

Monitoring of antimicrobial resistance in staphylococci and streptococci isolated from bovine intramammary infections - Brito M.A.V.P.¹, Mendonça L.C.¹, Silva M.A.S.¹, Lange C.C.¹, Souza G.N.¹, Guimarães A.S.¹, Ribeiro J.B.¹

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Antimicrobial resistance of staphylococci and streptococci from bovine intramammary infections was monitored in isolates from 11 dairy herds during 2009-2011. Herds were visited four times and composite milk samples were collected from all cows immediately before milking. Selection of herds was according to harmonization of national antimicrobial resistance surveillance and monitoring programs (World Organisation for Animal Health) and based on a prevalence of 35% penicillin-resistance in *Staphylococcus aureus*. Antimicrobial susceptibilities were determined according to CLSI M31-A3 (Clinical and Laboratory Standards, USA), using *S. aureus* ATCC 25923 as reference strain. Bacterial isolations and identifications followed procedures of National Mastitis Council (USA). *S. aureus* were mainly resistant to ampicillin (65%), penicillin (69.7%) and tetracycline (24%). Coagulase-negative staphylococci (CNS) showed less resistance than *S. aureus* to ampicillin (41%) and penicillin (47%) and tetracycline (22%), but higher levels of resistance to oxacillin (15%), clindamycin (11%) and erythromycin (7.7%). The *mecA* gene was detected in two out of the 18 oxacillin resistant CNS. *Streptococcus agalactiae* isolates from eight herds (45 strains) were sensitive to ampicillin, cephalothin and ceftiofur. Four strains were resistant to penicillin and one to oxacillin. Higher resistance levels were found to clindamycin, erythromycin and sulfonamides (51%), gentamicin (58%) and tetracycline (71%). All environmental streptococci tested (38) were sensitive to ampicillin, ceftiofur and cephalothin. Resistance levels were high to gentamicin, oxacillin and tetracycline (42%), clindamycin (34%), erythromycin (37%), penicillin (32%) and sulfonamides (74%). This study is part of a larger project on surveillance and monitoring of antimicrobial resistance in pathogenic bacteria from dairy herds.

Key-words: antimicrobial resistance, bovine mastitis, surveillance

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Monitoring of antimicrobial resistance in staphylococci and streptococci 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. Therefore, surveillance of antimicrobial resistance is important to ensure optimal results of antimicrobial use and minimize the risk for development and spread of antimicrobial resistance. The aim of this work was to monitor the antimicrobial susceptibility of staphylococci and streptococci isolated from dairy herds during three years.

MATERIAL E METHODS

Antimicrobial resistance of staphylococci and streptococci from bovine intramammary infections was monitored in isolates from 11 dairy herds during 2009-2011. Herds were visited four times and composite milk samples were collected from all cows immediately before milking. Selection of herds was according to harmonization of national antimicrobial resistance surveillance and monitoring programs (World Organisation for Animal Health) and based on a prevalence of 35% penicillin-resistance in *Staphylococcus aureus*. Antimicrobial susceptibilities were determined according to CLSI M31-A3 (Clinical and Laboratory Standards, USA), using *S. aureus* ATCC 25923 as reference strain. Bacterial isolations and identifications followed procedures of National Mastitis Council (USA).

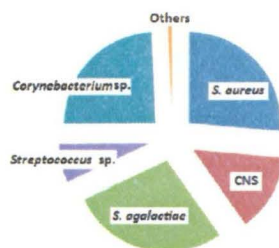


Figure 1 - Percentage of mastitis pathogens isolated during the antimicrobial monitoring studies.

RESULTS AND DISCUSSION

The distribution of mastitis pathogens isolated is shown in Figure 1. The most prevalent isolates were *S. aureus*, coagulase-negative staphylococci (CNS), *Streptococcus agalactiae* and *Corynebacterium* sp (similar to *C. bovis*).

S. aureus were mainly resistant to ampicillin (65%), penicillin (69.7%) and tetracycline (24%). CNS showed less resistance than *S. aureus* to ampicillin (41%), penicillin (47%) and tetracycline (22%), but higher levels of resistance to oxacillin (15%), clindamycin (11%) and erythromycin (7.7%). The *mecA* gene was detected in two out of the 18 oxacillin resistant CNS. *S. agalactiae* isolates from eight herds (45 strains) were sensitive to ampicillin, cephalothin and ceftiofur. Four strains were resistant to penicillin and one to oxacillin. Higher resistance levels were found to clindamycin, erythromycin and sulfonamides (51%), gentamicin (58%) and tetracycline (71%). All environmental streptococci (*Streptococcus* sp.) tested (38) were sensitive to ampicillin, ceftiofur and cephalothin. They showed high resistance levels to gentamicin, oxacillin and tetracycline (42%), clindamycin (34%), erythromycin (37%), penicillin (32%) and sulfonamides (74%).

CONCLUSION

This study is part of a larger project on surveillance and monitoring of antimicrobial resistance in pathogenic bacteria from dairy herds. The results provide useful data for surveillance purposes and contribute to identify changes in antimicrobial susceptibility in this bacterial population. The variation in antimicrobial susceptibility between individual isolates implies that the results cannot be used to indicate antimicrobial treatment of mastitis at the farm level.

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