Production and Reproductive performance of a flock of Sudanese Nubian goats fed on Molasses or sorghum based diets (1) Production.

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SUMMARY

Twenty-four mature newly freshened Nubian goats were selected from the flock of the Animal Production Research Center (Kuku) and were divided into two equal groups based on live weight and age and assigned to two diets (molasses or sorghum base diets).

Each group was further subdivided to three groups of 4 animals each according to date of birth. The results indicated that treatment has no effect on milk yield, milk composition, live weight changes and feed intake.. However the sorghum fed group maintained a record of 33% increase in FCM while the molasses fed group showed 10% live weight loss compared to 6% in the sorghum fed group. The molasses ration used in this study was found more profitable than sorghum ration.

INTRODUCTION

A major constraint facing livestock development in the Sudan is the lack of adequate supplies of feedstuffs at economic prices. Feed represents the greatest proportional cost in livestock production and its availability is affected by seasonal variations for animal nutrition and productivity throughout the year.

There is competition between livestock and human for the available protein feedstuff. To increase animal production, recent stress has been on utilization of agricultural by-products in animal feeding. Despite the availability of these by-products in great quantities and potentials as substantial feed sources, they are parley used due to their low nutritive value contents, which makes them less palatable. In spite of, the success in application of high

molasses feeding system in fattening cattle, there are few parallel efforts to establish such system for milk production. The objectives of the present study were designed to compare the effect of molasses-based diet and conventional concentrate diet on milk production potential of Sudanese Nubian goats.

MATERIAL AND METHODS

Twenty-four mature Lactating Pure Sudanese Nubian

goats immediately after freshening were chosen at random from the flock of the center. They were subjected to general health examination and sprayed with Gamatox at regular monthly intervals. Each pen was provided with feeding and watering troughs.

Two-diets (A and B) iso-energetic and iso-nitrogenous were formulated using different feed ingredients (Table 1). Diet A was a molasses-based diet and B was sorghum-based conventional diet. The former diet A contained molasses as a main source of energy and cotton seed cake with urea as a source of nitrogen, where the latter diet (B) was mainly formed of conventional ingredients using sorghum as a main source of energy and ground nut cake as a source of protein. Sorghum straw was offered to each group (lkg/head/day). Fresh Berseem *(Medicago sativa)* was offered twice weekly at the rate of half kg/head as a source of carotene. Fresh water and mineral lick were available *ad libitum.*

Proximate analyses for the two diets were performed according to A.O.A.0 (1985) and energy content was estimated according to Ellis (1981).

The experimental animals were initially weighed and randomly allotted to two experimental groups (12 head each) designed as group A and group B on basis of similar weight. Each group was further divided into three sub groups (4 head each) according to kidding date.

Each subgroup *was* offered four-kg (one kg/head) of concentrates plus sorghum straw at rate of one kg/head. The feed intake for each subgroup was estimated by weighing feed refusal and subtracting the weight from the total feed offered. Using the chemical composition of each experimental diet (Table 1) average daily

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dry matter and average daily energy intake were calculated for each group.

The kids were allowed to suckle their dam freely during the first three weeks of lactation before experimental readings were started. The kids were separated at 7 pm to 7 am (Sunset to morning) and milk was considered as a half-day yield. The average daily, monthly and total milk yield per lactation (kg) was calculated for each doe. The kids were weaned at three months.

Composite monthly fresh milk samples from each subgroup were collected, Fat content was determined by Gruber Method, protein content was determined by kjeldahl method, total solids and ash were determined by the method of A.O.A.0 (1985). Solid not fat was estimated by subtracted fat content from total solid.

Live weight changes during the whole lactation period were estimated for the two groups by subtraction of the initial live weight from the final live weight.

The total expenses for each group were estimated. Profitability was calculated and compared between experimental groups.

Differences between mean values of lactation performance and milk chemical composition of the molasses-based and sorghum-based groups were analyzed using the unpaired Student-t test Snedecor and Cochran (1980).

RESULTS AND DISCUSSION

The daily dry matter intake (DMI) recorded in this study was 1.40±0.15 kg and 1.44±0.15 for molasses and sorghum groups respectively. Table (2) . Expressed as percentage of live weight the dry matter intakes were found 4,6 and 4.8 for molasses and sorghum groups respectively. These findings are comparable to those reported by Devendera (1970), Morand Fehr and Savant (1978) and Gamal (1995) as 4-5% for dairy goats, but they are lower than those reported by Mackenzie (1957) and Louca *et al.* (1982) as **DMI** of 5- 7% for temperate breeds.

Table 2. Lactation performance of the experimental goats.

Item	Group A(mean ±SD) (molasses-based)	Group B (sorghum-based)	
No. of animal		12	12
Period (days)		150	150
Initial weight (kg)		30.5±4.6	30.0±5.3 NS
Final weight (kg)		27.29±4.46	28.18±2.5 NS
Body wt loss (kg)		3.2±0.3	1.82±2.0 NS
Daily **DMI** (kg)		1,4±0.15	1.44±0.15 NS
Daily energy make (MJ)		15.54	16.41
Daily milk yield (kg)		1.14±0.40	1.74±0.33 NS
FCM (kg/yield)		1.2	1.8
Lactation efficiency kg			

Feed/kg FCM	1.17	0.80
Energy utilize efficiency		
Milk energy MJ/kg feed	21.29	20.35

The average daily milk yield recorded was 1.14±0.40 and

1.74±0.33 kg for molasses and sorghum groups respectively. These figures are closely similar to those reported for Sudanese Nubian goats by Mason and Moule (1960) of an average daily yield of 1.52 kg. These figures also surpass those reported for Sudanese Nubian goats by El Naim (1979) (average daily yield of 0.5-0.7 kg) and Kudouda (1985) (average daily yield of 0.627-0.720 kg).

