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Short communication

Milk yield and composition of Muturu cattle under the semi-intensive system of management

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Abstract

Milk was once obtained daily for 98 days from Muturu cows in their 3rd lactation and analysed for yield and composition. Results showed that milk yield was generally low but there were highly significant ($P < 0.01$) individual variations in milk output. The butter fat content of the milk appeared relatively high (4.72 ± 0.08%). However, all the milk constituents were within the values reported for other tropical breeds. There was a significant inverse relationship ($r = -0.87$; $P < 0.05$) between butter fat and milk protein, while the relationship between milk protein and lactose was positive and significant ($r = 0.81$; $P < 0.05$). Even though milk yield of Muturu cattle is low, resource-poor rural farmers can readily extract some fresh milk from their cows for immediate family use in order to improve the family nutrition.

Keywords :Muturu cattle, milk yield, milk composition.

Introduction

The development of viable dairy industry in developing countries has often failed because of unfavourable environmental conditions and poor nutrition of imported temperate dairy cows (Preston, 1989). One way of solving this problem is to encourage the exploitation of the milk potentials of local animals. The need to explore and utilize all potential sources of animal protein in the country in order to improve the nutritional standards of the populace has been emphasized (Akinsoyinu *et al* 1975). According to Campbell and Marshal, (1975), a daily consumption of about 1.14 litres of milk is enough to furnish all the essential body requirements of an average person. But this very important food item is largely absent in the diets of most rural dwellers in most developing countries including Nigeria, as a result of inadequate local supplies and availability. This has led to the high cost of imported milk and milk products thereby making them unaffordable by most resource-poor rural dwellers.

Fortunately, many rural farmers in the South Eastern (SE) Nigeria keep some Muturu cattle whose milk could be incorporated into the family diet. The Muturu is the most widely distributed indigenous non-zebu cattle in the SE with an

estimated population of 42,000 out of the total national population of 177,000 (RIM, 1992). According to Umoh et al (1998), 83% of Muturu cattle rearers in the SE are full-time rearers with an average of herd size of 2-3 animals. The Muturu is also a docile animal which is well adapted to the semi-intensive system of husbandry commonly used by the rural farmers. There is a dearth of information on the milk producing potential and milk composition of muturu cattle in the hot humid zone of Nigeria. Hence, this study was undertaken

(i) to determine the milk yield and
(ii) to evaluate the chemical composition of milk of Muturu cattle.

Materials and Methods

Location: The study was conducted at the Muturu cattle research unit of the Department of Animal Science, University of Nigeria, Nsukka between the months of May and August i.e. during the rainy season. The location and climatic conditions of Nsukka have already been documented elsewhere (Ezekwe and Okwun, 1997).

Animal Management: Six lactating Muturu cows in their 3rd lactation were used for the study. The cows were grazed either on guinea grass (*Panicum* maximum)/giant star *(Cynodon dactylon)* pastures or in open natural grassland containing mixtures of two or more of the following grasses: *Brachiaria* spp, Imperata cylindrica, *Pennisetium* spp, *Hypoerenia rufa, Elucine indica* and *Seteria babeta.* Cows were grazed twice daily from 0900hr to 1200hr and from 1500hr to 1800hr before being yarded at night. Limited quantity of supplementary ration consisting of a mixture of dry cassava peels, brewer's dried grain and palm kernel cake in a ratio of 1:3:1 was provided for the cows at the rate of about 800g/cow/day. This was usually offered to the cows after the afternoon grazing. Cool, clean drinking water was provided *ad libitum.* Control of external parasites was done routinely during the experimental period using diazinon (Goldfleece, Bimeda, Dublin, Ireland).

Milking: Cows were hand-milked once daily between 0700hr and 0845hr starting 7 days post-calving. Calves were allowed to run with their dams after milking until after the afternoon grazing when the calves were isolated in separate pens prior to the next day's milking. Before milking, the calf was brought close to its dam but restrained from suckling. The cows were milked for 14 weeks i.e. 98 days.

The quantity of milk from each cow was measured with a measuring cylinder. Thereafter, 10ml of milk from each cow was collected in a plastic container and stored in the freezer at the temperature of –10°C. At the end of every week, samples of milk from each cow were pooled and used for the analysis of milk composition. A total of 84 milk samples were analysed for crude protein, butter-fat, lactose and total ash contents. Each sample to be analysed was first heated to 40°C to melt the fat and then cooled to 20°C. The butter-fat content was evaluated using the Garber method (Harvey and Hill, 1967). Crude protein content was determined using the Markam's semi-micro Kjeldhal apparatus (AOAC, 1980), lactose content was determined using Barnet and Tawab (1957) method as modified by Marker and Boulet (1959), while total ash was estimated by evaporating 2g of milk to dryness and ashed in a muffle furnace at 600°C for 3hr. Data were subjected to analysis of variance in accordance with the procedure of Steel and Torrie (1980). The relationships between milk fat and protein, protein and lactose were established using simple correlation analysis.

