

**Profile of Somatic Cell Count (SCC) and Milk Composition from Gir (*Bos indicus*)  
Cows' Milked Once, Twice or Three Times a Day**

**G. G. Santos<sup>2</sup>, M. G. C. D. Peixoto<sup>2</sup>, F. A. T. Bruneli<sup>2</sup>, V. F. N. Sérgio<sup>3</sup>, C. S. Ferreira<sup>3</sup>, R. S. Verneque<sup>2</sup>, J. C. C. Panetto<sup>2</sup> and C. A. V. Borges<sup>2</sup>**

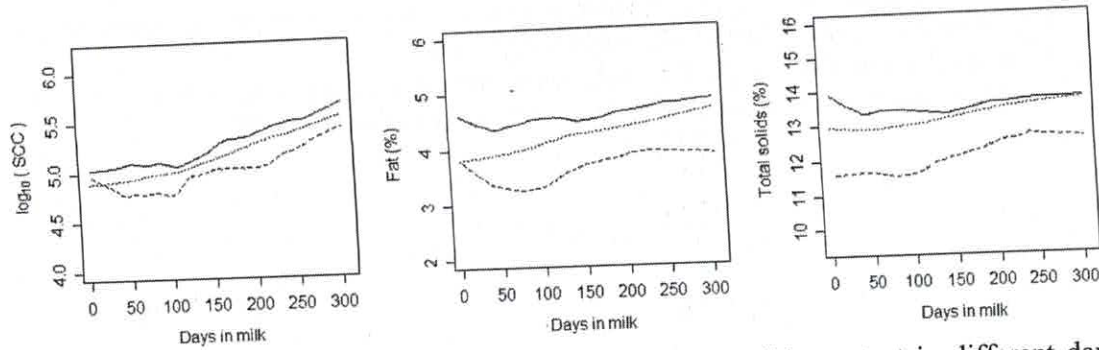
<sup>1</sup> Financial support: Fapemig and Embrapa, <sup>2</sup> Embrapa Gado de Leite - Juiz de Fora, MG, Brasil, <sup>3</sup> Departamento de Estatística, Universidade Federal de Juiz de Fora

The objective of this study was to ascertain SCC profile and milk components production during first-lactation period of Gir cows under one, two or three daily milking under tropical conditions in Brazil, as well as to investigate the relationship between them. The dataset consisted of 9,171 test-day milk yield recorded in 239 herds participating of the National Improvement Program of Dairy Gir. Most cows was submitted to two (88%), followed by those in three (6%) or one (6%) daily milking schemes. Milk samples were monthly collected in the test-day and sent to the Laboratory of Milk Quality in Embrapa Dairy Cattle to evaluate milk composition (protein, fat, lactose, and total solids) and SCC. Data of SCC were transformed to a logarithmic scale. In exploratory analyzes, it was used the smoothing method by Lowess (locally weighted regression scatterplot smoothing). The free software R was used in the statistical analyses. The results found that cows submitted to three daily milking had high content of total solids, especially, fat, and SCC. There was significant difference ( $p < 0.001$ ) in total solids and fat content among categories of milking scheme along lactation from one to three daily milking frequency. Similar results were found analyzing SCC according to daily milking scheme. However, these results must consider the reduced number of cows in one and three daily milking frequency.

**Key Words:** Animal breeding, Mastitis, Zebu cattle

## INTRODUCTION

Milk composition and SCC can vary according to breed, management practices, season, parity, stage of lactation, and age of the animal among others. Daily milking frequency is among the several factors that could impact on milk composition as well as on SCC. A few reports demonstrated a reduction in total SCC with increased milking frequency (Smith et al. 2002; Dahl et al. 2004; Österman et al. 2005), suggesting that increased milk yield may improve both the milk quality and the udder health. This statement is contrary to that suggested by Ingvarstsen et al. (2003) that the increasing in milk yield will cause an increase in the metabolic load, possibly weakening defenses and negatively affecting the health of the mammary gland. Otherwise some studies have found no effect of increasing milking frequency on SCC (Wall & McFadden, 2007, Shields et al. 2011). Some authors affirms that generally for European breeds in specialized systems the optimal number of daily milking is between 3× and 4× (Stelwagen, 2001), whereas Brazilian dairy farmers traditionally have adopted twice daily milking aiming at reducing labor costs. Despite the effects of milking frequency on milk composition and SCC is already known in the European breeds, in Zebu breeds these effects needs further studies. Therefore, the objective of this study was to verify initially the association of milking scheme with SCC and milk composition in Gir cows raised in Brazil.



**Figure 1.** Somatic cell score ( $\log_{10}$  (SCC)), fat and total solids content in different days of lactation in primiparous cows, milked once (broken line), twice (dotted line) or three (full line) times a day

### IMPLICATIONS

This study presented some clarification about milk composition and quality aspects related to daily milking frequency in Gir cows. It emphasizes the need of including that factor in genetic evaluation models for SCC. More researches and analysis are demanded to guide farmers' decision on daily milking frequency, considering also economic and productive aspects. Further studies will be carried out under the perspective of animal breeding for mastitis resistance.

### REFERENCES

- Dahl, G.E, R.L Wallace, R.D. Shanks, D. Lueking. 2004. Hot Topic: Effect of frequent milking in early lactation on milk yield and udder health. *J. Dairy Sci.* 87:882–885.
- Ingvartsen, K.L, R.J. Dewhurst, N.C. Friggens. 2003. On the relationship between lactational performance and health: Is it yield or metabolic imbalance that cause production disease in dairy cattle? A position paper. *Liv. Prod. Sci.* 83:277–308.
- Lacy-Hulbert, S. J., D. E. Dalley, D. A. Clark. 2005. The effects of once-daily milking on mastitis and somatic cell count. *Proc. N.Z. Soc. Anim. Prod.* 65:137–142.
- Österman, S., K. Östensson, K. Svennersten-Sjauna, J. Bertilsson. 2005. How does extended lactation in combination with different milking frequencies affect somatic cell counts in dairy cows? *Liv. Prod. Sci.* 96: 225–232.
- O'Brien, B., G. Ryan, W.J. Meaney, D. McDonagh, A. Kelly. 2002. Effect of frequency of milking on yield, composition and processing quality of milk. *J. Dairy Res.* 69: 367-374.
- Patton J., D.A. Kenny, J.F. Mee, F.P. O'Mara, D.C. Wathes, M. Cook & JJ. Murphy. 2006. Effect of milking frequency and diet on milk production, energy balance, and reproduction in dairy cows. *J. Dairy Sci.* 89: 1478–1487.
- R Development Core Team (2011). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. ISBN 3- 900051-07-0, URL <http://www.R-project.org/>.
- Shields, S.L., Rezamand, P.L, Sevier, D.L, Seo, K.S., Price, W., McGuire, M.A. 2011. Effects of increased milking frequency for the first 21 days postpartum on selected measures of mammary gland health, milk yield and milk composition. *J. Dairy Sci.* 78: 301–307.
- Smith, J. W., L. O. Ely, W. M. Graves, W. D. Gilson. 2002. Effect of milking frequency on DHI performance measures. *J. Dairy Sci.* 85:3526–3533.