorded highest values (1.8Kg, 19.4 g) compared with the two other groups (0.5Kg, 4g and 1.5Kg, 14.3g) for control group and male fed on pasture + supplemented sesame waste respectively. The total and daily feed intake of males fed on pasture + supplemented wheat bran registered higher values (24.210, 18.180Kg) compared with males fed on pasture + supplemented sesame waste (269, 202g) respectively.

<b>Item</b>	<b>Sesame waste diet</b>	<b>Wheat bran diet</b>	<b>Pasture (plant + shrubs)</b>
Sesame waste (%)	38	0	<i>Cenphruspp</i>
Wheat bran (%)	0	38	<i>Eragotisturmula</i>
Ground nut seed cake (%)	20	20	<i>Calotropis purocera</i>
Dura (%)	30	30	<i>Ziziphus spina</i>
Ground nut hay (%)	10	10	<i>Aegyptiacabalanite</i>
Sodium chloride (%)	1	1	<i>Zornia glachidiata</i>
Chemical analysis			
Dry matter (%)	92.7	92.7	95.9
Crude protein (%)	4.5	2.3	10
Crude fiber (%)	22.3	18.0	32.0
Ether extract (%)	4.4	3.1	7.0

Organic matter (%)	82.6	83.4	84.2
Ash (%)	10.1	9.3	10.0
NFE	61.6	69.2	36
ME(MJ/Kg)	1.1643	1.1825	1.001

ME=metabolizable energy.

**Table 1:** Ingredients and chemical composition of sesame and wheat bran diets.

Item	Sesame waste diet <sup>1</sup>	Wheat bran diet <sup>2</sup>	Pasture <sup>3</sup>	SE	P
No. of experimental animal (head)	20	20	20		
Experimental period (day)	90	90	90		
Initial body weight (Kg)	12.1	12.0	12.3	0.4	NS
Final body weight (Kg)	13.4	13.7	12.8	0.4	NS
Total change in body weight (Kg)	1.5	1.8	0.5	0.2	***
Average daily gain (g)	14.3	19.4	4.0	2.1	***
Total feed intake (Kg)	18.180	24.210	0	1.8	*
Daily feed intake (g)	202	269	0	27	*

Note: Sesame waste diet<sup>1</sup>; supplementary diet contain 38% sesame waste. Wheat bran diet<sup>2</sup>: supplementary diet contains 38% wheat bran, pasture<sup>3</sup>: plant and shrub in pasture (control). NS: not significant, \*\*\*: highly significant (p<0.001).

**Table 2:** Effect of sesame waste (song) instead of wheat bran on growth performance of male Desert goats.

### Carcass characteristics of male Desert goats

Slaughter, empty body, hot carcass weights and dressing percentages on hot and cold had not significantly (P>0.05) different between male fed on sesame waste and wheat bran diets table 3. But males fed on pasture + supplemented waste of sesame group had reveal relatively highest values on slaughter weight whereas recorded (14.2 Kg) compared with (12.8 and 12.7 Kg) for males fed on pasture + supplemented wheat bran and control group, on the other hand, males fed on pasture + supplemented waste of sesame group had relatively highest values whereas registered (6.7 Kg) compared with (6.5 and 6.0Kg) for males fed on pasture + supplemented wheat bran and control group respectively. The hot carcass weight of males fed on pasture + supplemented sesame waste had recorded relatively highest values where as registered (5.5 Kg) compared with (5.3 and 4.9 Kg) for males fed on pasture + supplemented wheat bran and control group respectively. The dressing percentages of males fed on pasture + supplemented wheat bran had relatively reveal highest values whereas (41.4%) compared with (38.9 and 38.6%) for males fed on pasture + supplemented with sesame waste and control group respectively for hot carcass weights. The dressing percentages of males fed on pasture + supplemented with wheat bran had relatively recorded highest values whereas recorded (37.6 Kg) in comparison with (36.4 and 34.2%) for control and males fed on pasture + supplemented with sesame waste group respectively for cold carcass weights.

### External body measurements of male Desert goats

The initial, final, total change of external body measurements represented in table 3. There is no significant (P>0.05) effect were found on final heart girth among all treatment groups, where as males fed on pasture + supplemented with wheat bran group was recorded relatively highest values (55.1, 55.0 and 54.9 Cm though males fed on pasture + supplemented with wheat bran group was recorded relatively highest values on the total change of heart girth (3.1Cm) compared with two other group (2.4 and 2.3 Cm). The final and total change in belly girth were relatively highest in males fed on pasture + supplemented with wheat bran group where as recoded (60.1, 58.7 and 58.5Cm) and (50.1, 4.4 and 3.0 Cm) for final and total change in belly girth respectively. The total change in height at wither was relatively highest on males fed on pasture (control) whereas registered (1.2Cm) in compared with (1.2 and 1.1Cm) for males fed on pasture + supplemented with wheat bran and males fed on pasture + supplemented waste of sesame group

respectively. The final body length of males fed on pasture + supplemented waste of sesame group relatively highest values whereas recorded (56.2Cm) compared with (55.7 and 54.3 Cm) for males fed on pasture + supplemented with wheat bran group and control group respectively. There was significant ( $P < 0.01$ ) differences on the total change in body length was reveal where as males fed on pasture + supplemented waste of sesame group registered (7.4 Cm) compared with (7.3 and 2.3 Cm) for males fed on pasture + supplemented wheat bran and control group respectively.

