

SOURCE OF ENERGY SUPPLEMENT ENHANCES MILK PRODUCTION IN BUNAJI COWS AT DIFFERENT PARITY

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ABSTRACT

A research was conducted to examine the effect of energy-based supplements and parity on milk yield and quality using Bunaji dams at Bayero University, Kano. The experimental diets evaluated in cross over design were the treatments labeled: T₁ (Control), T₂ was (maize + cotton seed cake + 1% NaCl); T₃ (Cassava + Cotton seed cake + 1% NaCl), T₄ (Groundnut husk + cotton seed cake + 1% each NaCl + Molasses) and T₄ After effect. The animals were offered supplements at 7:30 hours prior to milking by hand. The milk extracted were measured and sub sample of milk were collected for laboratory analysis. The findings revealed milk chemical composition were significantly (P<0.05) influence by the dietary treatments. Animals fed supplements with groundnut husk had more acidic milk (pH 5.41), Fat (3.37%) compared to others. Milk production was improved (P<0.05) in dams fed cassava-based supplement (63%) compared to control. Parity 3 animals produced (P<0.05) milk with higher total solids (44.48%), Phosphorus (5.05%) and Solid Non-Fat (40.87%). It is concluded that energy-based supplement increases milk yield compared to control. Dams in parity 3 had 2.8 folds more milk compared to animals in parity 1. It is therefore recommended that cassava be served as energy source to lactating dam for improve milk yield by 3 folds.

Keyword: Energy supplement, cassava, maize, groundnut husk, Milk yield,

INTRODUCTION

The primary reason for keeping livestock is for the production of milk and meat for human food and other by products for industrial uses. Milk production is a biologically efficient system that converts large quantities of roughage to milk. Milk is the nutritious food known to man because its protein contains all the essential amino acids needed for humans (Belewu,. (2006). Milk production is thus very important. This study therefore reports the research conducted to examine the effect of sources of energy supplements that will improve milk yield and quality in Bunaji dams raise in a semi intensive system of production.

MATERIALS AND METHODS

The experiment was conducted in Department of Animal Science, Teaching and Research Farm, Faculty of Agriculture, Bayero University Kano. Kano is located at (11°59'N and 8°26'E) in the semi-arid zone at an altitude of 460m above sea level. The area is characterized by tropical wet and dry climate; the zone has irregular rainfall pattern which Muhammad (2019), classified into four seasons. These seasons are: March to May *Bazara* (late dry season), June to August is *Damina* (early wet season), September to November is referred to *Kaka* (late wet season), and December to February as *Rani* (early dry season). Each of the seasons has implication on the availability of forage species and livestock production. The wet season has an annual rain fall ranging between 787 to 960mm. The location has about 4-8 months of dry season with maximum and minimum temperatures of 33°C and 15.2°C, respectively. The temperature goes as low as 10°C during harmattan. The environment is conducive to different species of livestock production (cattle, sheep, goats, rabbits, donkeys, horses and poultry). It is also favoured with abundance of grassland for grazing by animals and free from tsetse fly infestation. Cereal crops grown in the region includes millet, sorghum, maize, cowpea, groundnuts, soybean, and sesame. Commercial agricultural products include grains of pulses and cereals; horticulture crops and livestock (Muhammad *et al.*, 2007).

Management of experimental animals

The animals used for the experiment are part of the Departmental animals which are managed using semi-intensive system of production. The breeds of animals used were Bunaji. Cows in first, second and third parity were identified for the experiment.

Dietary Treatment and Experimental Design

Experimental diets were the treatments labeled: T₁ (Control), T₂ was (maize + cotton seed cake + 1% NaCl); T₃ (Cassava + Cotton seed cake + 1% NaCl), T₄ (Groundnut husk + cotton seed cake + 1% each NaCl + Molasses) and T₅ (After effect). The supplement was offered to three animals with each animal serving as a replicate per treatment in a cross over design for three cycles. Control was the period when the animals were milked with only 1% NaCl for 21 days, while the after effect was milk collection for another 21 days after supplementation. The experiment lasted for a period of 16 weeks. During the trial, the lactating animals were supplemented with 1.5 kg of the experimental diet which is equivalent to 24% of their daily feed requirement. Experimental feed ingredients used include cotton seed cake, groundnut husk, maize, cassava and iodized salt; which was purchased from Dawanau market in Kano state.

Milk extraction and sample collection

Milking was done in the morning after separation of cow and calf over the night. They were milked by the herder once a day manually (hand milking), in the morning at 8:00 hour. The physical presence of the calf was necessary to stimulate milk let-down; the calves were then permitted to suckle for a few seconds then tethered to the fore leg of the dam until milking was completed. Thereafter, the calves were permitted to suckle until the herd was moved off for grazing on crop residues. The measuring of the daily milk extracted was done using a one liter measuring cylinder. In a 100ml bottle, 50ml of the milk samples were collected for the different treatments on after every milking and stored in the refrigerator.

Chemical Analysis of experimental diets and milk

The experimental diets were oven dried at 65°C for 48 hours and thereafter grounded in hammer miller to pass a 1 mm mesh sieve. Dry matter (DM), Crude fibre (CF), crude protein (CP), nitrogen free extract (EE) and Ash were determined according to procedures described by AOAC (2005). The milk samples were analyzed for proximate composition by analyzing for total solids, fat (Gerber method), milk protein and ash. Solids-non-fat (%SNF) was calculated by difference between TS and fat.

