

RESEARCH PAPER

Studies on variation of milk constituents of cross-bred cows during different seasons

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ABSTRACT

This study was carried out on twenty cross-bred cows in rural areas of Lucknow district during 2000-01. The whole year was divided into five seasons i.e. winter, spring, summer, rainy and autumn. The milk samples were collected during 12 months in each season and analyzed for water, fat, protein, lactose, ash, SNF and total solids. The milk constituents were analyzed and found that, they differed significantly among the seasons. This may be due to inadequate management of practices and feeding schedule.

Key words : Breeding cycle, Feeding schedule, Milk constituents

The variation in the productivity cross-bred cows in different seasons is a universal phenomenon and is caused by the variation in the breeding cycle of the animal, the environmental factors like temperature, humidity and the quantity and quality of feed and fodders supplied to the animals. The quality of milk depends upon the fat level in the milk. Further, the percentage of fat, SNF (solid not fat) of milk do not follow a uniform trend through the lactating phase (Yadav *et al.*, 1991). The percentage of butter fat, Total solid and solid not fat (SNF) were low during April to June (summer season) and high during December to January (winter season), the overall percentage of the 4 constituents in Haryana cow milk were 4.35 ± 0.03 for fat, 3.33 ± 0.02 for protein, 13.40 ± 0.02 for total solid and 9.05 ± 0.01 for solid not fat (SNF) (Kaushik and Tandon, 1979). Singh (1980) revealed that the effect of climate on milk production was found lowest in April to September due to heat and rains weather becomes sultry most uncomfortable animals are unable to consume full fodder. During winter, it was found that milk yield increased to a marked extent due to cold weather and abundance of good green fodder. Hence, an attempt has been made to investigate the variation in the fat, SNF and total solid in milk of cross-bred cows reared in rural areas of Lucknow district during different seasons.

MATERIALS AND METHODS

Twenty cross-bred cows were selected from rural areas of Lucknow district and monthly milk samples of morning and evening for twelve months in each season were collected. One ml. of potassium chromate [$K_2Cr_2O_7$

(30%)] was used as preservative for 100 ml. of milk samples (Hussain *et al.*, 1984). The samples were thought to the Department of Animal Science, NDUAT, Kumarganj, Faizabad and analyzed for fat, protein, lactose, ash, total solid and solid not fat according to method described by AOAC (1989). Statistical analysis was done according to Snedecor and Cochran (1967) using completely randomized design.

RESULTS AND DISCUSSION

The mean percentages of water, fat, protein, lactose, SNF and total solid in cross-bred cow milk are given in Table 1.

The water percentage in milk was 86.70, 85.67, 85.30, 86.95 and 86.83 in winter, spring, summer, rainy and autumn seasons, respectively.

Statistically percentage of water observed was highly significant in rainy season followed by autumn, winter, spring and summer seasons, respectively.

The average fat percentage was 4.55, 5.09, 5.18, 4.06 and 4.60 in winter, spring, summer, rainy and autumn seasons, respectively. Fat percentage was recorded significantly higher in summer followed by spring, autumn, winter and rainy seasons. It might be due to low production of milk and feeding of wheat straw rich diet during summer season which showed increased fat percentage in milk.

The mean percentage of protein in milk was 3.52, 3.73, 3.87, 3.70 and 3.40 in winter, spring, summer, rainy and autumn seasons, respectively. A drastic reduction in protein which reflects on SNF percentage was due to under feeding. This may be overcome by good feeding

Table 1 : Seasonal variation in average milk yield (lit.) and its composition in milch cross-bred cows

| Contents | Winter season | Spring season | Summer season | Rainy season | Autumn season | Av. and S.E. | C.D. (P=0.01) |
|---------------------|---------------|---------------|---------------|--------------|---------------|-------------------------|---------------|
| Milk yield lit./day | 5.97 ± 0.29 | 5.22 ± 0.25 | 4.76 ± 0.25 | 5.12 ± 0.26 | 5.28 ± 0.25 | 5.29± 0.13** | 0.33 |
| Water % | 86.70±0.08 | 85.67±0.10 | 85.30±0.07 | 86.95±0.05 | 86.83±0.11 | 86.29±0.08** | 0.32 |
| Fat % | 4.55±0.05 | 5.09±0.06 | 5.18±0.05 | 4.06±0.03 | 4.60±0.04 | 4.70±0.05** | 0.18 |
| Protein % | 3.52±0.03 | 3.73±0.03 | 3.87±0.03 | 3.70±0.02 | 3.40±0.04 | 3.64±0.02** | 0.11 |
| Lactose % | 4.52±0.04 | 4.78±0.03 | 4.91±0.02 | 4.58±0.02 | 4.46±0.04 | 4.65±0.02** | 0.12 |
| Ash % | 0.71±0.01 | 0.73±0.01 | 0.74±0.01 | 0.71±0.01 | 0.71±0.01 | 0.72±0.01 ^{NS} | - |
| Total solid % | 13.30±0.08 | 14.33±0.10 | 14.70±0.07 | 13.05±0.05 | 13.17±0.11 | 13.71±0.08** | 0.32 |
| SNF % | 8.75±0.06 | 9.24±0.05 | 9.52±0.05 | 8.99±0.02 | 8.57±0.07 | 9.01±0.04** | 0.21 |

practices in farm conditions throughout the year by the farmers. (Lagates, 1960).

The mean percentage of lactose in milk was 4.52, 4.78, 4.91, 4.58 and 4.46 in winter, spring, summer, rainy and autumn seasons, respectively. Statistically lactose percentage was recorded significantly higher in summer followed by spring, rainy, winter and autumn seasons, respectively.

The average percentage of total solid in milk was 13.30, 14.33, 14.70, 13.05 and 13.17 in winter, spring, summer, rainy and autumn seasons, respectively. The total solid percentage was observed significantly higher in summer followed by spring, winter, autumn and rainy season.

The mean percentage of solid not fat in milk was 8.75, 9.24, 9.52, 8.99 and 8.57 in winter, spring, summer, rainy and autumn seasons, respectively. Statistically solid not fat was found significantly higher in summer followed by spring, rainy, winter and autumn season. This may be due to inadequate and imbalance feed supply in different seasons. Similar observations were reported by Ghose and Anantakrishnan (1964) and Schnieder *et al.* (1948).

Conclusion :

Seasonal variation in water, fat, protein, lactose, total solids and solid not fat content in different seasons of cross-bred cows reared under rural areas were found to have highly significant differences. It may be due to inadequate and imbalance feed supply and managerial practices.

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