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Effect of Treated Banana Waste on Carcass Characteristics, Meat Composition and Meat Quality Attributes of Sudanese Desert lambs

Yagoub Magboul Yagoub and Limya Abdallatif

Faculty of Agricultural Technology and Fish Sciences, Al-Neelain University Khartoum, Sudan.
Corresponding author E-mail: d.yagoub@hotmail.com

Abstract

The present study was conducted to detect the effect of different level of treated banana waste on carcass characteristics, meat composition and meat quality attributes of Sudanese desert lambs. Banana waste was enriched by mollase and urea and calcium carbonate and ensiled for a month, then was chemically analyzed. According to this analysis three iso-caloric and iso-nitrogenous experimental diets were prepared. These diets contained different levels of treated banana waste (0%, 5% and 10%) respectively. Twenty seven Sudanese desert lambs (Hammari ecotype) were randomly divided into three experimental groups with an average initial weight of 21.06 kg were used in feeding trials for 45 days. Following an adaptation period of two weeks. Each lamb group was offered one of the experimental diets for a feeding period of 45 days. Finally three experimental lambs from each group were slaughtered and carcass characteristics, meat composition and meat quality attributes were recorded. Dietary treated banana waste level produced no significant ($P<0.05$) effect on carcass characteristics, dressing percentages, yield of wholesale cuts and meat chemical composition. Although meat moisture and ash increased with the increase level of the dietary treated banana waste level but fat was increased. Protein content decreased with increased level of the dietary treated banana waste. Meat quality attributes showed that as inclusion of dietary treated banana waste increased water holding capacity, cooking loss, and measured rib eye area percentage increased. But meat PH was decreased with the increased level of dietary treated banana waste in the diet.

Keywords: Treated banana waste, Carcass Characteristics, Meat Composition and Meat Quality Attributes, Sudanese Desert lambs.

Introduction

A major gap exists between the demand and supply of conventional feed resources for feeding livestock in the world .In order to manage this problem of demand and supply, it is essential to increase the availability of conventional feed resources for the different livestock production and management systems. One method is to exploit the use of non-conventional feed resources (NCFR) in livestock production systems(Ben Salem et al ,2003).Potentially available NCFR include Crop residues ,agro-industrial by- products ,leaf and seed meals such as the

leaves and seeds of the African pear, slaughter house by – products, cassava Leaf meal , tapioca waste, tea waste, mango seed kernels and animal organic wastes. Most of these feed materials are low in energy, protein minerals and contain high amounts of anti-nutritional components (Ben Salem et al, 2003). The major constraints to the use of NCFR are collections, storage, dehydration (due to high moisture content) and detoxification processes. There is an urgent need for processing techniques that are economic and practicable. Non-conventional feed resources (NCFR) generally refer all those feeds that have not been traditionally used for feeding livestock and are not commercially used in production of livestock feeds.

Banana wastes are by-products of banana harvesting and packing for human consumption. In the Region, banana wastes are found mainly in some countries in Africa and Asia such as Sudan, Egypt, India, Thailand, Philippines, Pakistan, Vietnam and Malaysia. In most of these countries, these are usually fed to cattle, buffaloes, goats and sheep which relish the wastes. However, the extent to which the bananas can be such good use is limited by the distance of producers from banana packing houses. Two main varieties, *Musa sapient* L, and *M. paradisiacal* L. are involved. The discarded waste fruits usually represent about 10 to 20% of the total crop, but this varies with the efficiency of harvesting and packing. Bananas have a high energy and low protein content. They can be fed raw, in the

form of chips or as silage. The last of these is favored by the high fermentable sugar content of green bananas. Moreover, the starch in ensiled green bananas keeps well. The tannin content in green bananas is high, but this decreased with increasing polymerization of the ripe fruit. Apart from feeding, reject bananas have also been used in recent years as a fermentation substrate for single cell protein production. In many countries, rejected bananas have given excellent results as supplement to molasses-urea diets: Preliminary results from a 160 days feeding trial indicate that a daily intake per head of 3 kg fresh (McEvoy and Preston, 1976). Le Dividich and Canope (1978) fed fresh bananas and banana silage to sheep and found that these feeds were acceptable and suited to growing and fattening sheep.

