

## Investigation of the Susceptibility of Standard Biofilm forming Bacterial Isolates of Methicillin Resistant *Staphylococcus aureus* (MRSA) To Selected Antibiotics from the Fluoroquinolone Family, an *In-Vitro* Study

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Bacteria have the ability to form complex surface-associated communities known as biofilms. These biofilms are commonly associated with many health problems, as many persistent and chronic bacterial infections are thought to be linked to biofilm formation. Compared to planktonic cells, biofilms are characterized by significant antibiotic resistance as well as high virulence potential, which explain why biofilms are associated with tremendous impact on health including increased morbidity and mortality. Moreover, complications related to biofilms often result in additional hospitalization and medical care for patients, leading to substantial economic impact. In this study we are proposing to investigate *in vitro* susceptibility of methicillin resistant *Staphylococcus aureus* (MRSA) strain ATCC 43300 to selected antibiotics from the fluoroquinolone class. Antibiotics efficacy against MRSA biofilm bacteria is compared to planktonic state. The susceptibility of the six fluoroquinolones demonstrated variable activity against MRSA bacteria as they were not equipotent. For planktonic cells, the MIC values showed that moxifloxacin (0.049 µg/ml), Gatifloxacin (0.078 µg/ml) and levofloxacin (0.156 µg/ml) were the most effective, while norfloxacin (1.172 µg/ml) was the least effective. This was confirmed by measuring the diameter of the zone of inhibition. The results showed the same order of activity as the MIC values against planktonic cells. The biofilm cells, on the other hand, demonstrated less sensitivity against toward the same antibiotics used against planktonic counterparts. In this case, Gatifloxacin (328.13 µg/ml) was the most effective, followed by moxifloxacin (390.63 µg/ml) and ciprofloxacin (437.5 µg/ml). However, similar to the planktonic bacteria, norfloxacin (875 µg/ml) was the least effective against biofilm cells as well. These data conclude that biofilm cells are less susceptible to antibiotics compared to the planktonic cells. It is also evident from these data that some antibiotics are more effective when used against biofilm cells, while others perform better on the planktonic counterparts. Results of this project are expected to provide insight into the efficacy of various fluoroquinolone antibiotics against MRSA biofilms. This study could form the basis for future clinical studies that could recommend special guidelines for management of infections that are likely to involve bacteria in their biofilm state.

### Biography:

Dr. Majed Masadeh is an Associate Professor of Pharmaceutical Microbiology at the Pharmacy College of Jordan University of Science and Technology, where he teaches pharmaceutical microbiology and biotechnology, pharmacology and basic microbiology courses (since Sep 2005). Dr. Majed holds a Doctor of Philosophy (Ph.D) degree in Pharmacy (majoring in Pharmaceutical Microbiology) from The University of Abertay Dundee at United Kingdom (UK). In addition, Dr. Masadeh holds a Bachelor of Science degree in Microbiology (India), Master of Science in Medical Microbiology (India). Dr. Majed has expertise in bacterial/biofilm resistance investigation towards antimicrobial agents, research design, and scientific writing. Dr. Majed has published 38 papers in peer reviewed journals including the Current Microbiology, Drug Design, Development and Therapy, Annals of Clinical Microbiology and Antimicrobials, Infection and Drug Resistance, International Journal of Integrative Biology, Clinical Medicine Research, Pharmaceutical Biology, Cytotechnology, International Journal of Occupational Medicine and Environmental Health, Journal of Infection in Developing Countries, Electromagnetic Biology and Medicine, Prevalence of Depression among Relatives of Cancer Patient in Jordan, Palliative & Supportive Care, Journal of Pharmacy and Bioallied Sciences, Pakistan Journal of Pharmaceutical Sciences, etc... In Sep 2013, Dr. Majed was selected in the Academickeys Who's Who in Pharmacy Higher Education (WWPHE) from September 2013. Dr. Majed reviewer for: International Journal of Nanomedicine: Dove Medical Press, International Journal of Medical Devices: Evidence and Research, British Journal of Pharmaceutical Research (BJPR), European Journal of Medicinal Plants, British Microbiology Research Journal, International Journal of Cell Culture and Biotechnology, (Cytotechnology), JJBS for Jordan Journal of Biological Sciences etc...