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## Effect of season on composition of Red Sindhi cow milk

**Chetan Chougale, Dr. RJ Desale, DK Kamble, VP Kad and MR Patil**

### Abstract

The present study was undertaken on “Effect of season on composition of Red Sindhi cow milk” on healthy 20 cows (Red Sindhi cow) selected from Agriculture College Dhule dairy farm Dhule. All cows were housed in barn under similar management conditions. All clean milk sanitary precautions were undertaken to produce clean milk by dry full hand method of milking. In different seasons viz. Rainy, winter and summer season representative samples of 200 ml milk were collected. Samples of fresh milk drawn from the udder were analyzed for fat, lactose, protein, ash and total solid (T.S.). It was found that season had significant effect on fat, protein, ash and total solid (T.S.) and non-significant effect on lactose content of cow milk.

**Keywords:** Red Sindhi cow, milk quality, season, composition

### Introduction

India is considered as an agrarian country in which major proportion of population is vegetarian. Milk is complete food and one of the sources of animal proteins. India is the largest milk producer in the world with a production of 221.06 MT in 2021-22, contribute 23% of total global milk production. The per capitata availability of milk 444 g/day. About 55% of the total production is buffalo milk and then cow milk rank second in total milk production.

In India with the expansion in dairy industry it becomes necessary for its future glory to find out Indigenous cow breeds from different zone of our country. Red Sindhi is an important milch breed of cattle. This breed was originated from the Sindh state of Pakistan. The animal of the breed is heavy and heat tolerant. Cows of this breed are good milkers and milk potential of the cow is comparable with Sahiwal breed. The red Sindhi breed exported to more than 20 countries including America, Australia, Brazil and Sri Lanka etc. In India breed is facing endangered population status as animal of this breed is not available in field condition. Breed presently maintained only in few organized herds of the country. Red Sindhi animals are red in colour and have good appearance. The females of good milkers producing 4179 kg of milk in a lactation and calves regularly. There are approximately less red Sindhi pure animals in the country.

Milk and its products are excellent source of vital nutrients. It is described as nature’s nearly perfect food. Milk proteins offer a high-quality animal protein in diet. Milk fat fractions are now being recognized to possess interesting anti-cancer properties. Minerals and vitamins contents of milk contribute significantly to human nutrition. Calcium is needed for protection against brittle bones in the latter part of life. It is now considered to play a vital role in controlling blood pressure in protecting colon from cancer. Milk and milk products from dairy animals are palatable and easy to digest therefore important human food. Milk, according to the prevention of food adulteration (PFA) rules, is the normal mammary secretion derived from the complete milking of a healthy milch animal without either addition there to or extraction there from. Free from colostrum, contains all the nutrients essential for growth i.e., water, fat, proteins, lactose, minerals vitamins and ash and has been recognized as a vegetarian food since ancient times and all Indians consume milk and milk products without reticence. It is especially beneficial for young ones as it contains nutrients for growth and development particularly a sufficient concentration of quality protein, mineral and vitamins. Especially vitamin A, riboflavin and vitamin B12 is also the richest natural source of calcium in the best available form, (Pathak 2003). However, in this study on Red Sindhi we have focused only on gross chemical composition of the milk as how it affected by different season.

### Methodology

The research experiment entitled “Effect of season on composition of Red Sindhi cow milk”

was carried in laboratory at Department of Animal Husbandry and Dairy Science after collecting samples from Agriculture college Dhule dairy farm Dhule. For critical analysis the facilities from the Department of Agriculture Chemistry and Soil Science PGI and Department of Food Processing Engineering, Dr. Annasaheb Shinde College of Agriculture Engineering, Mahatma Phule Krishi Vidyapeeth, Rahuri was utilized. The Experiment was conducted during the year 2022-23.