### The economic benefits

The expenses of the study were 237.300, 358.300 and 310.000SDG for pasture group (control), pasture + supplemented with wheat bran group and pasture + supplemented with sesame waste respectively. The revenues of the study were 300.000, 400.000 and 500.000SDG for pasture group (control), pasture + supplemented with wheat bran group and pasture + supplemented with sesame waste respectively. The profits of the study were 72.700, 41.000 and 190.000SDG for pasture group (control), pasture + supplemented with wheat bran group and pasture + supplemented with sesame waste respectively.

Item	Sesame waste diet <sup>1</sup>	Wheat bran diet <sup>2</sup>	Pasture <sup>3</sup>	SE	P
No. of experimental animal (head)	20	20	20		
Experimental period '(day)	90	90	90		
Slaughter weight (Kg)	14.2	12.8	12.7	0.8	NS
Empty body weight (Kg)	6.7	6.5	6.0	0.4	NS
Hot carcass weight (Kg)	5.5	5.3	4.9	0.4	NS
Dressing percentage (%)					
Hot carcass weight / slaughter weight (Kg)	38.9	41.4	38.6	1.4	NS
Cold carcass weight / slaughter weight (Kg)	34.2	37.6	36.4	1.4	NS

Note: Sesame waste diet<sup>1</sup>; supplementary diet contain 38% sesame waste. Wheat bran diet<sup>2</sup>: supplementary diet contains 38% wheat bran, pasture<sup>3</sup>: plant and shrub in pasture (control). NS: not significant.

**Table 3:** Effect of sesame waste (song) instead of wheat bran on carcass characteristics of male Desert goats.

Item	Sesame waste diet <sup>1</sup>	Wheat bran diet <sup>2</sup>	Pasture <sup>3</sup>	SE	P
No. of experimental animal (head)	20	20	20		
Experimental period '(day)	90	90	90		
Initial heart girth (Cm)	52.6	52.0	52.6	0.05	NS
Final heart girth (Cm)	54.9	55.1	55.0	0.05	NS
Total change of heart girth (Cm)	2.3	3.1	2.4	0.05	NS
Initial belly girth (Cm)	55.7	55.0	54.1	0.5	NS
Final belly girth (Cm)	58.7	60.1	58.5	0.6	NS
Total change of belly girth (Cm)	3.0	5.1	4.4	0.6	NS
Initial height at wither (Cm)	58.0	55.9	55.3	0.3	NS
Final height at wither (Cm)	59.1	57.1	56.9	0.4	NS
Total change of height at wither (Cm)	1.1	1.2	1.6	0.5	NS
Initial of body length (Cm)	48.8	48.4	52.0	0.6	NS
Final of body length (Cm)	56.2	55.7	54.3	0.4	NS
Total change of body length (Cm)	7.4 <sup>a</sup>	7.3 <sup>a</sup>	2.3 <sup>b</sup>	0.05	**

Note: Sesame waste diet<sup>1</sup>; supplementary diet contain 38% sesame waste. Wheat bran diet<sup>2</sup>: supplementary diet contain 38% wheat bran, pasture<sup>3</sup>= plant and shrub in pasture (control). NS: not significant, \*\*: highly significant ( $p < 0.01$ ).

**Table 4:** Effect of sesame waste (song) instead of wheat bran on external body measurements of male Desert goats.

<i>Type of diet</i>	<i>Item</i>	<i>Expenses (SDG)</i>	<i>Revenues (SDG)</i>	<i>Profits (SDG)</i>
<sup>1</sup> Pasture	Price of herd=20 headx8.44SDG	168.800		
	Price of animal husbandry	033.300		
	Price of veterinary drug	035.200		
	Total of expenses	237.300		
	Price of 20 headx15000SDG		300.000	72.700
<sup>2</sup> Pasture + supplemented diet of wheat bran	Price of herd=20 headx8.44SDG	168.800		
	Price of animal husbandry	033.300		
	Price of veterinary drug	035.200		
	Price of supplemented diet of wheat bran	121.000		
	Total of expenses	358.300		
	Price of 20 headx20000SDG		400.000	41.000
<sup>3</sup> Pasture + supplemented diet of sesame waste	Price of herd=20 headx8.44SDG	168.800		
	Price of animal husbandry	033.300		
	Price of veterinary drug	035.200		
	Price of veterinary drug	035.200		
	Price of supplemented diet of sesame waste	072.700		
	Total of expenses	310.000		
	Price of 20 headx25000SDG		500.000	190.000

Note: <sup>1</sup>pasture = 20 animals fed on pasture (control), <sup>2</sup>Pasture + supplemented diet of wheat bran= 20 animals fed on pasture+ supplemented diet contain wheat bran, <sup>3</sup>Pasture + supplemented diet of sesame waste = 20 animals fed on pasture+ supplemented diet contain sesame waste, SDG= equivalent.

