

## Biochemical Taste Parameters of Milk from Machine Milking Cows in Late Lactation Period

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**Abstract:** This research was performed to investigate the effect of late lactation period on milk biochemical taste parameters such as fat and acidity of machine milked cows and to show these biochemical parameters during last month of late lactation. Cows were fed standard diet for lactation period. In the study, a total of 40 cow milk samples were collected and examined from DIMES Company during January month. The milk fat rates were lower ( $p < 0.05$ ) for cows in first week (2.8%) than last week (3.3%). There were statistically no significant differences between the weeks for milk acidity (sH and pH) values of machine milked cows. The milk fat and acidity values (sH and pH) during study were favorable for desired taste and consumer choice.

**Key words:** Milk, biochemical taste parameters, late lactation, machine milking

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### INTRODUCTION

The variation in milk yields and components within a species depends on so many factors. Some of these factors are genetics, stage of lactation, daily variation, parity, type of diet, age, milking methods, udder shape and season. There has been extensive research in recent decades into milk flavor and the agents responsible for the production of biochemical components. However, only limited information is available on the flavor chemistry of many varieties and it is impossible to accurately reproduce the flavor of any milk products. The machine milking in early lactation periods are known as important factors which have influences on the milk biochemical components (Cimen *et al.*, 2009; Yildirim and Cimen, 2009). However, there were not enough statements about effect of machine milking on biochemical taste parameters of milk during late lactation period and the studies on the milk taste parameters in dairy farm conditions are limited (Cimen *et al.*, 2007, 2008a, b; Cimen and Karaalp, 2009). In this research, it was studied the effect of late lactation period on milk biochemical taste parameters such as fat and acidity of machine milked cows and to show these biochemical parameters during this period. This is the first detailed study on milk taste parameters in machine milked Holstein cows during last month of late lactation period.

### MATERIALS AND METHODS

In the experiment, a total of 40 cow milk samples were collected and examined from DIMES Company during

January month. To determine milk composition, samples were obtained by hand milking on last 3 days each week for this month. The samples were composites of milk collected at consecutive morning and afternoon and were collected into plastic vials preserved with micro tabs, stored 4°C, until analyzed for determination of parameters. The milk fat was determined by Roesse-Gottlieb method (Hundrieser *et al.*, 1984). Milk acidity was determined using a Xerolyt electrode (model HA 405; Ingold Electrode, Wilmington, MA). Cows were fed standard concentrate diet for lactating cows. Comparisons were done by using Duncan test with help of the SPSS (Norusis, 1993).

### RESULTS AND DISCUSSION

In the study, milk fat levels during January month (except first week) were not lower as showed from intake of high energy and these levels were normal for lactating animals. The reason of these results may be due to dams were fed suitable standard concentrate diet for lactating period. Figure 1 shows that milk fat rates in this study were consistent with normal values (3-4%) for cows announced by Kaneko *et al.* (1997).

The cows in study had lower results ( $p < 0.05$ ) for milk fat levels of first week (2.8%) than results of last week (3.3%). However, milk fat levels (except first week) during weeks were similar with normal levels for healthy cows announced by Kaneko *et al.* (1997).

This research was conducted winter period (January). However, cold weather in the late lactation period was not a significant financial problem (total fat production).

