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Project title: Bioinspired Living Coating for Wood Protection

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Abstract (approx. 200 words)**:**

Traditional wood treatments often involve synthetic chemicals and toxic compounds, which cause environmental and health issues. Additionally, their degradation over time necessitates regular maintenance or replacement, incurring costs and raising environmental concerns. Bioinspired living coating systems offer an innovative, sustainable solution for effective wood protection. This approach relies on the growth and biofilm formation *of Aureobasidium pullulans*, an active living ingredient in the coating. Inspired by nature's resilience, these coatings dynamically respond to environmental changes, facilitating self-repair and renewal. As *A. pullulans* grows, it continually replenishes the protective layer, overcoming the limitations of conventional coatings prone to degradation.

This study is a part of the "Bioinspired living skin for architecture" project (ERC CoG #101044468 – ARCHI-SKIN), which aims to develop innovative bioinspired solutions for material protection. Our research focuses on developing a technically practical, controlled, and optimized *A. pullulans* biofilm formation process to enhance the protective functionality and performance of the coating.

Mimicking nature's strategies, this bioinspired living coating provides an eco-friendly alternative to hazardous preservatives, aligning with sustainability goals and a circular economy. Harnessing living biological systems inspired by nature enables the development of durable, self-repairing, and environmentally responsible wood protection solutions, opening new possibilities for broader sustainable material adoption.

Key words: engineered living material, self-healing, fungal biofilm, wood protection, bioinspired coatings