

SOMATIC CELL COUNTS IN MILK OF HOLSTEIN/FRIESIAN COWS AND CROSSBRED HERDS UNDER TROPICAL CONDITIONS.

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SUMMARY

Milk is produced in all Brazilian regions, in more than a million farms. The range of milk producers varies from a larger proportion (80%) of smallholders that use crossbred cows (Holstein x Zebu cattle) to large farms with Holstein/Friesian cows. Data about subclinical mastitis and somatic cell counts (SCC) is scarce and incomplete, although parameters for SCC are now used by public and private sectors to evaluate milk quality. We aimed to evaluate the influence of the year season on the SCC of both the individual Holstein /Friesian cows and the bulk tank milk (BTM) of crossbred herds. Milk samples from individual cows (n=113,904), and from BTM (n=468,282) representing a period of three years (2006-2008), were available for analysis. SCC values were divided in seven classes (from <50,000 cells/ml to >1,600,000 cells/ml). Considering a threshold of 200,000 cells for individual cows, 46.5% and 48.3% of milk samples were found to be positive for subclinical mastitis during the dry and rainy seasons, respectively. As for BTM, 46.3% and 49.9% of samples were found above a threshold of 400,000 cells during those two seasons respectively. There was a significant reduction of SCC ($p<0.001$) during the dry season. The high prevalence of high SCC in both individual cows and BTM indicates that subclinical mastitis is both a health problem and a milk quality issue. These results indicate that additional specific measures to control mastitis need to be implemented during the rainy season.

INTRODUCTION

Dairy is an important industry in Brazil. Milk is produced in more than a million farms and 85% of the production is concentrated in the Southeast, Southern and Central-Western regions. The range of milk farms varies from small ones that milk crossbred cows (mainly Holstein x Zebu cattle) to large farms with Holstein/Friesian cows. The latter are concentrated in the Southeast and Southern regions, but the majority of herds are of crossbred cows, especially in the Southeast. Data about subclinical mastitis and somatic cell counts (SCC) is scarce and incomplete, although parameters for SCC are now used by public and private

sectors to evaluate milk quality [1].

Information obtained in temperate regions indicate that SCC increase during the summer months [10]. The prevalence of mastitis pathogens are also influenced by season [6,7]. Since for a large part of Brazil there are two well characterized seasons, that is dry/mild to cold, May-Oct, and rainy/hot, Nov-April, we aimed to evaluate the influence of these seasons on the SCC on both individual Holstein/Friesian cows and on crossbred herds, which are better adapted to the predominant hot/rainy conditions.

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ANIMALS, MATERIAL AND METHODS

A total of 113,904 milk samples from individual Holstein/Friesian cows, and 468,282 bulk tank milk (BTM) samples were available for this study. They represented a period of three years (2006-2008). Milk samples were analysed in a Bentley Comb 2300 equipment (Laboratory of Milk Quality, Embrapa Dairy Cattle, Juiz de Fora, MG), according to SCC values were divided in seven classes, from <50,000

cells/ml to >1,600,000 cells/ml [3]. Statistical analysis was conducted to assess the impact of year season on SCC [9]. For individual cows 200,000 cells was considered as a threshold for subclinical mastitis [4]. For BTM samples a threshold of 400,000 cells/ml was used to indicate the accepted subclinical mastitis status of the herds [1].

RESULTS

Considering a threshold of 200,000 somatic cells, for individual cows, 46.5% and 48.3% of milk samples were defined as "positive" for subclinical mastitis during the dry and rainy seasons, respectively (Tab. 1).

As for the BTM samples, and considering a threshold of 400,000 somatic cells, 46.3% and

49.9% were found as having an indication of high level of subclinical mastitis in the herd, during the dry and rainy seasons respectively (Tab. 2). Tables 3 and 4 show SCC records according to the seven classes used in this paper.

DISCUSSION

Despite the high values found for SCC in both individual cows and BTM there was a significant reduction ($p < 0.001$) during the dry season, as compared to the rainy one. The high prevalence of high SCC in individual cows and BTM indicates that subclinical mastitis is a health problem with consequences on the quality of milk, the profitability of the producer and the yield and quality of dairy products. The bulk tank SCC depends on subclinical mastitis among cows being milked into the bulk tank [2]. Observing the BTM-SCC is a readily available and inexpensive way of monitoring the mastitis trend in the herd. We used the BTM-SCC to evaluate the subclinical mastitis situation in crossbred herds, since there was no available data for individual cows from these farms. Our results show that no progress in controlling mastitis has been made during recent years (2006-2008) in Brazil. The lack of any comprehensive national or regional program for controlling mastitis may explain our results. On the other hand, the history of success of a number of farmers in controlling the disease may be due to individual efforts

or to local dairy-funded programs. In order to reduce consistently the bovine mastitis prevalence of Brazilian herds, one should look to examples like the one of Finland where the prevalence of bovine mastitis decreased continuously from 38% in 1995 to 31% in 2001 [5,8]. Their results also indicate that the mastitis control method used had been effective. Subclinical mastitis is a common reservoir of infectious pathogens including several species of staphylococci and streptococci, all highly prevalent in Brazilian herds. Information about the distribution and antibiotic susceptibility pattern of mastitis pathogens in milk samples in the dairy population is important for strategic decision making and optimal planning of mastitis control programs. Studies conducted elsewhere indicate a strong seasonal effect on the prevalence of mastitis pathogens [6,7,8]. It is most probable that different pathogens prevalence over time between our countries requires different mastitis control programs that can be adapted to the most frequent bacteria species. Our results suggest that more data need to be acquired concerning the prevalence