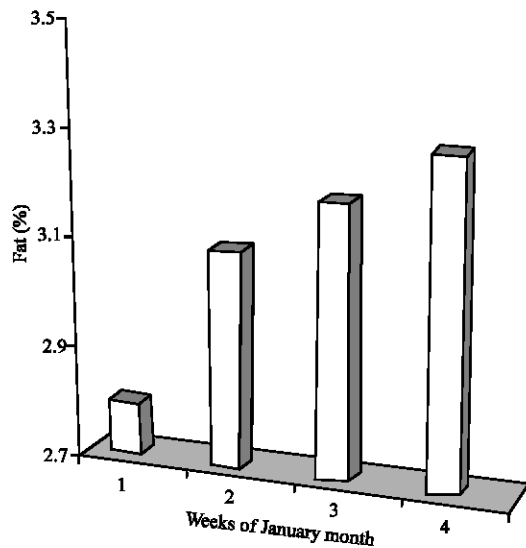


Fig. 1: Milk fat rates during January month

The cows may have sufficient reserves for maximum milk fat production in all weeks of last month of late lactation period. As a consequence, animals experience an optimum energy balance, which is associated with a suitable metabolic conditions and milk fat levels (Goff and Horst, 1997). In study, milk fat rates were favorable for economic producing of dairy products. It is known that milk has been priced upon fat content thus, higher milk fat levels results in increased economic return for dairy producers. A decrease in milk fat levels can directly lead to economic loss if the milk price depends on milk fat percentage. Choosing suitable breeds for machine milking and proper feeding management in MM treatment can improve the economy of production. The milk fat rates (except first week) in late lactation were favorable for desired taste because, milk must contain a fat percentage at least 3.2% for desired taste of milk (Outlaw *et al.*, 1993).

Milk fat is essential for the development of the correct flavour in milk products (McSweeney and Sousa, 2000). Indeed, satisfactory flavor development is one of the principal problems encountered in the manufacture of reduced-fat variants of established cheese varieties. The fat is the most important component among the milk parameters and its producing is affected by many environmental factors such as machine milking (Yildirim and Cimen, 2009). The taste and quality of milk depends on the concentration of aromatic substances, acidity, total fat and fatty acids levels. Pierre *et al.* (1999) confirmed that these milk biochemical parameters are very important factors in dairy products, specially cheese manufactured from cow.

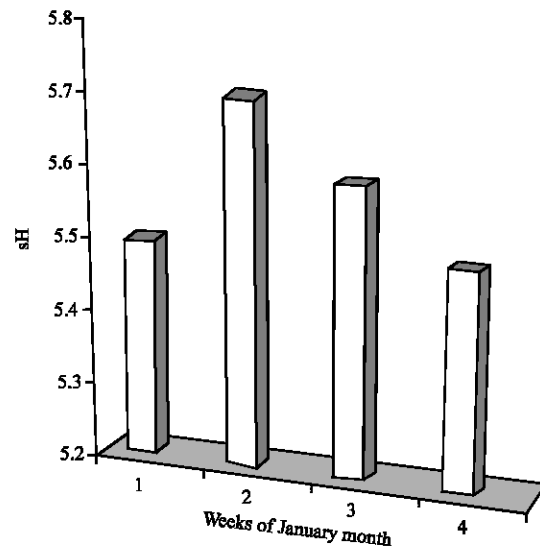


Fig. 2: Milk acidity (sH) during January month

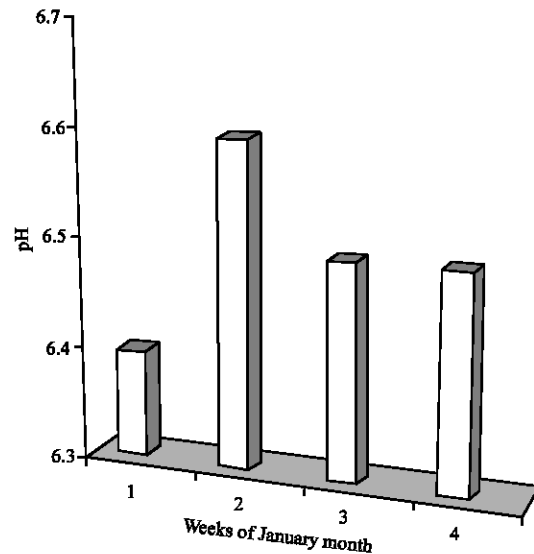


Fig. 3: Milk acidity (pH) during January month

There were statistically no significant differences between the weeks for milk acidity for sH (Fig. 2) and pH (Fig. 3) during study period. Milk acidity of groups in this study was compatible with normal values for cow announced by Kaneko *et al.* (1997).

The milk acidity (sH and pH) during January month was favorable for desired taste. The extra acidity value in milk is not desirable for flavor.

In the study, the acidity of milks for late lactation is not higher than the normal value for sH values. Turkish dairy milk acidity values have changed between 4.20 milk acidity (sH) and 12 milk acidity (sH) (Kurt *et al.*, 1993).

## CONCLUSION

Finally, the acidity (sH and pH levels) and total fat levels in late lactation milks is favorable for consumer choice. Since, the study was done for early lactation period, this research should be repeated for entire lactation period to see if the results will change over the time.

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