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*EFFECT OF FEEDING SOME ADDITIVES ON YIELD, TOTAL SOLIDS AND SOLIDS - NOT - FAT CONTENT OF COWS' MILK

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Diversification of dairy industry with launching of different types of products stimulated research on milk solids. Altering milk composition is a topic which gained importance during recent years (Ferris and Vasavada, 1989). The basis of pricing milk became its solids content, with introduction of organised co-operative movement in milk marketing. At the same time cross-breeding of animals for better production increased chances for low milk solids. Pruthi *et al.* (1987) reported that milk samples collected from four military farms in India showed samples with milk solids less than standards prescribed by prevention of food adulteration act (PFA). Milk co-operatives will not accept milk with low solids from farmers. Moreover there are provisions under PFA to convict these farmers legally if their samples do not meet minimum standards for milk solids.

Among different alternatives for modifying milk composition feeding certain additives was tried in this study.

Materials and methods

Cross-bred milch cows at Kerala Agricultural University Livestock Farm, Mannuthy were used for this study. Twenty four cows of uniform age and parity at 60 to 120 days of lactation and showing milk fat content between 3% and 4% were used for this study.

Concentrate feeding was done as per the recommendations in package of practices, Kerala Agricultural University (Pushkaran, 1987). Greengrass was fed adlibitum. Treatments consisted of feeding of following additives at given levels.

a. Acetic acid-5% solution 200ml/day
b. Sodium bicarbonate-1.5% of concentrate feed
c. Potassium carbonate-1.2% of the concentrate feed
d. Magnesium oxide-0.8% of the concentrate feed

Each additive was fed to six cows. Total experimental period of 40 days was divided into four periods. 1. Pre-treatment period-5 days before feeding additive. 2. Adaptation period-20 days in which additives were fed for adapting the animal system with additive. 3. Experimental period-5 days in which additive feeding was continued. 4. Post feeding period-10 days in which additives were not fed.

Morning milk samples were collected during all the periods at the rate of three samples per animal during each period. Milk yield and feed consumption of the animals were also recorded.

Total solids% was found out by Gravimetric method (I.S:1479-Part II, 1961). Solids-not-fat % was determined by finding the difference between TS% and fat % estimated by Gerber method (IS 1224-Part I, 1977). Effect of each treatment was found out by pairwise comparison between mean of observations during different periods using Student's t-test (Snedecor and Cochran, 1967).

Results and discussion

Mean milk TS% and mean milk SNF% observed on feeding different additives are given in Table 1. None of the treatments had any influence on feed consumption.

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Table 1 Mean* values of TS% and SNF% on feeding different additives

Treatments	Total solids%		Solids-not-fat%	
	Pre-treatment period	Experimental period	Pre-treatment period	Experimental period
Acetic acid	12.93+0.14	13.05+0.19	9.22+0.11	9.02+0.09
Sodium bicarbonate	12.30+0.15	12.52+0.13	8.76+0.13	8.62+0.12
Potassium carbonate	12.26+0.09	12.68+0.14	8.65+0.09	8.78+0.10
Magnsium oxide	12.19+0.15	12.38+0.21	8.60+0.07	8.66+0.07

* Mean of 18 observations (6 animals x 3 samples)

Acetic acid : Acetic acid feeding did not produce any significant change in TS% or SNF% of milk. But an increasing trend on milk TS% continued even after withdrawal of the additive. This indicates that if feeding was continued for a longer period of time a more conspicuous effect can be observed. There was a decreasing trend on SNF%. Acetic acid being a lipogenic fatty acid a decrease in SNF% is expected (Vansoest, 1963). Feeding of acetic acid also produced a nonsignificant increase in milk yield (0.29 kg/day).

Sodium bicarbonate : Feeding sodium bicarbonate produced a non significant increase of 0.22% in total solids while there was a decreasing trend on SNF%. This result agreed with West *et al.* (1987) and Emery *et al.* (1965). Feeding sodium bicarbonate reduced milk yield significantly by 1.28 kg/day($P<0.05$). This result agree with the findings of Noble (1990) and Emery *et al.* (1965) who observed decrease of 0.3 kg/day and 2 kg/day respectively, in milk yield. Potassium carbonate: Feeding of potassium carbonate increased milk TS% significantly by 0.42 units ($P<0.05$). This result agrees with reports of Erdman (1988) and West *et al.* (1987). During hot weather supplementation of potassium salts is advantageous because heat stress causes elevated loss of potassium from skin. (Mallonee *et al.*, 1985). SNF% showed a nonsignificant increase of 0.13%. Significant increase in TS% was brought about by significant rise in fat% and insignificant increase in SNF% observed in this study.

Feeding of potassium carbonate reduced milk yield significantly by 0.71 kg/day($P<0.05$). This observation is similar to that of West *et al.* (1987) but an increase in milk yield was reported by feeding the same additive by Erdman (1988). Magnesium oxide: Effect of magnesium oxide on TS% and SNF% was negligible and nonsignificant ($P<0.05$), as observed by Emery *et al.* (1965).

Magnesium oxide feeding produced a nonsignificant increase in milk yield (0.73 kg/day) which agreed with the findings of Erdman *et al.* (1982).

Summary

The effect of feeding acetic acid (200 ml/d), sodium bicarbonate (1.5% of concentrate feed), potassium carbonate (1.2% of the concentrate feed) and magnesium oxide (0.8% of the concentrate feed) on yield, total solids (TS) and solids-not-fat (SNF) contents of cows' milk was studied. Feeding was done for 25 days. Potassium carbonate feeding increased TS% significantly from 12.26 to 12.68 while there was

a significant reduction in milk yield (0.71 kg/day). None of the additives produced significant changes in SNF%. Feed consumption by the animals was not affected by feeding any of the additives.

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