Tab. 1: Milk SCC of Holstein-Friesian cows kept under tropical conditions according to the year season (2006-2008) and a threshold of 200,000 cells, indicative of subclinical mastitis. (*significance level ($p < 0.05$))

Year	SCC Category	Season			
		Hot/Humid		Dry/Mild	
		n	%	n	%
2006*	< 200,000	9,546	51.6	10,316	54.8
	> 200,000	8,968	48.4	8,514	45.2
2007*	< 200,000	9,731	51.6	11,363	52.9
	> 200,000	9,140	48.4	10,132	47.1
2008	< 200,000	10,235	52.0	8,733	52.8
	> 200,000	9,431	48.0	7,793	47.2
Total*	< 200,000	29,512	51.7	30,414	53.5
	> 200,000	27,539	48.3	26,439	46.5

Tab. 2: Bulk tank milk SCC of crossbred (Holstein-Friesian x Zebu) cows under tropical conditions according to the year season (2006-2008) and a threshold of 400,000 cells. (*significance level ($p < 0.05$))

Year	SCC Category	Season			
		Hot/Humid		Dry/Mild	
		n	%	n	%
2006*	< 400,000	29,822	49.8	42,137	52.9
	> 400,000	30,177	50.2	37,436	47.1
2007*	< 400,000	38,099	49.0	43,011	50.5
	> 400,000	39,660	51.0	42,149	49.5
2008*	< 400,000	43,023	51.3	47,297	57.8
	> 400,000	40,907	48.7	34,584	42.2
Total*	< 400,000	110,944	50.1	132,445	53.7
	> 400,000	110,704	49.9	114,159	46.3

Tab. 3: Milk SCC of Holstein-Friesian cows kept under tropical conditions according to the year season (2006-2008) and SCC categories from <50,000 to >1,600,000.

SCC Category (x 1,000 / ml)	Season				Total
	Hot/Humid		Dry/Mild		
	n	%	n	%	
<50	13,393	48.6	14,184	51.4	27,577
50 - 100	7,479	49.9	7,523	50.1	15,002
101 - 200	8,640	49.8	8,707	50.2	17,347
201 - 400	8,560	50.6	8,388	49.4	16,968
401 - 800	7,611	51.3	7,214	48.7	14,825
801 - 1,600	5,487	50.2	5,438	49.8	10,925
> 1,600	5,861	52.1	5,399	47.9	11,260
Total	57,051	50.1	56,853	49.9	113,904

Tab. 4: Bulk tank milk SCC of crossbred (Holstein-Friesian x Zebu) cows kept under tropical conditions according to the year season (2006-2008) and SCC categories from <50,000 to >1,600,000.

SCC Category (x 1,000 / ml)	Season				Total
	Hot/Humid		Dry/Mild		
	n	%	n	%	
< 50	8,537	44.7	10,926	55.3	19,463
50 - 100	10,003	42.9	13,310	57.1	23,313
101 - 200	28,910	45.2	35,011	54.8	63,921
201 - 400	63,194	46.3	73,198	53.7	136,392
401 - 800	69,701	47.9	75,844	52.1	145,545
801 - 1,600	32,756	51.5	30,869	48.5	63,625
> 1,600	8,247	52.5	7,476	47.5	15,723
Total	221,648	47.3	246,634	52.7	468,282

of mastitis pathogens, and the influence of season on these pathogens. However, it should be considered that there is some seasonal effect on the SSC for both highly specialized European breeds, as well as for the more adapted Holstein and Zebu crosses.

CONCLUSION

Controlling subclinical mastitis is a challenge to be met by the Brazilian dairy sector if it wants to pursue the goal to become a dairy exporter. Such a program is equally needed to guarantee a high quality milk supply to the Brazilian population. Our results also indicate that additional specific measures need to be implemented during the hot/wet months.

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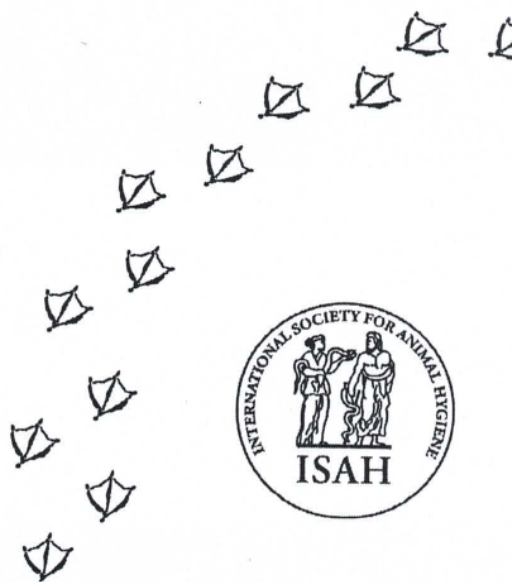
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