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MONITORING OF ANTIMICROBIAL RESISTANCE IN STAPHYLOCOCCI ISOLATED FROM BOVINE INTRAMAMMARY INFECTIONS

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Introduction

Antimicrobial substances are frequently used to treat clinical cases of bovine mastitis and as dry cow therapy. Both measures are considered important items of mastitis control programs for dairy herds (BRADLEY & GREEN, 2004). The continued use of antimicrobials in dairy herds is of concern due to selection of resistant forms of bacteria (WHO, 1997). The antimicrobial resistance found in animal pathogens may be related to failures in the mastitis curing rates. It might also affect human health by influencing the generation or selection of drug-resistant foodborne pathogens. Staphylococci are the most prevalent mastitis pathogens in Brazilian herds. The aim of this work was to monitor the antimicrobial susceptibility of staphylococci isolated from dairy herds during three years.

Material and Methods

Eleven herds were visited four times at approximately six-month intervals during 2009-2011. Composite milk samples were collected from all cows immediately before milking. The herds were selected according to the harmonization of national antimicrobial resistance surveillance and monitoring programs (OIE) and based on a prevalence of 35% penicillin resistance of *S. aureus*. Six herds often acquired lactating cows from other herds, while the other five replaced the stock with their own heifers. Sample collection, bacterial isolation and identification followed procedures of NMC (2004). All staphylococci were submitted to disk diffusion antimicrobial susceptibility tests according to CLSI M31-A3 (2008), using *Staphylococcus aureus* ATCC 29213 as reference strain. Antimicrobials (Oxoid) tested were: ampicillin 10µg, ceftiofur 30µg, cephalothin 30µg, clindamycin 2µg, erythromycin 5µg, enrofloxacin 5µg, gentamicin 10µg, oxacillin 1µg, penicillin 10 units, sulfa-trimethoprim 1.25/23.75 µg and tetracycline 30µg.

Results and Discussion

A total of 254 *S. aureus* and 113 coagulase-negative staphylococci (CNS) were isolated. Respectively, the numbers of *S. aureus* isolated in samplings 1, 2, 3 and 4 were 40, 74, 56 and 84 and the numbers of CNS were 37, 22, 23 and 31. Considering all *S. aureus* isolates, resistance was found to ampicillin (68%), penicillin (69.7%) and tetracycline (27.6%). The rate of sensitivity was above 90% for the other antimicrobials tested. The percentages of resistance found in CNS were: ampicillin (44%), penicillin (50%) and tetracycline (13%), oxacillin (13%), clindamycin (13%) and erythromycin (15%). The rate of sensitivity was above 90% for the other

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antimicrobials tested. The sensitivity rates for the four period sampled are shown in Table 1. The lack of a strict biosecurity program concerning the introduction of animals in some herds may have influenced the variation found in susceptibility patterns. The resistance molecular markers will be evaluated to verify their distribution among the herds.

Table 1. Percentages of antimicrobial susceptibility of *Staphylococcus aureus* and coagulase negative staphylococci isolated from 11 Brazilian herds, in four consecutive periods (S1, S2, S3, S4), separated by approximately six-month intervals.

Antimicrobials	<i>Staphylococcus aureus</i> (n=254)				Coagulase-negative staphylococci (n=113)			
	S1	S2	S3	S4	S1	S2	S3	S4
Ampicillin	42,5	37,8	26,8	25	51,4	63,6	60,9	51,6
Penicillin	50	40,5	16	22,6	45,9	54,5	52,2	48,9
Oxacillin	100	98,6	100	100	100	90,9	65,2	83,9
Cephalothin	100	98,6	100	100	100	100	100	100
Ceftiofur	100	100	100	100	100	100	95,7	96,8
Clindamycin	97,5	91,9	100	89,3	97,3	95,5	69,6	80,6
Gentamicin	95	95,9	96,4	100	100	95,5	82,6	100
Erythromycin	97,5	81	98,2	80,1	94,6	77,3	78,3	83,9
Enrofloxacin	100	98,6	98,2	98,8	100	100	100	100
Sulfa-trimethoprim	100	100	100	100	100	100	95,7	100
Tetracycline	72,5	70,3	85,7	65,5	91,9	68,2	69,6	70,9

The authors acknowledge the technical assistance of Marcos Aurélio Souto Silva and financial support of CNPq (Grant 578430/2008-8).

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National Mastitis Council 51st Annual Meeting Proceedings

*January 22-24, 2012
St. Pete Beach, Florida*