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Weekly evaluation of bulk tank milk somatic cell counts in Murciano-Granadina goats throughout an entire lactation

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SUMMARY – The European Union has suggested establishing a future legal bulk tank SCC limit for small ruminants milk (EEC/92/46 Directive). To study the effect of the SCC limit on goat dairy farmers in Murcia, we studied 1173 bulk tank milk samples from 66 goat herds of Murciano-granadina breed obtained weekly. The study period was from November 1998 to June 1999 (30 weeks). The SCC was carried out after 24 hours of sampling with a Fossomatic 90 . Data from herds with at least one SCC for each month was used to simulate the conditions proposed by the European Directive using the limit of 1,500,000 cell/ml. The geometric mean for the entire lactation was 845,000 cell/ml. This was lower than the limit suggested to the EU but close to the legal limit for the US. Data indicate that dairy goat farmers would be penalised during the first and last quarters because of the normal physiological milk SCC response in goats to season of the year. This situation should be considered before the establishment of a legal limit.

Key words: Goat, somatic cell counts, bulk, official rule.

RESUME – *"Evaluation hebdomadaire des comptages de cellules somatiques du lait en réservoir de réfrigération de chèvres Murciano-Granadinas sur toute la lactation". L'Union Européenne a suggéré la possibilité d'établir une future limitation légale aux comptages de cellules somatiques (CCS) de troupeaux pour la commercialisation du lait de petits ruminants avec la Directive CEE/92/46 (1992). Avec la finalité d'étudier l'effet de cette limitation sur le bétail caprin de Murcia, ont été étudiés 1173 échantillons de lait originaires de 66 troupeaux de la race Murciano-Granadina obtenus chaque semaine. L'étude a été faite de Novembre 1998 à Juin 1998 (30 semaines). Le CCS a été fait 24 heures après le ramassage des prélèvements avec un Fossomatic 90. Les résultats des troupeaux avec un ou plus d'un CCS par mois ont été utilisés pour simuler les conditions proposées par la Directive Européenne utilisant la limite de 1.500.000 cel/ml. La moyenne géometrique pour la lactation complète a été de 845.000 cel/ml. Les élevages pourraient être pénalisés pendant le premier et le dernier tiers de lactation en conséquence de l'élévation physiologique saisonnière du CCS qui se produit dans le lait de chèvre. Cette circonstance devrait être constatée avant d'établir une limitation légale pour la commercialisation du lait de chèvre.*

Mots-clés : *Chèvre, comptages de cellules somatiques, troupeaux, reglementation.*

Introduction

The legal limit for somatic cell counts (SCC) in cow milk in the European Union (EU) was established at 400,000 cell/ml (geometric mean of three months, with at least one sample each month). A legal limit has yet to be established for small ruminants. However, this situation is only temporary because the EU has suggested establishing a future legal bulk tank SCC limit for small ruminants milk (EEC/92/46 Directive). In the United States (US), a legal limit of 1,000,000 cells/ml of milk was established and goat dairy farmers frequently cannot meet this limit (Droke *et al.,* 1993). At the International Symposium *"Somatic Cells and Milk of Small Ruminants"* (Bella, Italy, 1994), it was suggested to the EU authorities that a legal SCC limit for bulk tank goat and sheep milk should not be lower than 1,500,000 cells/ml. (Barbosa *et al.*, 1994). This study was designed to determine what effect the suggested milk SCC limit would have on goat dairy farmers in Murcia.

Material and methods

Bulk tank milk samples (n = 1173) from 66 goat herds of Murciano-Granadina breed were obtained

weekly for SCC from November 1998 to June 1999 (30 weeks). In the studied area the parturition season usually goes from September to December and the dry period usually starts at the beginning of the summer (June-July). All herds delivered their milk to the same dairy plant (Jumilla in Murcia). The level of milk production and health status of the herds studied varied widely. Bulk tank milk was thoroughly mixed and samples were collected weekly into plastic tubes containing azidiol as a preservative, refrigerated and shipped to the laboratory. The SCC was carried out after 24 hours using an opto-fluoro-electronic counter (Fossomatic 90®) on samples maintained at 40°C. Logarithmic conversion of the SCC was made in order to calculate the geometric mean SCC (Andrews *et al*., 1983). The moving average was used in order to detect the temporal trend of the SCC (Thrusfield, 1995). Data from herds with at least one SCC for each month was used to simulate the conditions proposed by the European Directive using the limit of 1,500,000 cell/ml, and a three-month geometric mean as an indicator of SCC for each quarter year.

