



Research Article

Statistical Control Of Suitability To Turkish Standards Of Total Milk Fat Rates Obtained From Spring Season

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Abstract

This research was aimed to investigate the suitability of total milk fat rate obtained from Erzincan Province during spring season. The milk total fat rates were compared with the Turkish standards (minimum 3.5%) using one-sample t test by SPSS 18.0. The determined fat ratio in milk (3.54, %) during spring period was suitable to Turkish standards. The total fat level was found within a specific range to quality production for desirable dairy products such as cheese, yogurt etc. On the other hand further researches are needed to determine the suitability to Turkish standards of total milk fat rates obtained from different seasons and other provinces of Turkey. This research should be repeated for all season of year. Milk producers should be careful about the biochemical components having economic importance such as total milk fat obtained from different seasons to obtain maximum profit.

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1. INTRODUCTION

The biological function of milk is to supply nutrition and provide immunological protection to the offspring. For some animal species, milk is the only food consumed for weeks or months. Therefore, it must furnish all nutritive requirements such as carbohydrates, amino acids, minerals, and vitamins for maintenance and growth of the body. Milk content may change due to differences in relative rates of synthesis and secretion of milk constituents by the mammary gland. Variations can occur due to the differences among animal species, between individuals within a strain, and between conditions affecting an individual. Milk components are affected by animals [1] and environmental factors, such as milking methods [2], seasons [3] and lactation [4;5]. Factors affecting the cows may include the weather or seasons and the stage of lactation. Milk fat percentages can vary with the stages of lactation. The highest percentages are usually found in colostrum, followed by a decline during the first two months of lactation, then a slow increase as lactation progresses occur [6]. Researches on statistical control of milk components have been increased in recent years [1-3]. Statistical controls associated with raw dairy material are important in terms of product quality. In developed countries, manufacturers often refer to statistical controls for continuity of product quality. It must be known that which raw milk should be selected according to fat rate for the manufacturing of different dairy products. Therefore, the aim of this research is to investigate the suitability to Turkish standard of obtained milk according to its fat rate.

2. MATERIAL AND METHOD

In the research, the daily milk samples (100 ml) were obtained from Erzincan Province during months of spring season. Milk was collected daily during 90 days. The daily cow milk samples were composites of milk collected at morning and afternoon of day. The samples (100 ml) were collected into plastic vials preserved with micro tabs, stored 4°C until it was analyzed for the determination of fat rates. The milk samples were analyzed by automatic analysis using a Farm Milk Analyzer (Milkana). The total fat rate of raw milk was compared with the reference fat value (minimum 3.5%) of Turkish standards [7] using one-sample t test [8-10] via SPSS 18.0 package program.

3. RESULTS AND DISCUSSION

Descriptive statistics and significance values for milk fat to Turkish standards were presented in Table 1.

Table 1. The suitability of milk fat to Turkish standards

	Mean	Std. Deviation	Std. Error Mean			
Total fat, %	3.5451	,14327	,02006			
One-Sample Test						
Test Value = 3.5						
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Total fat	2.248	89	,029	,04510	,0048	,0854

Table 1 indicated the total fat rate of milk samples obtained from Erzincan province during spring season was compared with the Turkish standards (minimum 3.5%) using one-sample t test. The milk fat rates for mentioned province and season were favorable for reference value of Turkish standard. According to the results, dairy products such as full fat yoghurt can be made from milk obtained from Erzincan province during spring season. According to Kayastha et al. [11] climatic conditions and seasonal changes have significant impact on milk quality parameters. The results for the spring season could be an economic advantage to dairy manufacturers in terms of total fat rate.

In contrast to current study, the presented values by Ilhan et al. [12] about milk fat rates obtained from Bitlis (3.29 %) and Batman (3.32 %) Provinces do not comply with Turkish standards. From the results of the present study, it can be said that Erzincan province is more advantageous than Bitlis and Batman in terms of milk fat rates. Milk fat rates obtained from spring season were not different from the conventional milk results reported by Cimen et al., [13].