Various physical, chemical and biological treatments have been used to improve utilization of low quality forages such as crop residues. The most popular alkali for treatment has been sodium hydroxide, but its use is associated with health hazards. In parts of the world where small farms predominate, treatment with a urea solution followed by a period of storage under air-tight conditions may be more practical. Treatment of crop residues with urea has three primary interrelated benefits, namely increased nitrogen concentration, digestibility and feed intake (Hadjipanayiotou, 1984).

The objective of this work is to detect the effect of treated banana waste on carcass characteristics, meat composition and meat quality attributes of Sudanese desert lambs.

MATERIALS AND METHODS:

Banana Waste preparations: Deep stacking was prepared in an underground silo pit (1 x1 x 1m). The collected banana waste was spread on a plastic sheet and a mixture of mollase, urea and calcium carbonate was prepared and diluted with water . Dry banana waste was placed in the silo in layers, and moist with the diluted mixture. Then stacked in the underground silo pit surrounded with plastic sheet and pressed manually. The pressed mixture was covered using plastic sheet. A thin layer of soil (3 – 5 cm) was placed over the covered plastic sheet and left for a month. After that and proximate analysis was made on dried samples as outlined by AOAC (1980). Table(1)**.**

Experimental animals and procedure: Twenty seven Sudanese desert male lambs (Hamari ecotype) were used. They were rested, ear tagged and kept for a pre-experimented period of two weeks. During this period animals were treated with antibiotic and Albendazole and fed by a mixture of experimental diets. At the end of the adaptation period animals were weighed and divided into three groups of nine lambs and equal average live weight of (21.06Kg). Each group was separately penned and provided with watering and feeding facilities.

Feeds and Feeding: According to the proximate analysis of treated banana waste sample (Table1)**,** three iso-caloric and iso-nitrogenous experimental diets were prepared. These diets contained different levels of treated banana waste (0%, 5% and 10%) respectively Table (2)**.** The three animal groups were fed the experimental diet. At the end of the experiment three experimental lambs from each group were selected randomly for slaughtering.

Data recorded: A total of 9 animals were slaughtered serially (3 from each group). The animals were slaughtered according to local Muslim procedure.

Carcass Components: The hot carcass was weighed and kept in a chilling room for 24 hours at approximately 4^0c. The chilled carcass weight was recorded. Consequently the carcass was cut longitudinally into two halves by sawing along the vertebral column. Kidneys and kidney fat were removed and weighed. The left side was then quartered by cutting between 10^{th} and 11^{th} rib at right angle across the thoracic vertebrae into fore and hind quarters.

Carcass Partitioning: Meat and Livestock Commission M.L.C, (1974) method for cutting beef and lamb carcass was adopted. The cuts were: Neck, Shoulder, Back, Chest, Ram, Leg and Tail.

Chemical analysis of meat: Chemical analysis of protein, fat, ash and water content of minced meat samples were carried out according to the methods of AOAC (1980).

Data analysis: The SPSS statistical computer software (SPSS Base 7.5 for Windows). Was used for data analysis. Results are

presented mainly in the form of descriptive tabular summaries. ANOVA test were carried out as appropriate to assess the statistical significance or otherwise of particular comparisons.

Results and Discussion:

Effect of feeding treated Banana waste on carcass parts of lambs:

Table (3) showed data related to carcass yield and characteristics of lambs (Hammari sheep) fed diets containing different levels of treated banana waste. Hot dressing, chest, ram and tail were no significantly different among the treatment groups, chest decreased with increase in banana level in the diets. Neck, Shoulder, Back and leg showed no significant difference .Neck and leg increased in group B then decreased with increased banana in the diets. Shoulder decreased with increase in banana level in the diets. These results are in the same line with those reported by Fadelssed (2003) who reported no significant effects were found on parts of carcass in Shugor sheep in Rahad Scheme in Sudan.

