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Estimate of *Staphylococcus aureus* and *Streptococcus agalactiae* prevalence among dairy herds from Minas Gerais Holstein Dairy Farmers Association, Brazil, 2011/2012[1]

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Abstract: The real prevalence of contagious mastitis pathogens was calculated in the herds belonging to Minas Gerais Holstein Association (MGHA). One bulk milk sample was collected from 40 herds to identify *Staphylococcus aureus* and *Streptococcus agalactiae* using selective media. The real prevalence of *S. aureus* and *S. agalactiae* was calculated based on apparent prevalence, sensitivity and specificity from previous study performed in Brazil. The real prevalence of *S. aureus* and *S. agalactiae* was 93% and 41%, respectively. The results showed high prevalence of *S. aureus* and *S. agalactiae* in these herds. The adoption of control measures considering epidemiological features of each pathogen and prevalence of infected cows within each herd should be considered with objective of reducing the new infection rate and infection time. The main approach in control and prevention of *S. agalactiae* should be directed to eradication of this pathogen through treatment of infected cows. In contrast, the approach in control measures of *S. aureus* should be based mainly on culling of cows with chronic infection.

Keywords: ***Staphylococcus aureus, Streptococcus agalactiae,*** **herd prevalence**

Estimativa da prevalência de *Staphylococcus aureus* e *Streptococcus agalactiae* nos rebanhos da Associação dos Criadores de Gado Holandês de Minas Gerias, Brasil, 2011/2012

Resumo: A prevalência dos patógenos contagiosos da mastite foi calculado nos rebanhos vinculados a Associação dos Criadores de Gado Holandês de Minas Gerais (ACGHMG). Uma amostra de leite do tanque de expansão foi coletada em 40 rebanhos para identificação de *Staphylococcus aureus* e *Streptococcus agalactiae* usando meios seletivos. A prevalência real de *S. aureus* e *S. agalactiae* foi calculada baseado na prevalência aparente, sensibilidade e especificidade de estudos previamente realizados no Brasil. A prevalência real de *S. aureus* e *S. agalactiae* foi 93% e 41%, respectivamente. Os resultados mostraram alta prevalência de *S. aureus* e *S. agalactiae* nestes rebanhos. A adoção de medidas de controle considerando características epidemiológicas de cada patógeno e prevalência de animais infectados dentro dos rebanhos deve ser considerada com objetivo de reduzir a taxa de novas infecções e duração das infecções. O principal enfoque no controle do *S. agalactiae* deve ser direcionado para a erradicação deste patógeno por meio do tratamento de vacas infectadas. Em contraste, o enfoque no controle do *S. aureus* deve ser baseado principalmente no descarte de vacas com infecção crônica.

Keywords: ***Staphylococcus aureus, Streptococcus agalactiae,*** **prevalência em rebanhos**

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Introduction

Bovine mastitis is a disease that requires constant monitoring mainly due to the contagious pattern presented by certain pathogens. *Staphylococcus aureus* and *Streptococcus agalactiae* are among the major mastitis pathogens (Keefe, 1997; Salasia et al, 2004). When a herd is infected with *S agalactiae*, there is usually a high prevalence of infected animals within the herd (Keefe, 1997). The identification of these agents in dairy herds in the Minas Gerais State, Brazil, as well as the variation of somatic cell count according to contagious mastitis pathogens have been reported (Brito et al, 1999). The knowledge about prevalence of contagious pathogens mastitis allows the disease quantification in herds and can be used for making decision at region and herd level. This study investigated the prevalence of *S. aureus* and *S. agalactiae* among herds of Minas Gerais Holstein Association (MGHA).

