

**TITLE: Phenotypic and genotypic characterization of multiresistance and biofilm production by *Staphylococcus* spp. isolated from the nasal mucosa of hospitalized animals**

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**ABSTRACT:**

Bacteria of *Staphylococcus* genus are often found in the nasal mucosa and skin and may cause opportunistic infections in humans and animals. The objective of this study was to detect resistance genes and biofilm production for *Staphylococcus* spp. by multiplex-PCR and compare with the phenotypic tests. Fifty strains of *Staphylococcus* spp. isolated from the nasal mucosa of animals hospitalized at the Veterinary Hospital of the Universidade Estadual de Maringá were submitted to multiplex-PCR for detection of *mecA* and *blaZ* genes ( $\beta$ -lactam drug resistance genes) and *ica*-complex (*icaA*, *icaC* and *icaD*) for detection of biofilm. Phenotypic detection of resistance was performed by disc-diffusion technique with penicillin, oxacillin and cefoxitin antibiotics, and slime production with Congo Red Agar test (CRA). 30 strains were characterized to coagulase-positive *Staphylococcus* (CoPS) and 20 to coagulase-negative *Staphylococcus* (CoNS). 75% (n=15) of CoNS were negative for *mecA* and *blaZ* genes, 5% (n=1) was positive only for *blaZ*, 10% (n=2) were positive only for *mecA* and 10 (n=2) were positive for both genes, characterizing one  $\beta$ -lactamase-producing Staphylococci and 4 Methicillin Resistant *Staphylococcus* spp. (MRS). One of them was resistant to all antibiotics tested, the other three were resistant to oxacillin; the strain containing only *blaZ* gene showed resistance to penicillin. From the CoPS samples, 53.3% (n=16) were negative for both genes, 40% (n=12) were positive only for *blaZ* gene, 3.33% (n=1) only for *mecA* and 3.33% (n = 1) were positive for both genes, characterizing 12  $\beta$ -lactamase-producing Staphylococci and 2 MRS. Of the 12 CoPS samples containing only *blaZ* gene, nine were resistant only to penicillin and three to penicillin and oxacillin; all the samples containing *mecA* were resistant to all antibiotics tested. All samples were slime producers by CRA producing black and rough colonies after 48 hours of incubation. 92% of the strains were *icaA*-positive, 100% were *icaD*-positive and 100% were *icaC*-negative. The presence of *blaZ* gene gives to staphylococci the production of  $\beta$ -lactamase, enzyme that destroys the  $\beta$ -lactam ring that can be reversible with association with  $\beta$ -lactamase inhibitor. The *mecA* gene confers resistance to all  $\beta$ -lactam antibiotics irreversible. CRA was more sensitive than multiplex-PCR that can detected the production of *ica*-independent slime.

**Keywords:** Beta-lactams, PCR, colonization