The wide range of milk production recorded for Sudanese Nubian goats is indicative of inherent genetic potentials of this breed for milk production capabilities. In Sudan no selection programme has been establithed for improvement of SNG. In addition the system of goats keeping is mainly dependent on free pasturing, scavenging of town disposals which give a wide chance for continuous inbreeding. All these factors are responsible for the low productivity of a large number of goats at random selection. It could be concluded that figures of milk production recorded for SNG in this study or even those reported before did not give the full expression of the lactation potential of the breed, and that will not be achieved until constructive well guided selection programme is established.

In early lactation the dry matter intake was low and the daily milk yield (DMY) was high so the dietary ME supply was below maintenance and milk production requirement. More energy was mobilized for body reserve resulted in animal, losing weight. The animals were in negative energy balance.

The gap was high in molasses group than the sorghum group and the result was an increase in live weight loss.

In mid lactation both DMI and DMY were high. The dietary ME supply rose to meet the requirement for maintenance and milk production resulting an animal nearly keeping a constant live weight. The animals were in energy equilibrium.

In late lactation period the DMI was high and DMY was low. The dietary energy supply exceeded maintenance and milk production requirement resulting an animal gaining weight. The animals were in a positive balance. The surplus energy available for retention was lower in molasses group than sorghum group which was superior in live weight gain.

The lactation efficiency (kg feed intake kg FCM yield;

Table 2) recorded in this study was 0.80 and 1.17 for sorghum group and molasses group respectively Apparently the sorghum group recorded high lactation efficiency, but this was mainly achieved at

the expense of their body reserve. The average live weight loss during the lactation period was 11 % and 6% for the molasses group and sorghum respectively. The lactation efficiency value obtained was slightly higher than that reported by Gamal (1995) with Nubian goats. This increased efficiency may be attributed to the difference in the experimental diets composition, which induced higher DMY, FCM and lactation efficiency of group B.

Milk composition of the two groups was similar Table 3. In early lactation the amount of fat yield was due to high adipose tissue mobilization. In mid lactation the milk fat and solid not fat dropped to minimum level as result of dilution due to an increase in milk secreted and decrease in adipose tissue mobilization. Like wise, the increase in the amount, of these components at the end of lactation is due to concentration resulting from decrease in milk secreted. This is in agreement to that reported by Morad-Fehr *et* al. (1982) and Gamal (1995) that all milk, constituents are negatively correlated with the amount of milk secreted.

Table 3 . Milk composition of the experimental goats

Composition gm/kg milk	Group A(mean-SD) (molasses-based)	Group B (sorghum)
Butter fat	41.+3 0.2	42.1 ±0.20 NS
Crude protein	34.0± 0.2	36.3± 0.15 NS
Total solids	125.6± 0.17	125.1±0.26 NS
Solids not fat	84.3± 0.44	83.0 ±0.28 NS
Ash	6.7± 0.03	6.30 ±0.07
Energy value (MJ/kg)*	3.31	3.34 NS

NS not significant.

**Ev = 1.66+0.04 F (fat%).*

Table 4 summarized the feasibility of feeding molasses and sorghum rations. The use of molasses in the study is more economical than the sorghum rations. This is attributed to low cost of molasses compared to sorghum where during this study the price of kg of sorghum (24/SD) was 1.3 times the price of kg of molasses (18/SD) beside no significant difference were observed in milk yield when the two diets were fed. Such economic advantage of molasses feeding will allow the use of more sorghum grains **for human consumption.**

Due to the wide variation in milk yield observed for SNG in this study, it can be concluded that the genetic resource of the breed is greatly variable, and the production potential of the breed is much high than commonly Known and by an aid of selection programme coupled with improved management, a productive Sudanese Nubian goats could be obtained.

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الصفات الإنتاجية والتناسلية لقطيع من الماعز النوبية السودانية تعلق عليقة أساسها المولاس أو الذرة 1) الإنتاج

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ملخص البحث

تم اختيار عند 24 ماعز نوبي بالغة حديثة الولادة من قسم الماعز بإدارة مركز بحوث الإنتاج الحيواني حلة كوكو تم تقسيم القطيع إلى مجموعتين على أساس العمر والوزن مجموعة المولاس ومجموعة الدريش ثم تم تقسيم كل مجموعة إلى ثلاثة مجموعات أخري (4 حيوان / المجموعة) تبعا لتاريخ الميلاد وكانت النتيجة لا يوجد أي أثر معنوي بين المجموعات تحت الدراسة على التقييم في الوزن وإنتاج اللبن و الكمية المتناولة من الأكل إلا مجموعة الدريش سجلت 33 % زيادة في إنتاج اللبن المعدل بينما مجمو عة المرس سجلت نقص في الوزن بمقدار 10 % مع مجموعة الدريش التي سجلت 6 % نقص في الوزن مجموعة المولاس كانت اقتصادية أكثر من مجموعة الدريش