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## BOOK OF ABSTRACTS

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## Optimisation of *Aureobasidium pullulans* biomass production for use in living coating

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The ARCHI-SKIN project aims to develop living fungal coatings for various architectural surfaces, including wood, concrete, and plastic. These coatings will serve as a sustainable, self-renewing protective layer that provides UV protection, bioremediation, and antimicrobial properties. Based on preliminary screening, *Aureobasidium pullulans* was selected as the organism of choice (Butina et al. 2023). This globally distributed fungus inhabits diverse environments, ranging from the phyllosphere to marine and hypersaline habitats. It thrives under extreme conditions that are inhibitory to other microorganisms. *A. pullulans* exhibits several characteristics that make it suitable for biotechnological applications. It forms biofilms on wood and other architectural surfaces, making it particularly promising for use in living coatings. Additionally, it is non-pathogenic to humans, further supporting its safe deployment in the built environments.

Fermentation is the standard approach for cultivating *A. pullulans* to produce large amounts of biomass. Selected strains of *A. pullulans* with high potential for producing extracellular polymeric substances (EPS), such as pullulan, were cultivated in a laboratory-scale bioreactor (Elara ST, Solaris lab). The fermentation process was closely monitored and regulated in real time, with critical parameters such as pH, temperature, and dissolved oxygen (DO) used to control the kinetics of cell growth. The batch fermentation process was optimised to evaluate the effects of different *A. pullulans* strains and bioprocess conditions on biomass yield, with the goal of maximising biomass production for downstream use in biobased coating.

Initial optimisation focused on determining the optimal percentage of dissolved oxygen (DO%) as well as agitation and aeration rates. It was found that a lower DO% was sufficient to sustain the fermentation process, the agitation could be maintained at a constant rpm, and the aeration rate could be reduced. The aeration source was changed as a further optimisation step.

These results form the basis for the biomass in the ARCHI-SKIN project, where the fungal biomass serves as the core component of the living coating.

**Keywords:** biobased coating, optimisation, fermentation, *Aureobasidium*

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### REFERENCES

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