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Impedance analyses of biofilm formation of two *Staphylococcus aureus* strains under CuCl₂ or CuSO₄ influenceAstrid Helga Paulitsch-Fuchs^{1,2}, Daniela Toplitsch², Lisa-Marie Michelitsch², Elmar C Fuchs¹, Gernot Zarfel² and Clemens Kittinger²¹Wetsus Centre of Excellence for Sustainable Water Technology, Netherlands²Medical University of Graz, Austria

Biofilms often lead to significant problems in clinical settings as they are hard to remove from surfaces (e.g., catheters) and the show increased antimicrobial resistances. *Staphylococcus aureus* (strain DSM-799 and Newman) biofilms were grown for 48 hours in different concentrations of CuCl₂ or CuSO₄ in order to establish a copper value giving a breakpoint for cell growth. Electrical impedance sensing (EIS) was performed using an ECIS Model Z Theta (Ibidi, Germany). Biofilms were grown in eight well arrays with ten electrodes per well. Starting value impedance was measured using 150 µL of LB media and 150 µL of the copper solution in the desired concentration. This step was done for all eight cells and the solution was carefully removed with a pipette after the measurement. Afterwards, again 150 µL of the desired copper concentration were added to the empty cells and inoculated with 150 µL of the diluted ONC (OD600 of 0.5). Impedance was measured directly afterwards and after 24 and 48 hours of incubation at 37 °C and 90 rpm. Additionally typical laboratory measurements for biofilms (polysaccharide and protein content, life/dead cell flow cytometry) were performed. When uninfluenced, biofilms develop on the electrodes of the system, blocking the electrodes, causing the impedance values to drop. When cell growth and biofilm formation becomes inhibited this drop does not take place. These findings are supported by the data of the other measurement techniques. Future studies will evaluate the feasibility of the presented method for use in routine antimicrobial assessment. Other species and different antimicrobial substances will be used.

Biography

Astrid Helga Paulitsch-Fuchs has expertise in biofilm formation of fungal and bacterial species; especially the response of organisms in those structures to antimicrobial substances. Recently she also focuses on the influence of magnetic and electric fields on the cell envelopes of different species. After completing her PhD at the University of Graz, Austria she moved to the Netherlands and worked as a Post Doctorate and Theme Coordinator at Wetsus, European Center of Expertise for Sustainable Water Technology.

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