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Suitability of Milk Obtained From Brown Swiss Cow for the Production of Different Types of Cheese

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----------***ABSTRACT***----------
This research was performed to investigate the favorable of protein/fat rate in milk obtained from Brown Swiss cow raised in Erzincan Province to various cheese making. The milk protein/fat rates of milk samples were compared with the different cheese standards using one-sample t test.The milk protein/fat rate ofBrown Swissbreedwas favorable for Cheddar andLimburger cheese making. However, protein/fat rates of milk samples in this study were not acceptable for standards of Mozzarella cheese. It can be said that, Cheddar and Limburger cheese can be made from milk in this study, whereas Mozzarella cheese cannot be made. These results show the importance of P/F rate to within a specific range to quality production for desirable cheese types. On the other hand, the differences at P/F rates offer potential for the production of different cheese types such as Cheddar, Limburger and Mozzarella. Further researches are needed to determination of suitability to various cheeses making of milk obtained from different season, cow breed and other province of Turkey.
KEYWORDS:*Milk, Cheese, Brown Swiss, Cheddar, Limburger, Mozzarella*

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I. INTRODUCTION

Cheese manufacturers ask if it is necessary to standardize cheese milk on a fat basis or on a protein-to-fat ratio (P/F) basis, and how standardization affects manufacturing efficiency, cheese composition and quality [1]. The difference in P/F of conventional milks is due to natural, seasonal-induced variations in levels and proportions of fat and protein [2];[3];[4] as affected by stage of lactation, feeding regimes, husbandry methods, and district. The different P/F rates in conventional milk obtained from different district and animal material offer new profitable opportunities for the production of various cheese types[5].Therefore we must know that which milk should be selected according to P/F for the manufacturing of different cheese types. The aim of this research is to investigate the suitability of obtained milk according to protein to fat rate for the production of a certain cheese type.

II. MATERIAL AND METHOD

In the study, thedaily milk samples were collected during June season from Brown Swiss cows raised in Erzincan Province. The daily milk samples were composites of milk collected at morning and afternoon of day. The samples were collected into plastic vials preserved with micro tabs, stored 4ºC until analyzing for determination of protein and fat values. The milk samples were analyzed by automatic analysis using a Farm Milk Analyzer (Milkana). The P/F rate of conventional milk were compared with the reference P/F values [6] ofCheddar(0.91), Limburger(0.88) andMozzarella(1.22) using one-sample t test ([7];[8];[9]) by SPSS 18.0 package program.

III. RESULTS AND DISCUSSION

Obtained values are means, standard deviation and standard error from Table 1.

Mean	Std. Deviation	Std. Error Mean
0,8967	0,08889	0,01940

Table 1. Mean and Standard Deviation and Error for Protein/Fat Ratio

As shown the Table 2, the protein/fat rate of milk samples was compared with the Cheddar cheese standards using one-sample t test. The milk protein/fat rates for mentioned breed were favorable for reference value of Cheddar Cheese. According the results, cheddar cheese can be made from milk samples.

	Test Value = 0.91					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
P/F Ratio	-,684	29	,502	-,01328	-,0537	,0272

Table 2. Suitability for Cheddar Cheese

In the study, P/F ratio in milk was compatible with the value reported in the mentioned standards for Limburger cheese (Table 3). Limburger cheese can be made from milk in this study.

	Test Value = 0.88					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
P/F Ratio	,862	29	,399	,01672	-,0237	,0572

Table 3. Suitability for Limburger Cheese

Protein to fat ratio in milk was not favorable for the value reported in the announced standards for Mozzarella cheese (Table 4). According to results obtained from the Table 4, Mozzarella cheese cannot be made from milk in the research.

	Test Value = 1.22					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
P/F Ratio	-16,62	29	,000	-,32328	-,3637	-,2828

Table 4. Suitability for Mozzarella Cheese

According to result from the study, we can say that milk samples for study were compatible with standard values announced for Cheddar and Limburger cheese. However, protein to fat ratio in milk was not proper for the reported value in the standard of Mozzarella cheese. It can be said that, Cheddar and Limburger cheese can be made from raw cow milk in this study, whereas Mozzarella cheese cannot be made. According to [5] the milk protein/fat rate (0.80) obtained from Holstein cows raised in Elazığ Province were not favorable for Cheddar and Limburgercheese whereas we found suitable values in studied milk for announced cheese types.

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