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### Comparative Study Monounsaturated fattyacids Profile of Milk in Gir and its crosses

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#### INTRODUCTION

Milk is an essential food for humans. The majority of milk consumed throughout the world is bovine milk. It is often described as a complete food because it contains all essential nutrients e.g. protein, carbohydrate in the form of lactose, fat, vitamins and minerals (Komorowski and Early, 1992)

The milk fat consists mainly of triglycerides, approximately 98 per cent, while other milk lipids are diacylglycerol (about 2% of the lipid fraction), cholesterol (about 0.3%), phospholipids (about 1%) and free fatty acids (FFA) (about 0.1%) (Jensen et al., 1995).

However, all studies on different crossbreeds have focused only on gross chemical composition of the milk. While scanty information is available in literature on the free fatty acid composition, "Comparative study Monounsaturated fattyacids Profile of milk in Gir and its crosses"

#### MATERIAL AND METHOD

This investigation was carried out in the laboratories of the Department of Animal Husbandry and Dairy Science utilizing the facilities and Dairy Science utilizing the facilities from the Department of Agriculture chemistry and Soil Science, Post Graduate Institute and Department of Food Processing Engineering, Dr. Annasaheb Shinde, College of Agriculture Engineering, M.P.K.V., Rahuri (M.S.). The experiments were conducted during the year 2013-14.

#### SELECTION OF COWS

For the present investigation, 12 Gir, 12 of Gir half breed (GHB) and 12 of Phule Triveni group cows were selected on their 1st (7-30 days), 2nd (31-60 days), 3rd (61-150 days) and 4<sup>th</sup> (151-270 days) lactation stages from the Research-cum-Development Project, (RCDP) on cattle.

These cows were divided into 3 groups according to their breeds as detailed below.

1. Breed first (Gir)
2. Breed second (Gir halfbreed)
3. Phule Triveni (PT)

The cows under each breed were further grouped according to the stage of lactation, as given below.

1. Between 07 to 30 days(SL)
2. Between 31 to 60 days(SL)
3. Between 61 to 150 days(SL)
4. Between 151 to 270 days(SL)

### Milk samples

Fresh composite milk samples of Gir and its cross breeds as per stage of lactation were collected from Research Cum Development Project on Cattle at 7 days interval and preserved in deep freeze till the analysis was completed. At a time, 1 liter of each milk sample was collected and analyzed.

### Spectra Alyzer

Spectra Alyzer ZEUTECH (Germany Company) i.e. NIR Analyzer based on principle of "Sample and Reference" measurement was been used for determination of fatty acid profile in milk. In this method first we had to standardize the 30 milk samples by incorporating the reference from the literature. Then after machine has been standardize the samples were put one by one in machine. Then for calibration time taken was 1 minute then main reading was displayed on the computer for analysis.

### STATISTICAL ANALYSIS

Factorial Randomized Block Design was adopted to study the effect of breed and stage of lactation on physico-chemical, mineral and fatty acid profile of the milk of Gir and its crossbred cows (Snedecor and Cochran, 1967).

## RESULT AND DISCUSSION

### Monounsaturated fatty acids

**1. Myristoleic acid (C14:1):** From the (Table 23) it was seen that the C 14:1 content in the milk of Gir (0.78 %), Gir half-bred (0.80 %) and Phule Triveni (0.81 %) in first stage of lactation. It remained minimum at this stage and from 31st day upto the end of lactation it showed a gradual rise up to the advanced stage of lactation.

Myristoleic acid per cent in the milk of breed was highest during 4th stage which was significantly superior to 3rd, 2nd and stage 1st. The myristoleic acid content in milk 1<sup>st</sup> and 2<sup>nd</sup> were almost similar with each other.

**Table 1**  
**Myristoleic acid (C 14:1) content of milk as affected by breed and stage of lactation**

Factors	Gir	Half-bred	Phule Trive NI	Mean
	← % of total identifiable fatty acid →			
SL <sub>2</sub>	0.78	0.80	0.81	0.80 <sup>a</sup>
SL <sub>2</sub>	0.93	0.90	0.85	0.89 <sup>b</sup>
SL <sub>2</sub>	1.30	1.00	0.90	1.07 <sup>c</sup>
SL <sub>4</sub>	1.50	1.30	1.00	1.270 <sup>d</sup>
Mean	1.13 <sup>c</sup>	1.00 <sup>b</sup>	0.89 <sup>a</sup>	1.01
	S.E. +		CD at 5%	
Breed	0.021		0.063	
SL	0.019		0.054	
Breed x SL	0.037		0.109	

Each value is a mean of three replications

Among the breeds it is observed that mean C14:1 content in Gir (1.13%) showed significantly superior to Gir half-bred (1.00%) and Phule Triveni (0.89 %). It was also observed that interaction effect between stage of lactation and breed on myristoleic acid of milk also showed significant differences.

**2. Cis-10 Pentadecenoic acid(C15:1):** From the Table 24 minimum mean C15:1 content in the milk samples was (0.62%) in the 1<sup>st</sup> stage of lactation which increased with each further stage of lactation.

