

TITLE: ANALYSIS OF ANTIMICROBIAL SUSCEPTIBILITY PROFILE AND BIOFILM FORMATION IN SUBINHIBITORY CONCENTRATIONS OF CIPROFLOXACIN IN STRAINS OF UROPATHOGENIC *Staphylococcus saprophyticus*

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ABSTRACT:

Staphylococcus saprophyticus is an uropathogen which ranks second as the causative organism of urinary tract infections (UTI) in women. Due to the high prevalence of UTI and empiric treatments there is an excessive use of antibiotics that contributes to the selection of resistant strains. It is worth noting that treatment with low-dose of antibiotics can cause an increase in adhesion and biofilm formation. Therefore, this study aims to determine the susceptibility profile to antimicrobials used in clinical practice, verify the presence of the *mecA* gene, evaluate the biofilm formation in the presence and absence of subinhibitory concentrations of ciprofloxacin, and to analyze the presence of genes involved in biofilm formation in clinical strains of *S. saprophyticus*. We used 47 clinical strains of *S. saprophyticus*, obtained from patients with UTI, identified by species-specific PCR. In disk diffusion test 25 strains were susceptible to the 11 tested antimicrobials. Furthermore, it was detected resistance to erythromycin (n = 19), penicillin (n = 3), ampicillin (n = 5), tetracycline (n = 2), sulfazotrim (n = 1) and cefoxitin (n = 1). The presence of *mecA* gene was detected by PCR in the cefoxitin resistant *S. saprophyticus* strain. Typing of staphylococcal cassette chromosome *mec* (SCC*mec*) by multiplex PCR identified gene segments compatible with the SCC*mec* type IIIB. The minimum inhibitory concentrations (MIC) for the antimicrobial ciprofloxacin were determined by broth microdilution technique. All strains were considered sensitive to the antimicrobial (breakpoint ≤ 1), being 32 with MIC = 0.5 $\mu\text{g/ml}$ and 15 with MIC = 1 $\mu\text{g/ml}$. The analysis of the biofilm formation revealed that 26 strains were strong, 6 were moderate and 15 presented weak biofilm production. *bap* gene was detected by PCR in 36 strains of *S. saprophyticus*. Among these, 20 were classified as strong, four as moderate and 12 as weak biofilm producers. No amplification was detected for the *icaA* gene in any strain analyzed. The biofilm formation was analyzed in 16 strains of *S. saprophyticus* in the presence of subinhibitory concentrations of ciprofloxacin. Seven strains showed an increased biofilm formation revealing a strain-dependent behavior. The results obtained provide a better understanding of the susceptibility profile of *S. saprophyticus* strains and the effects of subinhibitory concentrations of ciprofloxacin on biofilm formation for this species.

Keywords: *Staphylococcus saprophyticus*, susceptibility profile, SCC*mec*, subinhibitory concentrations, biofilm

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