Results and discussion

Geometric means SCC over the entire lactation are shown (Fig. 1). The geometric mean for the entire lactation was 845,000 cell/ml. This was lower than the limit suggested to the EU but close to the legal limit for the US. The trend throughout lactation for SCC was as expected. Higher counts appeared during early and late lactation. This is considered to be a normal seasonal physiological SCC response for goats (Sánchez *et al*., 1998). The SCC never went higher than the proposed EU limit of 1,500,000. However, the geometric mean SCC during early and late lactation either exceeded or was close to the US limit. In agreement with other researchers, we believe that this level is too low because many goat producers in the US cannot meet this legal limit, due in part to seasonal and not pathological conditions. In the month of April another increase in SCC was observed. The reason for the increase was attributed to time of oestrus which, in our studied area, is normally induced in April by dairy goat farmers. Oestrus has been shown to increase SCC in goat milk (Aleandri *et al*., 1996). The sanitary status of the udder halves was not considered in this preliminary work which aim is to describe the general situation of the goat dairy farms about bulk tank milk SSC in Murcia (Spain).

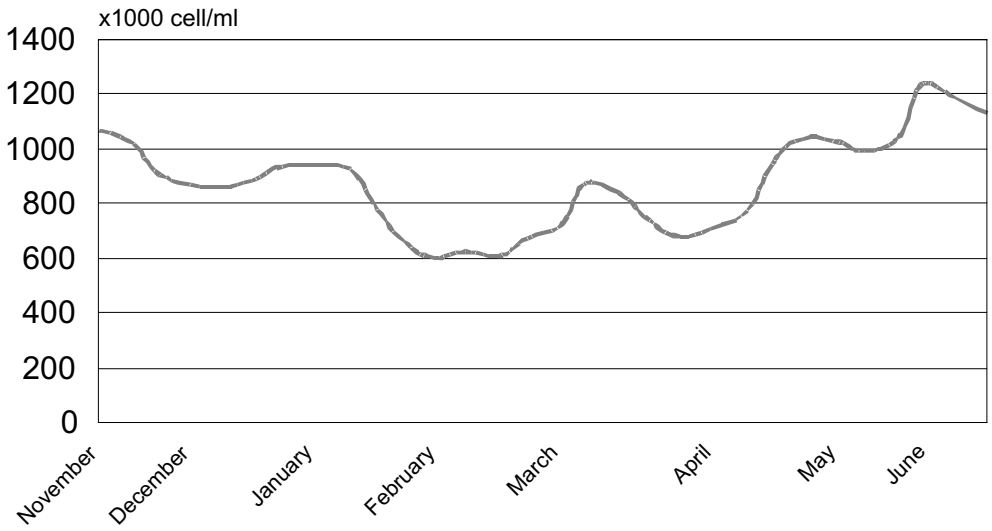

Fig. 1. Weekly bulk tank milk somatic cell counts for 66 goat herds in Murcia (Spain) for the 1998-1999 lactation period.

In order to simulate the official rule for SCC (ECC/92/46), the three-monthly (quarter year) means of the 24 herds which had at least one SCC count each month are shown (Fig. 2). The trends were similar to those observed in Fig. 1. However, the SCC increase in April was not very evident. This was because use of the rolling averages masked the effect of oestrus on SCC. Importantly, these data indicate that dairy goat farmers would be penalized during the first and last quarters because of the normal physiological milk SCC response in goats to season of the year.

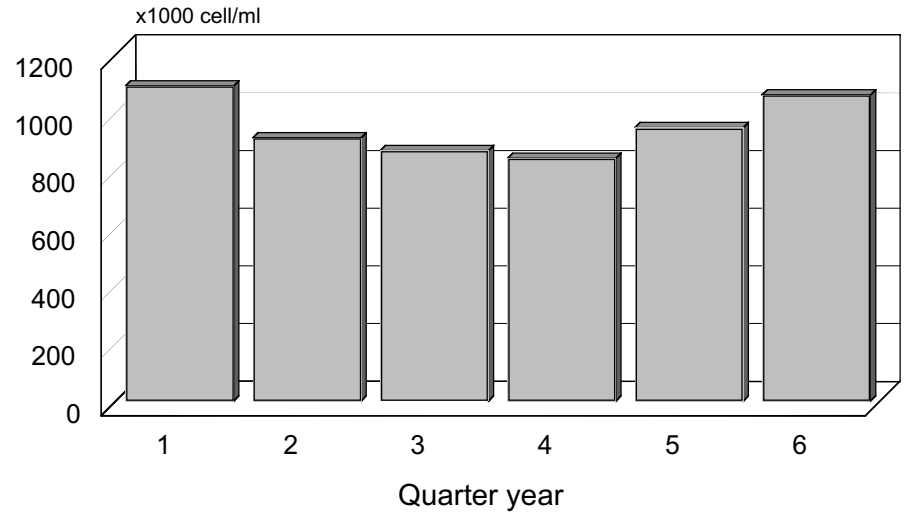

Fig. 2. Results of bulk tank milk somatic cell counts for 24 goat herds simulating conditions of the official EU rule (ECC/92/46 Directive).