**Table 2. Cis-10 Pentadecenoic acid (C15:1) content of milk as affected by breed and stage of lactation**

Factors	Gir	Half-bred	Phule Triveni	Mean
← % of total identifiable fatty acids →				
SL <sub>1</sub>	0.80	0.50	0.55	0.62 <sup>a</sup>
SL <sub>2</sub>	0.85	0.55	0.60	0.67 <sup>a</sup>
SL <sub>3</sub>	0.90	0.50	0.90	0.70 <sup>b</sup>
SL <sub>4</sub>	1.00	0.80	0.80	0.87 <sup>c</sup>
Mean	0.89 <sup>€</sup>	0.61 <sup>a</sup>	0.64 <sup>b</sup>	0.71
	S.E.+		CD at 5%	
Breed	0.028		0.081	
SL	0.024		0.070	
Breed x SL	0.048		N.S.	

Each value is a mean of three replications

Among the breeds average C15:1 content at 1<sup>st</sup> stage of lactation in case of Gir (0.80%), Gir half-bred (0.50%) and Phule Triveni (0.55 %) increased as the lactation stage increased.

It was also observed that within breed, mean C15:1 content in case of Gir (0.89) was significantly higher over Phule Triveni (0.64 %) and Gir half-bred (0.61%). The stage of lactation and its breed interaction did not show significant differences.

**3. Cis-10 Heptadecanoic acid(C17:1):** It may be observed from the Table 25 that the mean C17:1 content in the milk was 0.55, 0.57, 0.58 and 0.59 in the 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> stage of lactation, respectively. It was observed that C17:1 content increased with advancing stage of lactation.

Further, it appeared that the stage of lactation and its interaction with breed did not affect the C17:1 content in milk.

**Table 3: Cis-10 Heptadecanoic acid (C17:1) content of milk as affected by breed and stage of lactation**

Factors	Gir	Half-bred	Phule Trive	Mean
← % of total identifiable fatty acids →				
SL1	0.60	0.50	0.55	0.55
SL2	0.62	0.55	0.55	0.57
SL3	0.65	0.55	0.55	0.58
SL4	0.67	0.55	0.55	0.59
Mean	0.64 <sup>b</sup>	0.54 <sup>a</sup>	0.55 <sup>a</sup>	0.57
	S.E.1		CD at 5 %	
Breed	0.013		0.038	
SL	0.011		N.S.	
Breed x SL	0.022		N.S.	

Each value is a mean of three replications.

In case of the breeds mean content C17:1 of Gir (0.64%) showed significantly superior over the Phule Triveni (0.55%) and Gir half-bred (0.54 %).

**4. Oleic acid (C18:1n9c):** In the present investigation from (Table 26) the overall mean oleic acid (C18:1n9c) is 18.04 per cent. Among the breeds the highest oleic acid content is 18.07, 19.49 and 19.71 per cent in Gir, Gir half-bred and Phule Triveni, respectively in the 4<sup>th</sup> stage of lactation. The mean oleic acid percentage was 17.08, 17.46, 18.54 and 19.09 per cent in 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> stage of lactation, respectively.

**Table 4: Oleic acid (C18:1n9c) content of milk as affected by breed and stage of lactation**

Factors	Gir	Half-bred	Phule Trive	Mean
← % of total identifiable fatty acids →				
SL1	16.74	17.02	17.49	17.08 <sup>a</sup>
SL2	16.82	17.54	18.01	17.46 <sup>b</sup>
SL3	17.89	19.04	18.70	18.54 <sup>c</sup>
SL4	18.07	19.49	19.71	19.09 <sup>d</sup>
Mean	17.38 <sup>a</sup>	18.27 <sup>b</sup>	18.48 <sup>c</sup>	18.04
	S.E. +		CD at 5%	
Breed	0.011		0.032	
SL	0.009		0.027	
Breed x SL	0.019		0.055	

Each value is a mean of three replications

It was also observed that among breeds Phule Triveni (18.48) showed highly significant values over Gir half-bred (18.27) and Gir (17.38). The interaction effect between stage of lactation and breed showed significant differences.

### **CONCLUSION**

Monounsaturated fatty acid principal unsaturated fatty acid in milk i.e., oleic acid was in highest amount (18.04% of total fatty acids). While among breed highest oleic acid content was in Phule Triveni (18.48% of total fatty acids) which is used as source of energy and in form of triglycerides.

### **REFERENCES**

- IS: 1224 (Part 1) 1977. Method for determination of fat by Gerber method. Indian Standards Institution, ManakBhavan, New Delhi.
- IS: 1479 (Part I) 1960. Methods of test for dairy industry Part I. Rapid examination of milk. Indian Standards Insitution, Manak Bhavan, New Delhi.
- IS: 1479 (Part II) 1961. Methods of test for dairy industry Part II. Chemical analysis of milk. Indian Standard Institution, ManakBhavan, New Delhi.
- Jensen, R.G. and Newburg, D.S. 1995. Bovine milk lipids. In: Jensen R.G. ed. Handbook of milk composition. London, UK Academic Press. pp.543-575.
- Komorowski and Early, 1992 Korkman, N. 1950. Variation in cow and buffalo milk due to the age or number of lactations Dairy Sci. Abstr.13:409.