**Table 5:** Effect of sesame waste (song) instead of wheat bran on economic benefits.

## Discussions

### *Effect of sesame waste as a substitute for wheat bran on growth performance*

The final body weight, total body weight change and daily weight gain were significant ( $P < 0.001$ ) affected among all treatment groups table, 2. The current study was in line with the findings of [9] who reported that there was significant ( $P < 0.001$ ) differences between kids of Black goats fed on 0%, 10% and 20% sesame hull, and in contrast with [10] he reported that the final, total and daily weight were not affected by adding sesame waste in fattening Hammari lambs sheep and also this result was supported by the finding of [11] who reported that the addition of waste sesame seed to diet had no significant ( $P > 0.05$ ) effect on performance of Karayaka lambs (final live weight, average daily gain weight, feed conversion ratio (FCR) and carcass traits) between kids of Black goats fed on 0%, 10% and 20% sesame hull. These differences may be due to components of diet, environmental conditions, and age of experimental animals, breeds and genetical factors. The total feed intake and daily feed intake were significantly ( $P < 0.05$ ) affected all treatment groups table, 2. These results were in contrast with [9] who reported that there was no significant ( $P > 0.05$ ) on feed conversion ratio (FCR) between kids of Black goats fed on 0%, 10% and 20% sesame hull, and in contrast with [11] who reported that the addition of waste sesame seed to diet had no significant ( $P > 0.05$ ) effect on performance of Karayaka lambs (final live weight, average daily gain weight, feed conversion ratio (FCR) and carcass traits) between kids of Black goats fed on 0%, 10% and 20% sesame hull.. These differences in results may be due to breeds, ingredients of diet, environmental conditions and genetics factors.

### ***Effect of sesame waste instead of wheat bran on carcass characteristics of male Desert goats***

Slaughter weight, empty body weight and dressing percentages were shown in table, 3. On the whole, the aim of using alternative feed in goats to reduce the cost of feeding while improving or not affecting, growth performance, carcass characteristics and meaty quality. In current study, these results were in line with findings of [12] they reported that no significant ( $P>0.05$ ) differences were found among different treatment groups (0, 10 and 20% hull sesame) in Black goat kids fed finishing diets containing sesame hull. In agreement with current study, [6] reported that the use of sesame hull in Awassi lambs fed on finishing diet had less or no effect on carcass characteristics, and meaty quality. Current study, in line with findings of [13] they studied effect of replacing barley grain with *Prpsois juliflora* pods on carcass characteristics of Awassi lambs and observed that dressing percentage, non- carcass component, weights of carcass cuts and percentages of loin cut tissue were similar among all treatment groups [14]. Studied the effect of feeding peas to lambs and reported that the meat quality (i.e., ultimate pH, meat colour and cooking loss) was similar to lambs fed diets containing soybean meal [13]. Registered that water holding capacity improved when Awassh lambs fed with *Prpsois juliflora* pods (20%) compared with commercial diets.

### ***Effect of sesame waste as a substitute for wheat bran on external body measurements of male Desert goats***

The current study reported that there were no significant ( $P>0.05$ ) differences among all groups treatment except the total change of body length which reveal significant ( $P<0.05$ ) differences, whereas recorded (7.4, 7.3 and 2.3 Cm) for males fed on sesame waste diet, wheat bran diet and pasture respectively table, 3. These results were in the same line with findings of [10] who reported that the initial and final of belly girth, heart girth, height at wither and body length of Hammari lambs had no significant ( $P>0.05$ ) differences on lambs either fed on sesame waste diet or lambs fed on wheat bran diet. Also the current result was sported by the findings of [11] who reported that the adding of sesame waste seeds to the diet had no significant ( $P>0.05$ ) effect on final live weight, average daily weight gain, feed conversion ratio (FCR) and carcass traits.

### ***The economic benefits***

The highest profits were recorded by kids fed on sesame waste diet, followed by kids fed on pasture and kids fed on diet of wheat bran where as registered 41, 72 and 190 SDG for wheat bran diet, kids fed pasture and sesame waste diet respectively.

### **Conclusion**

The objective of the study was to evaluate the effect of replacing wheat bran with sesame waste in fattening diet on growth performance, carcass characteristics, external body measurement and economic benefits. The current study showed that the sesame waste has good nutrients allowing it for using at up to 20% in fattening diet of Desert goat kids to replace wheat bran with sesame waste.

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