

Antifungal activity of titanium dioxide nanoparticles against *Candida albicans*

ABSTRACT

The unregulated release of titanium dioxide nanoparticles into the environment has raised concern, in particular due to the impact of the nanoparticles on indigenous micro-biome in our ecosystem. This paper reports a study on antifungal activity of titanium dioxide nanoparticles on a healthy growing fungi species, *Candida albicans*, a known opportunistic pathogen. A quantification of the total cell death was performed using a direct staining method, Trypan blue exclusion assay. Exposure to nanoparticles not only altered the growth rate, but also affected the onset and length of *Candida albicans* growth phases. The lag and the onset of the death phase were shortened and accelerated, respectively. Up to 65% of the *Candida albicans* were killed after exposure to 100 µg/mL of the anatase titanium dioxide nanoparticles, while only 33% were killed with rutile. A higher dosage and incubation time of the nanoparticles increased their toxicity. Cells suffered from morphological changes upon the nanoparticle exposure, which correlates well with the results showing an altered growth phase culture.

Keyword: Titanium dioxide; Trypan blue exclusion assay; *Candida albicans*; Antifungal activity; Growth rate