# Mesoporous titania coating: determination of its physicochemical properties and yeast behavior.

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We have synthesized titania mesoporous films using titanium (IV) chloride as sol-gel precursor and surfactants from Pluronics® (Pluronic F-127, POE-POP-POE) and Brij ™ series (B96 y B58, alquil-POE) that act like molds for pore size and distribution. Nanotopography is known to be key for adhesion and cellular growth. In this experiment, we demonstrate that nanotopography is also determinant for proliferation of eukaryotic microorganisms such as *Candida albicans* (ATCC 10231). We cultivated the microorganism in the presence of the films, the films derivatized with APTES ((3-Aminopropyl)triethoxysilane) and the films derivatized with APTES and then doped with $CuCl_2$ (a known fungicide). Results show that mesoporous films prepared with Brij-96 presented the best outcome in regards of controlling cellular proliferation (up to a 75% inhibition of development in the Brij-96 derivatized with APTES-$CuCl_2$). We also characterized the mesoporous films by performing a scratch essay, which determines damage resistance of the material, and a contact angle assay. Results showed that every film tested can resist up to 40N without tearing and the contact angle, that determines superficial hydrophilicity, allowed us to establish that the coating made with Brij-96 is the least hydrophilic coating of all. This is in accordance with minor cellular proliferation results using this surface. We observed our films through scanning electron microscopy (SEM) and demonstrate that films derivatized with APTES or with APTES-$CuCl_2$ did not change the original nanotopography of the coating. Lastly, we did an EDS (Energy-dispersive X-ray spectroscopy) essay to ratify the presence of Ti in all of the films, C and N in the ones derivatized with APTES, and C, N and Cu in the ones derivatized with APTES-$CuCl_2$.

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