Effect of feeding treated banana waste on chemical composition of meat:

As presented in table (4) chemical analysis of lambs meat fed graded levels of treated banana waste was not significantly affected. These results agreed with those of Mohamed (2004) and Musa (2010) who reported that there were no significant differences between male groups in moisture, crude protein and ash.

Effect of feeding treated banana waste on quality attributes of meat:

Meat quality attributes of lambs fed graded levels of treated banana waste was presented in Table (5). As the same trend of the study no significant difference was seen in this parameter. Researchers as Fadlelsid (2003), Mohamed (2006) and Musa (2010)who worked on different lamb breeds get similar results.

Conclusion:

It could be concluded that treated banana waste could be added to lamb feed without adverse effect on carcass characteristics and meat quality attributes.

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Table(1). Proximate analysis of treated banana waste.

Item	Value
Moisture (%)	5.38
Dry matter (%)	94.62
Ash (%)	20.79
Crude protein (%)	11.55
Ether Extract (%)	3.84
Crude Fiber (%)	32.59
Metabolizable Energy (%)	

Table (2). Ingredients proportions of experimental diets.

ITEMS	A	B	C
Sorghum grain	35	35	35
Wheat bran	30	30	30
Groundnut cake	10	9.5	9
Groundnut hulls	23	18.5	14
Treated Banana Waste	0	5	10
Lime stone	1	1	1
Salt	1	1	1

Table (3). Effect of feeding treated Banana waste on carcass parts of lambs (Hammari sheep).

Parameter	Experimental diets			L.S
	A	B	C	
Neck	4.26[a] ±.24	5.00 [a] ±0.342	4.57[a] ±0. 165	N. S
Shoulder	13.48[a] ±.93	14.58 [a] ±0.778	13.21 [a] ±0.033	N. S
Back	3.83[a] ±.25	4.16 [a] ±0.085	3.95 [a] ±0.245	N. S
Chest	3.65[a] ±.33191	3.14[b]±0.184	3.06 [b] ±0.036	N. S
Ram	5.24[a] ±.12	4.79 [b] ±0.026	4.57 [b] ±0.165	N. S
Leg	15.30[a] ±.57	17.67±0.242	16.95±0.175	N. S
Tail	.49 [a] ±.01	4.16 [b] ±0.637	3.77 [b] ±0.436	N. S
Hot dressing	43.36 [a] ±0.883	42.80 [a] ±0.083	46.93 [b] ±1.254	N. S

Table (4). Effect of feeding treated banana waste on meat chemical analysis of lambs (Hammari sheep).

Parameter	Experimental diets			L.S
	A	B	C	
Protein	20.12[a] ±0.505	20.12 [a] ±0.505	17.85[a] ±1.23	N. S
Fat	0.80[a] ±.000	1.10 [b] ±0.057	0.80 [a] ±0.115	N.S
Ash	1.25[a] ±0.144	1.00 [a] ±0.000	1.50 [a] ±0.288	N. S
Moisture	74.75[a] ±1.01	75.50[a]± 0.288	76.25 [a] ±1.01	N.S

Table (5). Effect of feeding treated banana waste on quality attributes of meat of lambs (Hammari sheep).

Parameter	Experimental diets			L.S
	A	B	C	
Rib eye	4.67[a] ±0.333	4.37 [a] ±0.780	5.40[a] ±000	N. S
Cooking loss	0.47[a] ±.03	0.47 [a] ±0.03	0.47 [a] ±0.03	N. S
W.H.C	1.13[a] ±0.16	1.50 [a] ±0.06	2.23 [a] ±0.39	N. S
PH	5.50[a] ±0.06	5.47[a]± 0.03	5.40 [a] ±0.00	N.S