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Effect of feeding CFA on milk production, milk nutrients and components in lactating murrah (*Bubalus bubalis*) buffaloes

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Abstract

The study was conducted to examine the effect of composite feed additive on fluctuations in weekly milk production and milk composition in lactating buffaloes. The experiment was carried out in buffalo farm ICAR-CIRB Hisar. Initial milk yield of control and treatment group was 10.78 ± 1.86 and 10.87 ± 1.31 respectively which were comparable between the both groups ($p>0.05$). The initial milk protein%, milk fat%, lactose% and SNF% were 4.26 ± 0.32 and 4.25 ± 0.25 , 6.67 ± 0.73 and 6.86 ± 0.73 , 4.51 ± 0.23 and 4.52 ± 0.22 , 9.31 ± 0.31 and 9.32 ± 0.16 in control and treatment group. Initial milk yield (kg d^{-1}) of both the groups were similar ($p>0.05$). Although there are differences in milk yield (kg d^{-1}) throughout the study, it was comparable ($p>0.05$) statistically between control and treatment groups. The weekly milk composition in term of fat (%), solid-not-fat (SNF %), protein (%) and lactose (%) showed no apparent variations ($p>0.05$) between the groups.

Keywords: ICAR-CIRB, physiological, supplementation

Introduction

Milk production in lactating animal's udders is a complex and dynamic physiological process. Milk production and milk compositions varies with age of animal, days in milk, parity, basal diet fed along with concentrate and physiological status of the animal, hence needed to be carefully studied. With increasing population, demand for animal products are also increasing hence it become necessary to increase milk production by utilizing limited resources of feed and fodder available. Researchers round the globe are working hard to develop different techniques and feed additives which can enhance animal milk production and provide balanced nutrients. Blanch *et al.* (2016) ^[3] studied the effect of supplementation of commercial product, Next Enhance@300 (NE300; cinnamaldehyde and garlic oil encapsulated product) on rumen fermentation and milk production of dairy cows and reported that multiparous cows on NE300 supplemented diet, produced more milk (additional 3 kg/d) than the un-supplemented control. Supplementation of cinnamaldehyde and condensed tannins from quebracho trees saponins from *Yucca schidigera* extract in cows had been reported to have no effect on milk production, milk fat and milk protein among dietary treatments (Benchaar *et al.*, 2008). Hence a composite feed additive was developed by ICAR-CIRB, Hisar to study its effect in lactating Murrah buffaloes on milk production and milk composition.

Material and Methods

Animals and management

Murrah buffaloes ($n= 18$) were selected (avg. milk yield 10.83 ± 1.56 kg) and (avg. live weight, 507.24 ± 44.18 kg; parity, 2-5) at early stage (30 days) of lactation for the experiment and divided into two groups (CFA and CON). The experiment was conducted for three months. Farm grown green sorghum (about 25 kg) was offered at 11:00 am every day, after ensuring complete consumption of concentrates. Wheat straw was offered *ad libitum*. Water was freely available to the buffaloes. The animals were housed in roofed, cement-floored stalls with individual feeding provision and adapted to their respective diets for a period of 15 days.

Collection of samples

Animals were milked twice a day by full hand milking technique and milk samples (100 ml each) were collected on the test days. During the study of three months feeding 220 individual milk samples were collected from 18 lactating buffaloes and analysed weekly.

Total Milk yield of morning and evening from each animal was recorded using automatic weighing balance of capacity of 100 kg. Samples were collected from milk weighing bucket after complete milking and through mixing and stored at 4°C until processed and analysed on same day. Milk components like milk fat, milk protein, solid not fat (SNF) and lactose using pre-calibrated automatic ultrasonic milk analyser (LACTOSCAN LA, 8900 Zagora).

Statistical analysis

Data obtained were subjected to analysis of variance (ANOVA) using SPSS 17.0 software and treatment means were ranked using Duncan’s multiple range tests according to Snedecor and Cochran (1994).The data are expressed as mean ± SD with significance level $p < 0.05$.