Figure 3 shows the percentage of herds that exceeded the SCC thresholds proposed for the EU (1,500,000 cell/ml) and used in the USA (1,000,000 cell/ml). For the proposed EU threshold, the overall situation appeared favourable because most herds were below the proposed threshold. The increase in SCC during late lactation appeared to be a problem because 12.5% of the goat producers exceeded 1,500,000 cells/ml of milk. For the remaining quarters, only 4.1% of the herds exceeded the limit. The limit used in the US appears to be too strict. With this level, close to 80% of the dairymen would have their milk rejected in the first quarter because of the physiological increase in SCC after parturition. Significantly, 20% of the herds would have their milk rejected for the entire lactation.

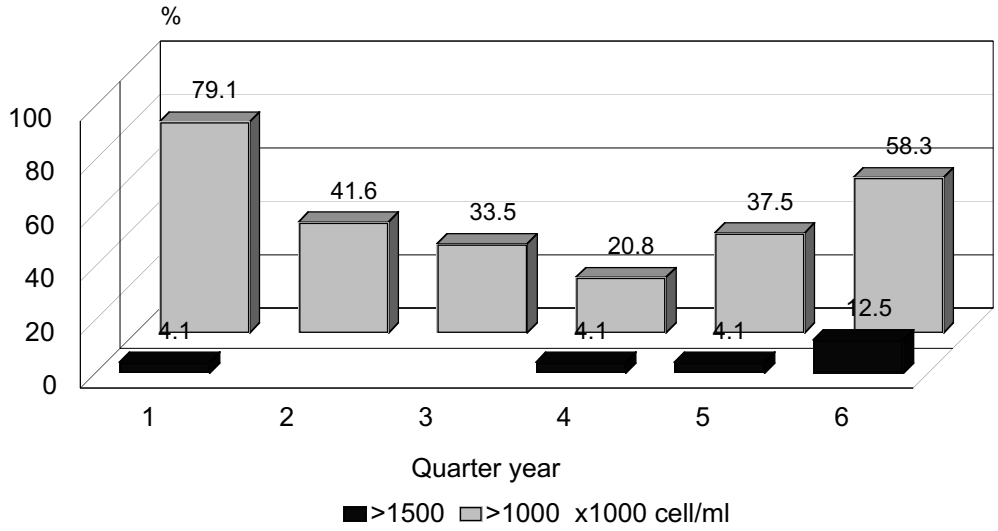

Fig. 3. Percentage of herds exceeding the EU (proposed) and US thresholds for goat milk somatic cell counts.

Conclusions

The bulk tank SCC for goat herds studied in Murcia appeared acceptable because only a few herds exceeded the proposed SCC limit during a few quarters.

The legal limit used in the USA is too strict and would be a major problem for goat dairymen in Murcia.

Before acceptance of the SCC limit proposed for small ruminants bulk tank milk, the physiological increase in SCC during early and late lactation should be considered for goats.

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References

Aleandri, M., Fagiolo, A., Calderini, P., Colafrancesco, R., Giangolini, G., Rosati, R. and Demichelis, F. (1996). Studies conducted on somatic cells count of goat milk. In: *Somatic Cells and Milk of Small Ruminants*, Rubino, R. (ed). EAAP Publication No. 77. Wageningen Pers, Wageningen, pp. 65-70.

Andrews, R.J., Kitchen, B.J., Kwee, W.S. and Duncalfe, F. (1983). Relationship between individual cow somatic cell counts and the mastitis infection status of the udder. *Aust. J. Dairy Technol*., 38: 71-74.

Barbosa, M., Barillet, F., Berthelot, X., Casu, S., Foglini, A., Gabiña, D., Jaubert, G., Kalantzopoulos, G., Ledda, A., Perrin, G., Poutrel, B., Renaud, J. and Rubino, R. (1994). *Conclusions of the Scientific Committee of the International Symposium on Somatic Cells and Milk of Small Ruminants,* ISZ/CIHEAM/FAO/IZCS/EAAP, Bella (Italy), 25-27 September 1994.

Directive 92/46 (1992). ECC Council. *Diario Oficial de las Comunidades Europeas*, L 268: 1-34.

Droke, E.A., Paape, M.J. and Di Carlo, A.L. (1993). Prevalence of high somatic cell counts in bulk tank goat milk. *J. Dairy Sci.,* 76(4): 1035-1039.

Sánchez, A., Corrales, J.C., Marco, J. and Contreras, A. (1998). Aplicación del recuento de células somáticas para el control de las mamitis caprinas. *Ovis,* 54: 37-51

Thrusfield, M. (1995). *Observational studies*. Documents from the Advanced Seminar on Application of Quantitative Methods in Veterinary Epidemiology, IAMZ (CIHEAM), Zaragoza (Spain), 14-25 October 1996.