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POSTER ABSTRACT BOOK



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**MICROBIOLOGY**  
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## **FT-NIR and FTIR spectroscopic analysis of *Aureobasidium pullulans* biofilm**

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### **Abstract**

*Aureobasidium pullulans* is ubiquitous, non-pathogenic, dimorphic fungus with biotechnological significance due to its production of extracellular polysaccharide pullulan, key component of its biofilm's EPS. However, the structure of its biofilm remains poorly understood.

This study analyzed biofilm structure of three morphologically different *A. pullulans* strains on four solid media – Yeast Nitrogen Base (YNB), Potato Dextrose Agar (PDA), Sabouraud Agar (SA) and Synthetic Nutrient Deficient Agar (SNA). Depending on their morphology, strains were inoculated onto media and incubated at 25°C. After two weeks, biofilms were analyzed using Fourier-transform near-infrared spectrometer (FT-NIR) and Fourier-transform infrared spectrometer (FTIR). Each sample underwent five measurements. Spectral pre-processing and data mining were performed using Opus 6.5 and PLS\_Toolbox, an extension of Matlab package.

Principal Component Analysis (PCA) of all spectra indicates no major differences between biofilms of different strains, but showed distinct spectral differences on nutrient-poor SNA medium compared to other media. This trend appears in data from both instruments, confirming that chemical variations in the fingerprint region of IR spectra are also reflected in NIR spectra, which capture overtones and combination bands. Loadings analysis highlights bands related to -OH groups (around 5000 cm<sup>-1</sup> and 7000 cm<sup>-1</sup>) and -CH groups (around 1000 cm<sup>-1</sup>) as the most relevant for the model. Previous findings indicate all strains grow in yeast form on SNA medium, possibly explaining variations in biofilm structure, however more in-depth investigation is needed.

These findings enhance understanding of *A. pullulans* biofilm formation, crucial for optimizing its use as a living coating in ARCHI-SKIN project.



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