

**REGULAR ARTICLE**

## Effect of different antibiotics against *in vitro* *Staphylococcus aureus* biofilm grown on chitin flakes

Soma Banerjee<sup>1\*</sup>, Abira Sahu<sup>1</sup>, Shouvik Dutta<sup>1</sup>, Rimashree Baishya<sup>1</sup>, Prasanta Kumar Maiti<sup>2</sup>

<sup>1</sup>Department of Biotechnology, Heritage Institute of Technology, Chowbaga Road, Anandapur, Kolkata-700107, India

<sup>2</sup>Department of Microbiology, Institute of Post Graduate Medical Education & Research (S.S.K.M. Hospital) Kolkata, India

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**\*Corresponding Author:**

Email:

soma.banerjee@heritageit.edu

Phone: +913324430454 ext. 752

Fax: +913324430455

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**ABSTRACT**

MIC determination is the standard assay for testing the susceptibility of planktonic bacteria to antibiotics. It has been observed that biofilm grown cells express properties distinct from planktonic cells, for which antibiotics are generally not effective against biofilm forming organisms. The current study aims at comparison of the susceptibilities of biofilm grown cells to single antibiotic and in combination with others to identify those that were effective against *Staphylococcus aureus* biofilms. *S. aureus* ATCC 25923 were used for the purpose. They were grown in Tryptic Soya Broth (TSB) with chitin flakes as the inert surface to which the organisms adhered to produce the biofilm. Growth pattern of both biofilm producing and planktonic cells were studied. Viable counts were determined on Tryptic Soya Agar (TSA) plates. Different antibiotics viz. gentamicin, vancomycin, ciprofloxacin were used to determine the sensitivity of the bacterial strain. There was a marked difference in antibiotic susceptibility between the planktonic and biofilm population of the organism. It was found that the biofilm colonies were more resistant to the antibiotics like ciprofloxacin, vancomycin and gentamicin than the planktonic cells. The reduction in growth of bacteria was much more for gentamicin compared to that of ciprofloxacin and vancomycin and when antibiotic combination gentamicin - vancomycin it is much more reduced. It is thus clear from the test that the antibiotic susceptibilities of planktonic populations are not necessarily applicable to the effective treatment of the same organism once a biofilm has been established.

**1. Introduction**

Microbial biofilms are highly resistant to antibiotics and host immune defences. Formation of biofilms by various microbial pathogens is the major cause of many chronic and recurrent infections. It has been estimated that biofilms account for 80% of all microbial infections in the human body (Fengjun et al. 2013). They are able to persist in different locations of the human body for prolonged period of

time. Therefore, it is very difficult to eradicate biofilm associated infections. Moreover, bacterial population formed in a biofilm is 10-1000 times resistant to antibiotics than planktonic cells. (Svjetlana et al. 2007)

It has been found that *Staphylococcus aureus* presides as a part of the normal skin flora and in anterior nares of the nasal passages of 20% of human population. Usage of several indwelling medi-