

NOTA BREVE

FACTORS AFFECTING COLOSTRUM AND MILK OF WEST AFRICAN DWARF AND RED SOKOTO GOATS

FACTORES QUE AFECTAN AL CALOSTRO Y LA LECHE DE CABRAS ENANA DE AFRICA OCCIDENTAL Y ROJA DE SOKOTO

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SUMMARY

Sixteen West African Dwarf and Red Sokoto does managed under intensive management system with zero grazing were milked once weekly from two days after kidding for twelve weeks. Age, breed and season had no significant effect ($p>0.05$) on total solids composition of colostrum, while season had significant ($p<0.05$) effect in milk. While the effects of breed and age on protein in colostrum were significant, breed and season had significant effects on protein in milk. However, season and age had significant effects on fat deposition in both colostrum and milk.

RESUMEN

Dieciséis cabras Enanas de África Occidental y Rojas de Sokoto manejadas intensivamente sin pastoreo, fueron ordeñadas durante doce semanas desde dos días después del parto. La edad de la cabra, la raza y la estación no mostraron efecto sobre los sólidos totales del calostro, mientras que la estación tuvo efecto significativo ($p<0,05$) sobre la leche. Mientras los efectos de la raza y edad sobre la proteína del calostro fueron significativos, los de la raza y la estación lo fueron sobre la proteína de la leche. Sin embargo la estación y la edad tuvieron efec-

tos significativos sobre la deposición grasa tanto en el calostro como en la leche.

INTRODUCTION

Milk is an important source of protein in Nigeria where its consumption per caput is low. Cattle have been the primary source of milk supply for human consumption despite its low productive capacity, which characterizes the performances of tropical breeds thereby making the milk supply consistently inadequate to satisfy the ever growing population especially in the urban area. Goats in Nigeria are kept mainly for meat production (Payne, 1990). Their milk is rarely used for human consumption especially in the South western Nigeria. There is persistent awareness about the unique importance of goat milk for human nutrition and health (Parkash and Jenness, 1968; Devendra and Burns, 1983; Haenlein, 1992). It is particularly rich in antibodies and low in bacteria count especially when freshly drawn

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(Belanger, 1975), and sometimes recommended by the physician in treatment of many human ailments such as hyperlipoproteinemia, intestinal resection, coronary bypass, childhood epilepsy, cystic fibrosis, gallstones etc. (French, 1970; Haenlein, 1992). While the composition of goat milk in temperate countries has been extensively studied and reviewed (Parkash and Jennes, 1968; Jenness and Sloan, 1970; Jenness, 1980; Haenlein, 1992) little has been done in the tropics. It is thus essential to look into the composition of goat milk with this high nutritive quality. This study therefore evaluated the milk composition of West African Dwarf (WAD) and Red Sokoto (RS) goats kept under an intensive management in the South Western Nigeria.

MATERIALS AND METHODS

The goat flock from which the data was obtained was located at the University of Agriculture, Abeokuta, Nigeria, latitude $7^{\circ}5.5' - 7^{\circ}8'N$, longitude $3^{\circ}2.5'$ and 76 meters above the sea level (masl). The climate is humid and vegetation zone is rain forest. Mean annual rainfall, temperature and humidity were 1037 mm, $34.7^{\circ}C$ and 82 percent respectively.

EXPERIMENTAL ANIMALS AND THEIR MANAGEMENT

Sixteen West African Dwarf and Red Sokoto does were used for this experiment. The animals were managed under an intensive system with zero grazing on chopped (*Panicum maximum*, *Pennisetum purpureum* and

Stylosanthes hamata) and supplemented with 0.3-0.5 kg/head/day of a concentrate compounded from wheat offal (40 percent), dry brewers grains (36 percent), maize (5 percent), bone meal (0.5 percent), palm kernel cake (18 percent) and common salt (0.5 percent) given *ad libitum*. Bucks were introduced to does for natural mating.

The animals were subdivided into two groups with regards to their age and season of kidding. These include 1.5-3 years, 3.5-5 years, and wet and dry seasons. Their ages were determined by dentition formula according to Saini *et al.* (1992). Milking of goats that kidded in the wet season commenced from the month of May, 2002 while those that kidded during the dry season were milked from the month of October, 2002, each for 12 weeks. On each milking day, the kids were separated from the dams at 8.00 am and the does were milked dry. The isolated does were milked dry 8h later to obtain the milk yield, after which the kids were returned to their dams. Milk samples were obtained weekly for 12 consecutive weeks from each doe after kidding except for the first three days postpartum when samples of colostrum were collected. Milk samples were obtained from each doe in plastic sample bottles and stored at $-18^{\circ}C$ prior to laboratory analysis.

