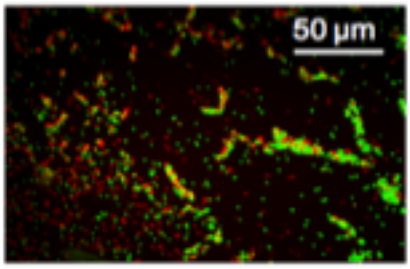
# Labex MATISSE

## Axis 3 : INTERFACES, TRANSPORT, REACTIVITY IN NATURAL MEDIA

### « Development of biocidal coatings from biosurfactants: Application in the protection of cultural heritage materials»

Claire Valotteau




*Biocide properties of sophorolipids on surface revealed by fluorescent staining (red : damaged cell wall ; green : intact cell wall)*

Hosting laboratories, teams and and thesis supervisors names:

Laboratoire de Chimie de la Matière Condensée de Paris, Niki Baccile, Florence Babonneau
Laboratoire de Réactivité de Surface, Vincent Humblot, Claire-Marie Pradier
Laboratoire de Recherche des Monuments Historiques, Faisl Bousta

Research project

Sophorolipids are eco-friendly biosourced glycolipids known for their antimicrobial and antifungal properties in solution. Our purpose is to use these molecules to develop new coating in order to protect surfaces against biocontamination. Thus the first step of this study is a proof of concept on gold model surfaces. These surfaces appear as an interesting tool to better understand the biocidal mechanisms of sophorolipid which are unclear until now. The second part of this project aims to develop coatings of sophorolipids on usual materials such as glass, using among other layer-by-layer deposit.

Summerize your scientific results & impacts

We were able to anchor sophorolipids on surface and we show that they are still biocide after such immobilization. Moreover our results suggest that this biological activity comes from the interaction between the saccharide moiety of the sophorolipid and the bacterial membranes. This mechanism was, from what we know, never reported on literature.

Main key facts (for instance publications / pri ces / oral presentations)

This work was presented by poster on the Renewable Resources & Biorefineries (Antwerpen, 2013) and the International conference in the frame of the 50th anniversary of the Centre de recherche sur la conservation des collections (Paris, 2013). Oral presentations were done on the European Conference on Surface Science (Antalya, 2014), the European Conference on Biodeterioration of Stone Monuments (Cergy-Pontoise, 2014) and Matériaux 2014 (Montpellier, 2014).
One publication is currently under submission.
Collaborations with the Biomedical Sciences Research Institute of Ulster University (experimental stay in june 2014) and the Institut Charles Sandron of Université de Strasbourg were developed.

SORBONNE UNIVERSITÉS