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# Study and comprehension of dynamics of surfaces microbial colonization to develop new preventive treatments suited to indoor environments

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Fungi are common indoor environments biocontaminants implicated in the biodegradation of materials and also in the occurrence of various diseases, especially respiratory. Currently, knowledge about microbial species implicated and the stages of colonization leading to visible fungal contamination in indoor environments are rare.
In this context, the aim of this research is to study and understand the dynamics of microbial colonization of the media to develop new preventive treatments suited to indoor environments.

For this, a bench and test protocols have been developed to monitor fungal and bacterial contamination of different materials in two different contamination scenarios. Thus, contamination in real exposure was performed on six materials. Microscopy, culture and molecular biology analysis were then carried out over a period of 23 days.

These analyses showed a microbial growth on all tested materials with increased bacterial and fungal load during the test. This campaign has also identified the glass cloth and oak materials as the most vulnerable towards the fungal growth.

These two products have been used to study the dynamics of microbial colonization and to test the effectiveness of treatments based on garlic and essential oils.

Bacterial and eukaryotic diversity present on oak and glass cloth was characterized by high-throughput sequencing. The results showed a diversity of the ecosystem characterized by a dynamic complex of bacteria and eukaryotes.

Concerning antifungal preventive treatments tested, differences in efficiency were observed between the two media. Thus no effect was observed on the glass cloth while two of the three tested treatments seemed effective on oak. Taking into account the efficiency, a priori targeted, of treatment solutions tested and high microbial diversity, the use of a broad-spectrum treatment appears essential to prevent fungal growth.

The study of the mechanisms of fungal growth could also be a relevant approach to refine the choice of preventive treatments.