The data generated from this study were subjected to least squares analysis of variance (Systat, 1993).

RESULTS AND DISCUSSION

The result of the study showed that the constituent of the colostrum and

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milk of the does include total solids, protein and fat (**table I**). The levels of these constituents were higher in colostrum than milk. Breed, age and season had no significant effects on the total solid components of colostrum. While this is true for breed and age group in milk, the effect of season on total solid in milk was significant ($p < 0.05$). The level recorded in the wet season is higher than that of dry season (**table I**). In colostrum, the protein level recorded in RS does were higher than that of the WAD does. Also young does (1.5-3 yr) recorded higher protein level than the older ones. In milk however, while age had no significant ($p > 0.05$) effect on protein, breed and season did (**table I**).

The fat content in the colostrum produced during the wet season was significantly higher than that of the dry season. The contrary is however the

case in milk. Also for age, while younger animals (1.5-3 yr) had significantly higher fat content in their milk, older does (3.5-5 yr) had more fat in their colostrum. The result obtained in this study is similar to the report of Mba *et al.* (1975) who obtained similar values for the three components in colostrum and milk in RS and WAD does in Northern Nigeria. The report of Akinsoyinu and Akinyele (1979) also corroborated the result of this study that WAD does had higher values of the total solids, protein and fat contents than the RS does.

The total solids level in milk was affected by season; milk produced in the wet season contained higher total solids than those produced in the dry season. This result is similar to the report Parkash and Jenness (1968).

The protein content of colostrum is more than that of milk. Colostrum is

Table I. Effects of breed, age group and season on total solids, protein, fat percent (LSM±SEM) in the colostrum and milk of West African Dwarf and Red Sokoto goats. (Efecto de la raza, grupo de edad y estación sobre los sólidos totales, proteína, grasa, lactosa, minerales, calcio y fósforo (p.100) en el calostro de cabras Enanas de África Occidental y Rojas de Sokoto).

Variables	No	Colostrum			No	Milk		
		Total solids	Protein	Fat		Total solids	Protein	Fat
Over all	16	18.96±0.85	7.90±0.43	7.89±0.25	191	16.41±0.26	5.03±0.12	4.71±0.11
Breed								
WAD	8	19.06±1.20	6.84±0.61 ^b	7.92±0.35	96	16.48±0.37	5.29±0.17 ^a	4.73±0.16
RS	8	18.86±1.20	8.96±0.61 ^a	7.87±0.35	96	16.33±0.36	4.77±0.17 ^b	4.69±0.16
Season								
Dry	8	17.71±1.20	7.52±0.61	6.61±0.35 ^b	96	15.67±0.37 ^b	5.41±0.17 ^a	5.10±0.16 ^a
Wet	8	20.21±1.20	8.28±0.61	9.18±0.35 ^a	96	17.15±0.36 ^a	4.65±0.17 ^b	4.32±0.15 ^b
Age group								
1.5-3	8	18.70±1.20	9.29±0.61 ^a	6.97±0.35 ^b	96	16.19±0.37	4.86±0.17	5.33±0.16 ^a
3.5-5	8	19.23±1.20	6.51±0.61 ^b	8.82±0.35 ^a	96	16.63±0.36	5.17±0.17	4.09±0.16 ^b

^{a,b}Means in the same subclass having different superscripts differ significantly ($p < 0.05$).

rich in antibodies which are protein, this may account for the higher protein levels recorded in colostrum over milk. Age played significant role in protein deposition in colostrum with younger does having higher protein level than older does. The metabolic rate of young animals is usually higher than that of older animals consequently, the absorption and utilization of proteins will be higher in younger animals. The level of protein recorded in the dry season in milk was higher than that of wet season. In the dry season, concentrate feed supplement was given to the does because of decrease pasture availability during this season. This could have resulted to increased level of dry matter intake.

The fat level recorded in colostrum in the wet season is higher than dry

season, also older does had more fat than younger ones. In the wet season, the animals tend to eat more due to the cold weather, and also tend to lay down fat for heat conservation. It is also expected that older animals will lay down fat more than younger ones due to reduced metabolic activities. In milk however, the fat level recorded in the dry season was higher than in the wet season and more in the younger does. The energy level of the concentrate feed supplement given at this period may be responsible for the higher fat deposit. Hormonal influence may also come to play here, as the pregnancy hormone; progesterone (steroid hormone) favours fat deposition in female animals. The activity of this hormone may take longer to wane in younger animals than older ones.

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