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Determination of Fat Depression Levels in Cow Milk Obtained from Edirne and Tekirdag Provinces

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Abstract

The present study aimed to determine fat depression levels in cow milk obtained from Edirne and Tekirdag provinces in May. The data for this subject were obtained from a private dairy factory. When dairy cattle's milk fat levels fall below 3.20%, a condition known as milk fat depression is identified. Milk fat depression is an undesirable situation because it causes problems to obtain dairy products. Using a one-sample T-test, the May datas were compared to the value of 3.2%, which is recognized as the milk fat depression threshold. According to this study, Edirne and Tekirdag both had total fat levels of 2.93% and 3.32%, respectively. Depression was seen in the Edirne province when the total fat levels were compared to the reference value. However, Tekirdag province has not reported any cases of depression. Therefore, the Edirne milk received in May is unattractive for dairy production. Such negativity has not been noticed in the province of Tekirdag. To raise milk fat levels, restrictions on animal feeding should be made in the province of Edirne. It is important to analyze the fat depression in milk from various provinces. Therefore, it is crucial to act quickly to feed and produce animals in depressed areas for the sake of both the national economy and public health.

Key words: Cow, Depression, Fat, Human Health, Milk

1. INTRODUCTION

A crucial component of milk, milk fat is extremely susceptible to genetic, environmental, and dietary alterations that could affect the profile of fatty acids and how they affect human health (Santin Junior et al., 2019). A decrease in milk fat percentage, milk fat total yield, and a major shift in the content of milk's fatty acids are all signs of milk fat depression (by 50% or more) (Jordana Rivero and Anrique, 2015). Dry matter intake, diet balance, mineral matter intake (Erdem et al., 2012) and health considerations all play a role in this complex issue. A danger factor for the effectiveness and profitability of contemporary dairies is milk fat depression (MFD), a condition that was first described more than 150 years ago (Rico and Harvatine, 2013).

On the other hand, developed nations base a significant portion of their pricing strategy on milk biochemical factors. Milk fat depression is a severe issue since it ranks first among biochemical characteristics with economic significance and affects milk pricing and quality (Anonymous, 2007). Studies on milk fat depression have received a lot of attention recently (Rinaldi et al., 2022). Given that milk fat ranks top among the characteristics due to its economic significance, it is an essential biochemical parameter. It is well known that the milk fat ratio determines how much support farmers receive in EU nations. As a result, our EU candidate nation conducts extensive studies on environmental factors to raise milk fat levels (Cetin et al., 2010).

For these reasons, milk fat has been the primary subject of studies on milk parameters (Cetin et al., 2007; Tekelioğlu et al., 2010). When the milk fat content falls below 3.2% as a result of environmental factors, a condition known as milk fat depression is observed (De Vries and Veerkamp,

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2000). The minimal allowable fat threshold for efficient cheese manufacturing also reflects milk fat depression (Cicek, 2007). These factors make it necessary to research on milk fat depression regulation and prevention. This investigation was done to see if cow milk from the regions of Edirne and Tekirdag in May had a fat depression.

2. MATERIALS AND METHODS

The total fat concentrations were examined in the study to establish the fat depression threshold. The information gathered from the daily routine examination of milk gathered from the provinces of Edirne and Tekirdag in May was used. Using a Milkana Superior Milk Analyzer instrument (with data memory), total fat ratios in milk were determined. The reference value was chosen to be 3.20%, which is the threshold for milk fat depression (Bruckmaier, 2000). Data from May was utilized since milk fat depression may happen in the summer, particularly in the final weeks of spring. The pasture grasses have an energy deficit at these times (Fuller, 2004). The study's collected data on current milk total fat was contrasted with the given reference value.

The comparison was made in accordance with the reference value (3.20%) and employed a single sample T-test. The suitability of the data for normal distribution was assessed before analysis. The data's parametricity or non-parametricity was investigated. All statistical techniques utilized in the study were applied using the SPSS 18.0 package program.

3. RESULTS AND DISCUSSION

The results of the statistical analysis made according to the provinces to determine the depression levels in terms of milk total fat average values in the research are shown in Tables 1 and 2.

Table 1. *Milk fat depression analysis for Edirne province*

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Milk fat	26	2.93	.146	.029

One-Sample T-Test

	Test Value = 3.20					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Milk fat	-9.45	25	.000	-.270	-.328	-.211

When Table 1 is examined, fat depression was determined in the milk obtained from Edirne province. Fat depression in milk is a disadvantage for the province in question. Animal feeding studies should be given importance to eliminate this negative situation. For this purpose, it will be beneficial to regulate energy content, especially in animal feeds. Otherwise, there will be economic losses for those who are breeders in these provinces. Since this situation constitutes a negative situation according to EU standards, necessary regulations should be made in the mentioned province.

When Table 2 is examined, fat depression was not found in the milk from the province of Tekirdag. The situation is favorable for the provinces listed. Tekirdag province has a healthy amount of fat during May. Animal breeders should be educated to maintain this level. The fat depression threshold is not far from the 3.32% level, which is close to the 3.20% level. There is a danger of falling on the threshold of fat depression due to simple mistakes. For this bad scenario to change, farmer

knowledge is crucial. For this reason, farmers should be invited to seminars on environmental restrictions and animal feeding.

Table 2. *Milk fat depression analysis for Tekirdag province*

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Milk fat	27	3.33	.292	.071

One-Sample T-Test

	Test Value = 3.2					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Milk fat	1.79	26	.093	.126	-.023	.276

These workshops ought to be offered across all provinces, not just those at the crucial threshold. Since pasture grasses exhibit energy deficits at the end of spring and the start of summer, steps should be taken to prevent the creation of fat depression (Fuller, 2004).

4. CONCLUSION

Since milk fat depression is important for both the producer and the dairy industry, milk total fat levels should be monitored by dairy enterprises. Thus, fat levels should be prevented from falling below the mentioned limits. It would be beneficial to conduct similar studies in the provinces in question to support the results of the present study. Studies should be repeated in other months of the year, not only in May. These results may be an incentive for future research and a better understanding of the nutritional quality of milk and the economic value of milk fat content.

5. AUTHOR CONTRIBUTIONS

The authors have contributed equally to this study.

6. CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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