

**TITLE:** ACTION OF NATURAL COMPOUNDS AGAINST BIOFILM OF *STAPHYLOCOCCUS AUREUS* ON POLYPROPYLENE.

**AUTHORS:** TREVISAN, D. A. C.; MALACRIDA, A. M.; SILVA, A. F.; SANTOS, A. R.; ABREU FILHO; B. A.; CAMPANERUT-SÁ, P. A. Z.; MIKCHA, J. M. G.

**INSTITUTION:** UNIVERSIDADE ESTADUAL DE MARINGÁ – UEM. AV. COLOMBO, 5790 JD. UNIVERSITÁRIO MARINGÁ – PARANÁ – BRASIL. CEP 87020-900

**ABSTRACT:**

Biofilm formation on food processing environments can lead to serious hygiene problems and economic losses due to food spoilage and equipment impairment. *Staphylococcus aureus* is reported in several outbreaks of foodborne diseases and have the ability to form biofilm. Natural compounds are considered a green and sustainable source of new molecules that have shown to be effective biofilm inhibitors being an alternative for the control of bacterial biofilms. This work evaluated the effect of cinnamaldehyde, carvacrol and eugenol on planktonic cells and mature biofilms of *S. aureus* ATCC 25923 on polypropylene surface. Antimicrobial activity of these compounds was evaluated by determining the minimum inhibitory concentration (MIC) using the broth microdilution assay. The effect of different concentrations of these compounds on biofilm was evaluated by colony counts. The overnight culture of *S. aureus* was diluted in Tryptic Soy Broth (TSB) to yield  $10^7$  CFU mL<sup>-1</sup>, placed in microtubes containing polypropylene coupons, and incubated for 48 h at 35 °C. After incubation, *S. aureus* biofilm formed on polypropylene was treated with cinnamaldehyde, carvacrol and eugenol at MIC and 2 x MIC for 1 hour. Cells were detached using ultra-sonic bath (25 kHz/ 5 min), diluted, plated on Mueller Hinton Agar (MHA) and incubated at 35 °C for 24 h. MIC of cinnamaldehyde and carvacrol were 312 µg/mL and eugenol was 624 µg/mL. Number of *S. aureus* cells recovered from polypropylene surface was approximately 7,25 log CFU/cm<sup>2</sup>. Treatment with MIC and 2 x MIC of cinnamaldehyde reduced 0,75 and 1,94 log UFC/cm<sup>2</sup>, respectively. Carvacrol reduced 0,32 and 2,72 log UFC/cm<sup>2</sup> with the treatment at MIC and 2 x MIC, respectively. Treatment with MIC and 2 x MIC of eugenol was the least effective, reduced 0,27 and 1,15 log UFC/cm<sup>2</sup>. Thus, this study demonstrate that all substances tested showed a low antibiofilm activity to reduce *S. aureus* on polypropylene and could be used in conjunction with other sanitizers contributing to the eradication of bacteria.

**Keywords:** Biofilm, *Staphylococcus aureus*, carvacrol, cinnamaldehyde, eugenol.

**Development Agency:** CNPq, PPG/UEM, CAPES