



**HAL**  
open science

## **Impairment of *Candida albicans* adhesion on dielectric surfaces (SiO<sub>2</sub>) containing or not AgNPs by absorbed proteins**

Marvine Soumbo, Adriana Scarangella, Christina Villeneuve-Faure, Adnen Mlayah, Caroline Bonafos, Marie-Carmen Monje, Christine Roques, Kremena Makasheva

### ► **To cite this version:**

Marvine Soumbo, Adriana Scarangella, Christina Villeneuve-Faure, Adnen Mlayah, Caroline Bonafos, et al.. Impairment of *Candida albicans* adhesion on dielectric surfaces (SiO<sub>2</sub>) containing or not AgNPs by absorbed proteins. 6th Eurobiofilms ESGB, Sep 2019, Glasgow, United Kingdom. <hal-03092528>

**HAL Id: hal-03092528**

**<https://hal.science/hal-03092528v1>**

Submitted on 5 Jan 2021

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



HAL Authorization

## ABSTRACT TEMPLATE:

### SELECT CATEGORY: (DELETE AS APPROPRIATE [MAXIMUM 2 CATEGORIES])

**A:** POLYMICROBIAL/MICROBIOME; **B:** MECHANISMS/REGULATION; **C:** CLINICAL BIOFILM INFECTIONS; **D:** ENVIRONMENTAL/INDUSTRIAL BIOFILMS; **E.** ANTIMICROBIALS AND NOVEL AGENTS; **F.** OTHER

**TITLE:** Impairment of *Candida albicans* adhesion on dielectric surfaces (SiO<sub>2</sub>) containing or not AgNPs by adsorbed proteins

**AUTHORS:** (Please underline presenting author) M. Soumbo,<sup>a,b</sup> A. Scarangella,<sup>a,c,d</sup> C. Villeneuve-Faure,<sup>a</sup> A. Mlayah,<sup>c</sup> C. Bonafos,<sup>c</sup> M.-C. Monje,<sup>b</sup> C. Roques,<sup>b</sup> and K. Makasheva<sup>a</sup>

### AFFILIATIONS:

<sup>a</sup>LAPLACE, Université de Toulouse; CNRS, UPS, INPT; 118 route de Narbonne, F-31062 Toulouse, France

<sup>b</sup>LGC, Université de Toulouse; CNRS, UPS, INPT; 35 chemin des maraîchers, F-31062 Toulouse, France

<sup>c</sup>CEMES-CNRS; Université de Toulouse, 29 rue Jeanne Marvig, BP 94347, F-31055 Toulouse, France

<sup>d</sup>FERMaT, Université de Toulouse; CNRS, UPS, INPT, INSA; Toulouse, France

(main body of abstract should be 300 words maximum)

**Introduction:** Surfaces in contact with physiological fluids, like medical devices (MD) for humans, are firstly covered by adsorbed proteins. This conditioning film is considered crucial regarding microorganism adhesion then biofilm formation. Among microbial cells implicated in infections, especially nosocomial infections linked to the colonization of MD surfaces, yeasts of the genus *Candida*, i.e. *C. albicans*, are frequently involved.

**Hypothesis and aims:** Regarding our previous results on the interactions between thin dielectric layers of SiO<sub>2</sub> with tailored by silver nanoparticles (AgNPs) properties and proteins, our aim was to evaluate the shear-induced detachment of *C. albicans* in contact with a thin silica layer, containing or not AgNPs, at low shear stresses using a shear stress flow chamber.

**Methodology:** The study focuses on the shear-induced detachment of the yeast *Candida albicans* IP48.72 in contact with a thin silica layer ± AgNPs covered by adsorbed Bovine Serum Albumin (BSA) or Fibronectin (Fn) at low shear stresses using a shear stress flow chamber. The experimental arrangement is designed to address large range of shear stresses, up to 80 Pa, with specific attention paid to the low shear stress domain (0.01 Pa).

**Results:** Regarding *C. albicans* IP48.72 and SiO<sub>2</sub> alone, 27% of the cells remained stuck to the surface. In the same time, BSA induced a significant reduction of adherent cells (14%), while Fn favored the adhesion (84%). In all the tested conditions, adhesion level was maintained to 5 Pa. AgNPs deposited on the SiO<sub>2</sub> surface induced an increase in *C. albicans* adhesion level.

**Conclusion:** We demonstrated the impairment of *C. albicans* adhesion forces regarding the protein adsorbed on silica layer. This was also the first demonstration of a positive impact of AgNPs on *C. albicans* adhesion.

**Acknowledgement:** This project was supported by Toulouse University and Occitanie Council (APR 2016 ADAGIO).