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The suitability of milk obtained from Simmental cows having different initial weight for yogurt production to microbiological standards

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Abstract

In the study, 10 Simmental cows (total 30 cows) for each group (light, medium and heavy) were used. Statistical control on somatic cell counts (SCC) and pH values of milk obtained from dams having different initial live weight was applied for determination of suitability to standard of yogurt production. Somatic cell counts in light, medium and heavy dams were 79571, 53285 and 52598(cells/ml) respectively. Milk pH values in above mentioned different live weight groups were 6.56, 6.55 and 6.59 respectively. The somatic cell counts in raw milk obtained from all groups were statistically lower ($p<0.001$) for reference value (400000cells/ml) of yogurt production. This low SCC is ideal for the desired standards. The pH values of all groups were compatible with the reported standards (between 6.5-6.7) for yogurt making. According to findings of the research, we can say that milk samples obtained from dams having different live weight in early lactation period were suitable for reference values of yogurt production.

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Introduction

Milk parameters are influenced by breed, age, physical condition, lactation period, season, nutrition and similar factors (Gaunt, 1980; Lindmark-Manson *et al*., 2000). The somatic cell count and pH values of milk, which are particularly important variables for the dairy farms and sector, serve as significant markers for identifying nutrition and management problems, as well as for providing information about the level of success of farm.

In an experiment conducted by Bar-Peled *et al*. (1997) it was shown that changes in initial live weight of dams due to milk yield could lead to alteration in milk production during early lactation period. It is important the follow-up of the dam live weight for ideal herd management. Milk parameters change depending on changes in milk yield (Linn, 1988). It is known that milk yield is affected by dam live weight for all lactation periods (Berry *et al*., 2007). However, it is not known exactly which factors affect SCC and pH change during this critical (early lactation) period.

Elevated SCC in milk can also related with a higher pH in milk. An effect of the SCC on milk pH has also been reported in cows, goats, and ewe's milk which increases with increasing SCC (Vianna *et al*., 2008). Milk pH level and SCC are effective factor on economic importance of milk, and somatic cell count (SCC) is a basic indicator of raw milk quality (Bansal *et al*., 2007). High levels in pH and SCC have detrimental effect to cheese and yogurt yield and profitability of them (Barbano *et al*., 1991). The rise in pH observed in high SCC milk can be partly responsible for the coagulating problems observed with mastitic milk (Le Marechal *et al*., 2011). Therefore, pH and SCC are important in determining product quality. Although the effect of live weight of dam on milk biochemical parameters having economic importance such as fat and protein is known, the literature on the change of SCC and pH level according to initial live weight of dams is not present. In this article, statistical control on SCC and pH values of milk obtained from dams having different initial live weight will be applied for determination of suitability to yogurt production.

Material and methods

Animal material

In the research, 30 Simmental cows (10 cows for each weight group) were used. The weight groups were formed as light (< 450kg), medium (450- 600kg) and heavy (600kg >).

Milk analysis

Milk samples were collected individually from each cow in first month of early lactation period. The somatic cell counts within taken raw milk samples were detected by the standard analysis (Microscopic count) method. Milk pH was measured by pH-meter.

Statistical analysis

The SCC and pH means of groups were compared with the standards for yogurt production (max. 400000 cells/ml for SCC and between 6.5-6.7 for pH) using one-sample t test (Çimen, 2015; Ntoumanis, 2005).

Results and discussion

The statistical findings in terms of microbiological standards are covered in subheadings.

Statistical control for SCC

The SCC in raw milk from different initial weight groups was compared with the reference value for yogurt making in Table 1. Milk SCC in light, medium and heavy dams was 79571, 53285 and 52598 (cells/ml) respectively (Table 1). The somatic cell counts in raw milk obtained from all groups were statistically lower ($p<0.001$) for reference value (400000, cells/ml) of yogurt production. Low somatic cell counts in milk obtained from all groups are so favorable for announced standard. As shown the Table 1, yogurt can be made from milk of all groups. According to research findings, it was seen that there was no need for extra arrangement for somatic cell counts in raw milk obtained from different initial weight groups. According to SCC findings, we can say that the all raw milk samples obtained from dams having different live weight are ideal for yogurt making.

Table 1. Statistical control of milk SCC (cells/ml) for yogurt production.

	Observed value	Reference value	Significance level (p)
Light	79571±21568	400000	<0.001
Medium	53285±26537	400000	<0.001
Heavy	52598±18556	400000	<0.001

Statistical control for pH

Milk pH values in light, medium and heavy dams were 6.56, 6.55 and 6.59 respectively (Table 2).

The effect of dam having different live weights on somatic cell counts and pH values of raw milk was determined by this study. It is known that milk yield and parameters such as fat and protein is affected by dam live weight for all lactation periods (Berry *et al.*, 2007). However, it is not known exactly which factors affect SCC and pH change during early lactation period. The present study was important in determining the effect of dam initial live weight on the parameters such as SCC and pH of interest. Similar to this study, new studies should be made on the production of suitable dairy products according to present microbiological data. Acquiring new knowledge on dairy products such as yogurt affected by animal factors is important for the dairy sector.

Table 2. Statistical control of milk pH for yogurt production.

	Observed value	Reference value	Significance level (p)
Light	6.56±0.02	Between 6.5-6.7	>0.05
Medium	6.55±0.02	Between 6.5-6.7	>0.05
Heavy	6.59±0.03	Between 6.5-6.7	>0.05

The pH values of all groups were compatible with the reported standards (between 6.5-6.7) for yogurt production (Table 2). According to the results in terms of pH, we can say that yogurt can be made from dams having different live weight. The milk samples for all groups having ideal pH values are so favorable for yogurt standards during early lactation period. There is no need to manipulate for pH values for this period. There are no negative findings about microbiological data that affected yogurt making.

Conclusion

According to results of the study, we can say that milk samples obtained from dams having different live weight in early lactation period were suitable for reference values of yogurt. Yogurt can be made from raw milk samples collected from dams having different live weight in early lactation period in farm conditions. According to research findings, both pH and somatic cell counts among different live weight groups are not adversely affected from farm conditions. Based on this information, it can be say that live weight differences in terms of microbiological data do not negatively affect to yogurt production.

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