Milk fat rates for spring season in this research are compatible with standard values for dairy cows announced by Koneko and Cornelius [14]. According the findings from our study, fat rates of raw milk in all spring months were favorable for Turkish standards. Maximum rates of total milk fat are fundamental for obtaining the economic gain in dairy production. Therefore, further studies are needed to improve the interpretations about milk total fat associated with economy of dairy products. Content of cited milk fat rates, point out that spring season is favorable for the standards. Further researches are needed in order to determine the suitability milk which was obtained from different seasons and other provinces of Turkey to Turkish dairy standards. This study can be repeated for all seasons of the year.

4. REFERENCES

- [1] Yildirim S, Cimen M, Cetin M, Dilmac M. 2009. The effect of live weight and age of dam on milk biochemistry of machine milked cows. *Australian Journal of Basic and Applied Sciences* 3(2), 477-479.
- [2] Cetin M, Cimen M, Dilmac M, Ozgoz E, Karaalp M. 2007. Studies of biochemical parameters of milk of sheep milked by machine early lactation period. *Asian Journal of Chemistry*, 19(3), 2135-2140
- [3] Ceylan B, Çimen M, Bakır K, Oduncu İ. 2013. Farklı mevsimlerden elde edilen inek sütlerinde pH seviyelerinin peynir standartlarına uygunluklarının belirlenmesi. *Bilim ve Gençlik Dergisi* 1(1), 7-12.
- [4] Cetin M, Cimen M, Goksoy EO, Kirkan S, Yildirim S. 2010. Machine milked and suckled goats differ in some biochemical components of their milk in 1st and 2nd weeks of lactation. *International Journal of Agriculture and Biology*, 12 (5), 799-800.
- [5] Yılmaz Y, Çimen M, Şahin A. 2017. Milk total fat and pH curves of Simmental cows in early and late lactation period. *The International Journal of Engineering and Science*. 6(6), 94-96.
- [6] Milam, K.Z., Coppock, C.E., West, J.W., Lanham, J.K., Nave, D.H., Labore, J.M., Stermer, R.A., and Brasington, C.F., 1986. Effects of drinking water temperature on production responses in lactating Holstein cows in summer. *J. Dairy Sci.* 69:1009-1013.
- [7] Anonymous, 1981. Çiğ Süt Standardı. TS 1018. Türk Standartları Enstitüsü. Ankara
- [8] Çimen, M., 2015. Fen ve Sağlık Bilimleri Alanlarında Spss uygulamalı Veri Analizi. Palme Yayıncılık, Yayın No: 905, ISBN: 978-605-355-366-3. Sıhhiye, Ankara.
- [9] Norusis, M.J., 1993. SPSS for Windows: Base System User's Guide. SPSS, Chicago, USA.

- [10] Ntoumanis, N.A., 2005. Step-by-Step Guide to SPSS for Sport and Exercise Studies. Published in the USA and Canada by Routledge Inc. ISBN: 0-415-24978-3. (Print Edition) 29 West 35 th Street, New York, NY 10001.
- [11] Kayatsha, R.B., Zaman, G., Goswami, R.N., 2008. Factors affecting the milk constituents of native cattle of Assam. *Indian J. Anim. Res.* 42(4): 270-272.
- [12] İlhan, A., Çimen, M., Demir, Z., Turan, Z., Demir, B., Coşkun, B., 2015. Batman ve Bitlis İllerinden Elde Edilen İnek Sütlerinde Yağ ve Protein Oranlarının AB ve Türk Standartlarına Uygunluklarının Belirlenmesi. *Gıda Mühendisliği 6. Öğrenci Kongresi*, 11-12 Nisan, İstanbul.
- [13] Cimen, M., N. Yildirim, A. Dikici, O. Kaplan and N. Cıkçıkoglu Yildirim, 2010. Seasonal Variations of Biochemical Taste Parameters In Milks From Conventional and Environment-Friendly Organic Farming. *Bulgarian Journal of Agricultural Science*, 16 (6): 728-732.
- [14] Koneko, J.J. and Cornelius, 1980. *Clinical biochemistry of domestic animals*. 3rd ed. Academic press, New York. Pp. 41-376.