TITLE: ANTIBACTERIAL BEHAVIOR OF POLYPYRROLE NANOPARTICLES AGAINST *STAPHYLOCOCCUS AUREUS* ISOLATED FROM COWS AND GOATS WITH MASTITIS

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ABSTRACT

Mastitis is the most important disease in the dairy industry, includes both clinical and subclinical infections that impair animal health and is accompanied by decreased milk production. *Staphylococcus aureus* (*S. aureus*) might be considered the main cause of mastitis in dairy cattle and dairy small ruminate. *S. aureus* has a high pathogenicity by multifactorial and complex virulence factors, one of them is the ability to form biofilms. Biofilms form when bacterial colonizers adhere to an inert or living surfaces in aqueous environments and excrete a slimy, glue-like substance composed of exopolysaccharides. The biofilms protect bacteria from components of the host immune system and the effects of antimicrobial agents. In the last few decades the demand of new antimicrobial has gained interest from both academic research and industry. Polypyrrole (PPy) is a good example of new chemical substance with antimicrobial effect. The aim of the present study was to evaluate the antibacterial behavior of nanoparticles of PPy in water against biofilm producer or not *S. aureus* isolated from cows and goats with mastitis. One hundred thirty-eight isolates of *S. aureus* were initially evaluated for biofilm formation by spectrophotometry in microplates. Furthermore, the minimum inhibition concentration (MIC) and minimum bactericidal concentration (MBC) of nanoparticles of PPy in water for planktonic *S. aureus* were determined. From the total bovine analyzed samples (112), was found 5 (4.46%) *S. aureus* isolates showed a strong biofilm production, 17 (15.18%) moderate production, 36 (32.14%) with weak production and 54 (48.21%) did not produce biofilms. Strains from goats (26) showed no biofilm producer in 18 (69.23%) strains and weak biofilm producer in 8 (30.76%) strains. The MIC and MBC of *S. aureus* to PPy were found in same concentration (125µg/mL) in all strains tested, independent of biofilm production or not. This finding provide a new insight into the interaction between nanoparticles of PPy and *S. aureus*, and will offer potential benefits for the control of mastitis.

Keywords: biofilm, nanoparticles, intramammary infection, *S. aureus*

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