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Statistical control of protein depression in spring milk

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Abstract

In the study, it was aimed to determine whether there is protein depression in milk samples collected from the spring months. The data were obtained from the spring records of a private dairy company. Protein depression has an undesirable effect on the formation of dairy products. The critical threshold for protein depression is reported to be a minimum of 0.80. Mean, standard deviation and standard error for March were 0.8151, 0.09424 and 0.01693 respectively. Means, standard deviations and standard errors for April and May were 0.8761, 0.01365 and 0.00245; 0.8668, 0.02561 and 0.00460 respectively. According to p/f ratios in spring season, milk protein depression was not encountered in March (0, 8151), April (0, 8761) and May (0, 8668). Since the p/f ratios of milk samples obtained from March, April and May are above the depression threshold, we can say that protein depression does not appear. More studies are needed to obtain more information about protein depression on milk collected from different seasons and different environmental conditions.

Keywords: Depression, Environmental conditions and Statistical control

Introduction

The major factor that impacts milk fat and protein levels is milk yield. There is a negative relationship between milk yield and mentioned parameters (Alphonsus, 2015) [2]. Milk parameters are as important as milk yield. Parameters such as fat and protein are important for production of dairy products. At the same time, the amount of fat and protein of milk is covered by support in many developed countries (İlhan *et al.*, 2014; Yıldırım *et al.*, 2014) [8, 13]. Milk protein may be undesirably reduced in cows as a result of insufficient feed intake, especially in the early lactation. Depression of these parameters below a certain level in milk is called depression. The critical threshold for protein depression is reported to be a minimum of 0.80. If the protein/fat ratio is less than 0.80 in milk, milk protein depression occurs (Stokes *et al.*, 2012) [11]. Both fat and protein depression is a negative situation for the dairy sector. Many researches related to depression in these parameters have increased in recent years. Milk protein is an important parameter because higher protein leads to higher milk products (Alderson and Pollak, 1980; Fox and McSweeney, 2003) [1, 7]. Last decades, scientists focus on milk depression (Eryılmaz *et al.*, 2013) [6]. There has been extensive research in recent decades into milk parameters and the mechanisms responsible for the production of milk parameters. Limited knowledge is available on the fat and protein depression. No sufficient data on protein depression in raw milk obtained from dairy cows such as Red Holstein are available.

Material and Methods

Data collection and Laboratory analysis

Daily milk data was collected from a milk company during all months (30 samples for each month) of spring season. The animal breed used in the farm was Red Holstein. Samples were collected directly from homogenized bulk milk at determined local points and put in to the 100 mL sterile plastic container stored at 4 °C and immediately transported in freeze to the laboratory and analyzed. Milk protein rates were determined by milk auto-analyzer (Milkana).

Statistical analysis

Protein/fat rates obtained from spring season were analyzed by one sample t test (Çimen, 2012) was made to compare differences ($p < 0.05$) between means of months and protein depression threshold (0.80) with help of the SPSS 18.0 (Norusis, 1993; Çimen 2015) [10, 5].

Results and Discussion

Means, standard deviations, standard errors for protein/fat rates and protein depression thresholds of raw cow milk for each month of spring season were shown in Table 1 and 2.

Table 1: Descriptive statistics for p/f rates

Months	N	Mean	Std. Deviation	Std. Error Mean
March	30	,8151	,09424	,01693
April	30	,8761	,01365	,00245
May	30	,8668	,02561	,00460

Daily data was collected during all months (30 samples for each month) of spring season. Means, standard deviations and standard errors of the mentioned data (p/f rates) were shown in Table 1. Mean, standard deviation and standard error for March were 0.8151, 0.09424 and 0.01693 respectively. Means, standard deviations and standard errors for April and May were 0.8761, 0.01365 and 0.00245; 0.8668, 0.02561 and 0.00460 respectively.

Table 2: One Sample T Test results for protein depression threshold

Months	t	Degree of Freedom	Sig. (2-tailed)	Mean Difference
March	,891	30	,380	,01507
April	31,043	30	,000	,07608
May	14,528	30	,000	,06682

According to result from statistical analysis in Table 2, we can say that there was no statistically significant difference between depression threshold (0.80) and milk protein/fat rate (0.8151) of March month. Milk protein/fat mean (0.8761) of April month is higher than reference value (0.80). Similarly, milk protein/fat rate (0.8668) of May is higher than mentioned depression threshold (0.80). If protein/fat rate of a month is statistically less than the reference value (depression threshold), depression will be accepted for that month. Whereas the protein/fat rates of April and May months were statistically higher than the reference value (depression threshold). According to result obtained from this month, it can be said that there was no protein depression in raw cow milk obtained from spring season. According to results from Ulaş and Şahin (2019)^[12] there is no protein depression in milk collected for the summer season and this findings in agreement with the spring season findings in our study. Eryılmaz *et al.* (2013)^[6] reported that there was protein depression in milk for all months of summer season. Our findings obtained from spring are inconsistent with findings of Eryılmaz *et al.* (2013)^[6]. Kayastha *et al.* (2008)^[9] reported that climatic conditions and feeding regimes in different countries can influence the milk protein and fat rates. Understanding the effective factors on milk protein/fat rates is a major importance to the dairy sector because the milk and parameters of it influence the milk products (Cimen *et al.*, 2013)^[4]

Conclusion

The results of this study showed that spring had not a significant negatively impact on milk protein/fat rates. Although this research was done for spring season and Red Holstein cow breed, similar studies should be done in other months and cow breeds.

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