Results and Discussion

Variations in the weekly milk yield of Muturu cows

Table 1: Total weekly milk yield and composition of Muturu cattle

	WEEK														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Overall
Total Weekly Milk Yield (kg)	3.74	4.10	4.48	4.99	5.54	5.77	5.47	5.06	4.82	4.69	4.38	3.73	3.57	3.35	63.69
% CP $\overline{X}$	3.56	3.28	3.77	3.81	3.99	4.22	4.22	3.97	3.83	3.82	3.81	3.72	3.55	3.26	3.77
±SE	0.27	0.32	0.23	0.20	0.19	0.17	0.14	0.09	0.07	0.12	0.12	0.08	0.12	0.15	±0.16
% FAT $\overline{X}$	4.82	4.85	4.78	4.62	4.31	4.14	4.38	4.57	4.72	4.86	4.86	4.90	5.02	5.34	4.72
± SE	0.07	0.04	0.05	0.08	0.14	0.13	0.15	0.07	0.01	0.08	0.08	0.09	0.08	0.06	±0.08
% LACTOSE $\overline{X}$	3.67	3.67	3.71	3.81	3.89	4.08	4.19	4.12	3.87	3.56	3.56	3.46	3.43	3.37	3.75
± SE	0.06	0.04	0.03	0.03	0.03	0.08	0.08	0.07	0.06	0.04	0.04	0.04	0.02	0.03	±0.05
% ASH $\overline{X}$	0.78	0.76	0.74	0.78	0.76	0.72	0.80	0.75	0.73	0.74	0.69	0.69	0.78	0.65	0.74
± SE	0.04	0.01	0.03	0.05	0.03	0.05	0.03	0.02	0.02	0.06	0.03	0.03	0.02	0.03	±0.03

during the experimental period are shown in Table 1. The total weekly milk output of the cows increased from 3.74 kg in week one to a peak of 5.77 kg at week 6. The average daily milk yield of the cows was 0.42 ± 0.03 kg at week one and increased to about 0.96 ± 0.14 at week six. Ngere *et al* (1975) reported a daily milk yield of between 0.36 – 0.70 kg for the Ghana Shorthorn (a strain of Muturu) Cattle. Furthermore, Olaloku (1976) had observed that for lactation lengths of 120-216 days. the lactation milk yield of Muturu cows ranged from 127-421 kg. From these data, it is clear that the milk yield of Muturu cattle is low. Expectedly, there were highly significant ($P < 0.01$) individual variations in the weekly milk yield of the cows suggesting that increased milk yield in Muturu cattle could be achieved through selection.

The low milk yield of Muturu cows was not surprising not only because Muturu cattle have not been selected for milk production, and because of their diverse genetic background, but also because of their small body size. Montsma (1960) had rightly pointed out that Muturu cows are poor milk producers partly because of their very small size and poorly developed mammary gland. The poorly developed mammary gland appears to be one of the major factors responsible for the low milk yield observed in this study. According to Schmidt (1971), the daily milk yield of mammals is dependent not only on the amount of secretory tissues in the mammary gland but also on the rate of milk secretion per unit of tissue. Another factor that could adversely affect milk yield of cattle is poor nutrition. Although the cows used in this study received some limited quantity of supplementary ration, this might not have been adequate to supplement their daily grazing, more so when natural grassland constituted the bulk of their grazing fields. It is widely acknowledged that tropical grasses are usually lower in nutritive value than temperate grasses of comparable age (Pagot, 1992). Peak milk yield was attained at week 6 of lactation. Thereafter, the decline in milk yield became rapid, perhaps an indication that Muturu cattle are not good materials for milk production, hence the observed low persistency in milk yield.

All the milk constituents (Table 1) are within the range reported for other tropical cattle breeds (Ibeawuchi and Dalyop, 1995, Ibeawuchi and Umoh, 1990 and Ngere, 1978). There was a negative relationship between butter fat percent and milk protein ($r = -0.87$; $P < 0.05$), while the relationship between milk protein and lactose was positive and significant ($r = 0.81$; $P < 0.05$). This may suggest that the selection of Muturu cows for high butter fat content will lead to a decline in the protein content of the milk.

Conclusion

Even though the observed milk yield of these cows might not reflect the actual milking potential of the breed, because of the milking frequency used and short lactation length, the data will however serve as a useful benchmark for further studies on the evaluation of the milking ability of Muturu cattle. The present study has shown that Muturu cattle can be hand-milked easily contrary to the popular belief that the breed is wild and difficult to milk. In this regard, it is clear that rural farmers who keep Muturu cattle can take advantage of this to collect fresh milk regularly from their cows for immediate family consumption. This, no doubt, will impact positively on the nutritional standard of rural farm-families.

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