Material and Methods

The studied population was composed by 112 dairy herds with almost 6.000 cows in lactation located at Minas Gerais and Rio de Janeiro State. The herds were located at Region 1 (north) and Region 2 (south). The observed number of dairy herds in Region 1 and 2 was 42 and 70, respectively. The simple randomized sampling stratified by region for finite population was used to calculate the number of herds. The information used to calculate the sample was the expected prevalence (50%), confidence interval 95% (1,96), significance level (95%) and error (15%). One bulk milk sample was collected from 40 herds to identify *S. aureus* and *S. agalactiae* using selective media. From these herds 16 and 24 were located in Region 1 and 2, respectively. The real prevalence of *S. aureus* and *S. agalactiae* was calculated based on apparent prevalence, sensitivity and specificity for one bulk milk sample culture from previous study performed in Brazil (Brito, 1999). The association between prevalence of *S. aureus* and *S. agalactiae* and regions was evaluated by chi-square test.

Result and Discussion

The real prevalence of *S. aureus* and *S. agalactiae* was 93% and 41%, respectively. The real prevalence of *S. aureus* among herds located in Region 1 and 2 was 100.0% and 89% (Table 1). For *S. agalactiae*, the real prevalence was 57.0% and 31% in Region 1 and 2, respectively (Table 2). The results showed high prevalence of *S. aureus* and *S. agalactiae* in these herds and a homogeneous distribution among herds from Region 1 and 2. The adoption of control measures considering epidemiological features of each pathogen and prevalence of infected cows within each herd should be considered with objective of reducing the new infection rate and infection time. The main approach in control and prevention of *S. agalactiae* should be directed to eradication of this pathogen through treatment of infected cows, since this pathogen is sensitive to several antibiotics and lives only in infected udder. In contrast, the approach in control measures of *S. aureus* should be based on culling of cows with chronic infection due to its difficulty elimination.

Conclusion

Control measures have not been adopted to effectively combat these pathogens within the herds MGHA. Information on the prevalence of contagious mastitis pathogens can help in decision making for management of milk quality herd of MGHA.

Table 1 – Apparent prevalence and real prevalence of *Staphylococcus aureus* among dairy herds from Minas Gerais Holstein Dairy Farmers Association, 2011-2012

Region	N	*Staphylococcus aureus*			
		AP	CI 95%	RP	CI 95%
1	16	0,75[a]	0,54 - 0,96	1,00	0,72 - 1,00
2	24	0,67[a]	0,48 - 0,86	0,89	0,64 - 1,00
Total	40	0,70	0,56 - 0,84	0,93	0,74 - 1,00

[a] equals letters between rows means no statistical difference (p>0,05); N – number of herds; AP – apparent prevalence; RP – real prevalence; CI – confidence interval 95%

Table 2 – Apparent prevalence and real prevalence of *Streptococcus agalactiae* among dairy herds from Minas Gerais Holstein Dairy Farmers Association, 2011-2012

Region	N	*Streptococcus agalactiae*			
		AP	CI 95%	RP	CI 95%
1	16	0,38[a]	0,14 - 0,62	0,57	0,21 - 0,93
2	24	0,21[a]	0,05 - 0,37	0,31	0,07 - 0,56
Total	40	0,28	0,14 - 0,41	0,41	0,20 - 0,62

[a] differents letters between rows means statistical difference (p<0,05); N – number of herds; AP – apparent prevalence; RP – real prevalence; CI – confidence interval 95%

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References

BRITO M.A.V.P., J.R.F. Brito, M.T. Ribeiro & V.M.O Veiga. Padrão de infecção intramamária em rebanhos leiteiros: exame de todos os quartos mamários das vacas em lactação. Arq. Bras. Med. Vet. Zootec. v. 51, n. 2, p. 129-135, 1999.

Keefe, G. P. *Streptococcus agalactiae* mastitis: a review. Can. Vet. J. v. 38, n. 7, p. 429-435, 1997.

Salasia, S.I.O., Z. Kuhsnan, C. Lämmler, M. Zsöck. Comparative studies on pheno-and genotypic properties of *Staphylococcus aureus* isolated from bovine subclinical mastitis in central Java in Indonesia and Hesse in Germany. *J. Vet. Sci.,* v. 5, n. 2, p 103–109, 2004.