Statistical analysis

Records collected from the experiment were managed using Excel. This was later imported to SAS for analysis. The data collected were subjected to analysis of variance (ANOVA) using a cross over model ($Y_{ij} = U + T_i + P_j + E_{ij}$) in SAS (2003). Where Y_{ij} = dependent variable (Milk produced), U = universal mean, T_i = treatment to the i th number, P_j = cross over to the j th period and E_{ij} = error term.

RESULTS AND DISCUSSION

Table 1 presents the chemical composition of milk from Bunaji dams fed energy-based supplement at different parity managed using semi intensive production system. The results obtained revealed all the constituents evaluated were significantly ($P < 0.05$) influence by the dietary treatments. Animals fed supplements with groundnut husk had more acidic milk (pH 5.41), Fat (3.37%) compared to others. Milk production was improved as a result of the different types of energy-based supplements offered. Table 1 presents the chemical composition (%) of milk from Bunaji dams fed energy-based supplement at different parity managed using semi intensive production system.

Treatment	pH	Fat	TS	Ash	P	SNF
Control	6.450 ^a	3.788 ^c	40.333 ^a	0.514 ^a	3.963 ^b	36.544 ^a
Maize+CSC	6.212 ^{ab}	3.519 ^{bc}	38.751 ^a	0.492 ^a	3.939 ^b	35.170 ^a
Cassava+CSC	6.133 ^{ab}	3.616 ^{ab}	42.854 ^{ab}	0.498 ^b	3.868 ^a	39.245 ^b
Groundnut husk+CSC	5.414 ^c	3.369 ^a	38.851 ^{ab}	0.489 ^a	3.924 ^{ab}	35.225 ^{ab}
After Suppl.	6.036 ^b	3.283 ^a	45.833 ^a	0.533 ^a	3.650 ^a	42.533 ^{ab}
Parity						
1	5.987	3.607	38.844 ^b	0.484	3.841 ^b	35.242 ^b
2	6.021	3.626	44.484 ^a	0.503	3.815 ^b	40.869 ^a
3	5.910	3.648	38.297 ^b	0.512	4.055 ^a	34.648 ^b

Means along column with different super script differs significantly ($P < 0.05$). TS=total solids, P =Phosphorus
SNF=Solid non fat

Dams fed cassava-based supplement had 63% more milk compared to control (Fig 1) similar to report by Wanapat and Kang (2015). Decline in milk production was observed within week 2 when the supplements were withdrawn. Parity significantly ($P < 0.05$) influenced the total solids, phosphorus and Solid Non-Fat components of constituents of milk of Bunaji dams fed energy-based supplement managed using semi intensive production system. Animals in parity 3 (Figure 2) produced milk with higher total solids (44.48%), Phosphorus (5.05%) and Solid Non-Fat (40.87%). Dams in parity 3 had 2.8 folds more milk compared to animals in parity 1.

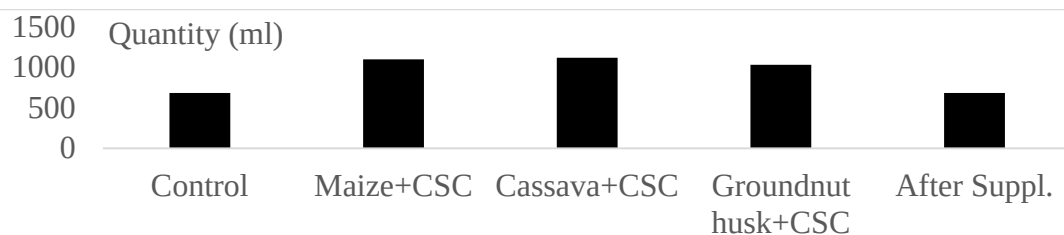


Figure 1. Effect of Sources of energy on milk yield of Bunaji dams managed in semi intensive production systems

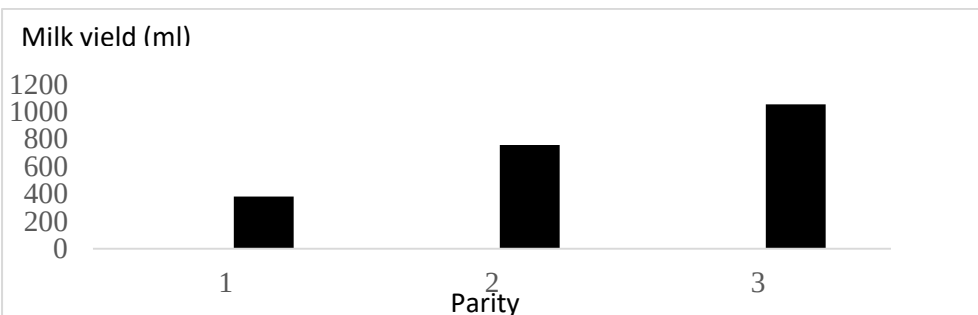


Fig 2. Effect of parity on milk yield of Bunaji dams fed energy based supplement

CONCLUSION AND RECOMMENDATION

Milk production was improved by 63% due to cassava-based supplement compared to control. Animals in parity 3 produced milk with higher total solids (44.48%), Phosphorus (5.05%) and Solid Non-Fat (40.87%) and 2.8 folds more milk. It is thus recommended that dairy cattle farmers include cassava in the supplement of their lactating dam

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