Results and Discussions

Initial milk yield in start of experiment were 10.78 ± 1.86 and 10.87 ± 1.31 , that were comparable statistically ($p > 0.05$) in control and treatment group. In the end it was found that milk yield in treatment group was 11.31 ± 1.83 and in control group was 9.42 ± 3.13 . This shows that there was more milk production in treatment group (1.89 kg) than control group. Blanch *et al.* (2016) [3] studied the effect of supplementation of commercial product, Next Enhance®300 (NE300; cinnamaldehyde and garlic oil encapsulated product) on rumen fermentation and milk production of dairy cows and reported that multiparous cows on NE300 supplemented diet, produced more milk (additional 3 kg/d) than the un-supplemented control. Fig1. Shows milk production in treatment and control group.

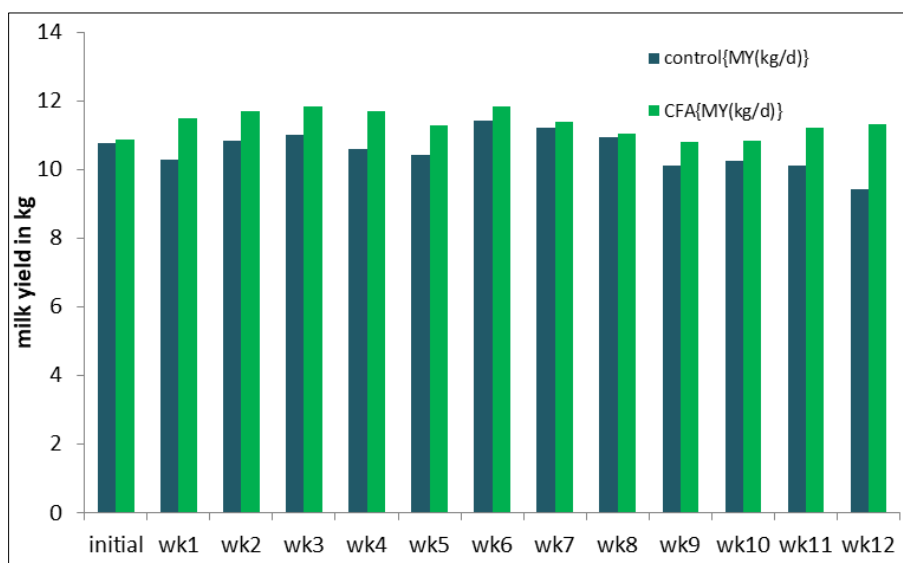


Fig 1: Effect of composite feed additive on milk production in buffaloes

Milk protein%, milk fat%, lactose% and SNF% were 4.26 ± 0.32 and 4.25 ± 0.25 , 6.67 ± 0.73 and 6.86 ± 0.73 , 4.51 ± 0.23 and 4.52 ± 0.22 , 9.31 ± 0.31 and 9.32 ± 0.16 in control

and treatment group and were comparable statistically ($p > 0.05$). Fig. 2. Depicts variations in lactose and protein % in lactating buffaloes.

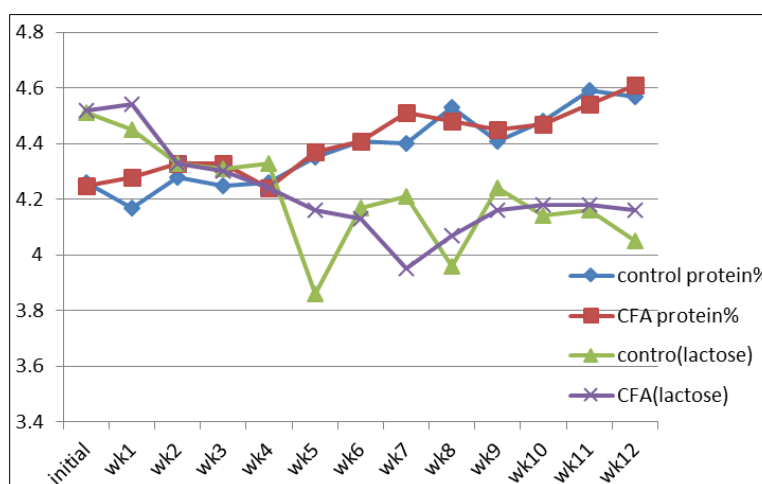


Fig 2: Effect of composite feed additive on milk lactose and protein % in buffaloes