All experimental animals were housed in a barn and managed under more or less similar managerial conditions. Sanitary precautions like clipping of long hair at udder and flank, grooming, washing of hind quarters, wiping udder with towel soaked in 2% Dettol solution, tying tail with legs etc. were taken care prior to collection of milk samples. Cows were milked by full and dry hand method of milking. Two streams of fore milk from each quarter of udder were discarded and a sample of 200 ml milk was collected directly into sterilized conical flasks and plugged immediately. Milk sample were brought to laboratory for chemical analysis and the fat, solid not fat (SNF), total solid (TS), water, Sp. gr. and acidity percent was determined as per AOAC (1995) [1].

### Season of milk collection (Factor for study)

- Rainy season (July-Oct)
- Winter season (Nov-Feb)
- Summer season (March-June)

### Parameters determined in milk were as follows

- Fat percent
- Lactose
- Protein
- Ash
- Total solid (TS)

## Results and Discussion

### Fat

In different seasons it was noticed that the values for milk fat were significant. The milk fat content affects the most during winter season the mean value of milk of winter season was 4.57. It might be due to pasture grazing diet supplemented with concentrate and dry matter and also the lower temperature suitable to produce high fat in milk. The extreme heat condition affects the fat content during summer which may be cause of lower fat content and also more water consumption affect fat content. The result showed the mean value of fat % in three seasons (rainy, winter and summer) are 4.28, 4.57 and 4.12, respectively. Its level was lower in summer season comparing to any other season but winter showed the highest amount of milk fat. These results agreed with Ayub *et al.*, (2007) [3].

### Lactose

The result for different seasons, winter season showed highest value of 4.34 followed by rainy 4.33 and summer 4.32. Sahu *et al.*, (2018) [10] In the present study the mean value for lactose percentage was found significantly higher in the winter season than summer season and lowest in the rainy season.

### Protein

It was observed that average value of total protein in milk sample for rainy, winter and summer season were 3.28, 3.35 and 3.22 respectively. Similar result by, Ayub *et al.*, (2007) [3],

Milk Protein was higher in winter than summer. The higher milk protein in winter could be attributed to the diet containing high digestible protein content from the green feed (Birssem) and concentrate feed, whereas the feeding in summer gave the lowest milk protein where the diet contained low supplier for protein such as maize silage and rice straw. In this respect, Colombari *et al.* (1999) [6] attributed the decrease in milk protein to inadequate intestinal absorbed protein, which in turn could be due to very limited rumen undegradable protein content in the diet and to an excess of soluble nitrogen.

Similar trend by, Sahu *et al.*, (2018) [10] the least square mean for protein percentage was significantly highest in the winter season followed by summer and lowest in the rainy season. significantly higher level of protein percentage in winter season could be attributed to better availability of quality green fodder during winter season as compared to that of summer season.

### Ash

The overall mean value for ash content was 0.68 per cent. During winter it reaches 0.74 per cent. As during winter season, the ash found relatively more due ample availability of the green fodder with hay and mineral mixer. Contradictory result Chen *et al.*, (2014) the ash content for raw milk fluctuated greatly over the period of study, but no significant seasonal difference was observed. The maximum ash content (1.03%) was observed in August and minimum content (0.53%) was found in October.

### Total solid

In winter the mean value for total solid is highest (13.05) followed by rainy (12.54) and summer (12.21). This is due to increase in fat, protein and other solids which ultimately increase total solids. Milk total solid % was higher in winter than summer. These results agreed with the results obtained by Auldust *et al.*, 1998 [2] and Ayub *et al.*, (2007) [3]. Similar result was also reported by Verma D. K., (2018) [7].

**Table 1:** Effect of season on composition of Red Sindhi cow milk

Parameters	Season				Overall value (%)
	Rainy	winter	Summer	Results	
Fat	4.28	4.57	4.12	S	4.33
Lactose	4.33	4.34	4.32	NS	4.32
Protein	3.28	3.35	3.22	S	3.28
Ash	0.72	0.74	0.67	S	0.70
Total solid	12.54	13.05	12.21	S	12.60

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