Milk fat% in treatment group in the end of trial was 7.76 ± 0.78 and that of control was 7.52 ± 0.75 . milk composition do not show significant variations in CFA fed buffaloes than control group. Fig. 3. Shows fluctuations in milk fat% and SNF% in CFA group and control group. Santos *et al.* (2010) [9]

observed that feeding of EO mixture containing eugenol, geranyl acetate and coriander oil as a major component of feed additive in dairy cows increased the total yield of milk fat or fat percentage in milk but has no effect on total milk production. Kholif *et al.* (2012) [7] studied the effect of

different plant essential oils (garlic, cinnamon and ginger oils) on the milk production in lactating Damascus goats, seven days after parturition. Results indicated that experimental additives, significantly increased milk yield, protein and solids not fat contents compared with the control, however fat percent and milk non-protein nitrogen were decreased ($p < 0.05$) by treatments compared to the control. Total solids and ash were not affected by the experimental additives. The experimental additives increased ($p < 0.05$) unsaturated fatty acids in milk specially C18:1n9c and conjugated linoleic acids (CLA).

Rennó *et al.* (2016) studied the effect of Cashew nut shell

liquid (CNSL) and castor oil (CO), a commercial blend of functional oils (CNSL and CO) and monensin supplementation on milk yield and composition in multiparous Holstein cows. Both the feed additives supplementation reported to increase ($P < 0.01$) total milk yield, protein and lactose yield than control group. Matloup *et al.* (2017) [8] studied the effect of supplementation of monensin with coriander oil and salinomycin in early lactation Friesian cows and reported that coriander and salinomycin resulted in greater ($P < 0.05$) daily outputs of milk, energy corrected milk, fat, and milk energy compared to control.

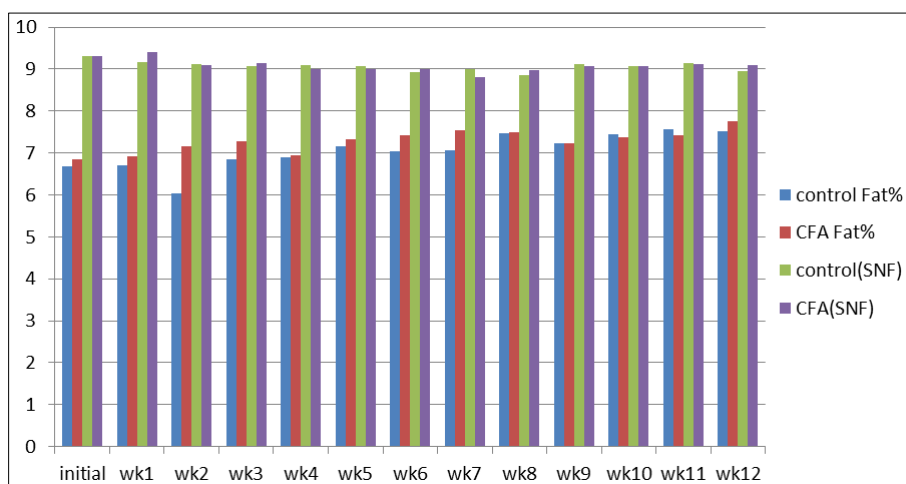


Fig 3: Effect of composite feed additive on fat% and SNF% in milk of buffaloes

Vendramini *et al.* (2016) [11] studied the effect of blend of essential oils, chitosan or monensin on nutrient utilization, blood profile, milk yield and milk composition of mid- to late-lactating and reported no significant changes in milk yield and composition among the treatments.

Conclusions

Composite feed additive have a positive effect on milk production in buffaloes. It do not affects the milk composition in treatment group but long term studies can be done in lactating animals to study fatty acid compositions in milk.

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