

Effect of VitB2@TiO₂NPs and Starch@TiO₂NPs in the Susceptibility of Bacterial Strains [†]

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Abstract: Nanoparticles are frequently used as food additives or preservatives because they offer better organoleptic properties, better nutrient release, and greater stability. Titanium dioxide nanoparticles (TiO₂@NPs) are one of the types most found in food and cosmetics; however, their biocompatibility is not well established, and there is also no research on the effects of these in prokaryotic cells. The goal was to analyze the effect on the antibiotic susceptibility of bacteria strains when they are constantly exposed to low doses of uncapped@TiO₂NPs and functionalized@TiO₂NPs (with vitamin B2 and starch). Four strains, two nanoparticles, and 6 antibiotics were tested at 2 and 24 h of exposure. We observed that VitB2@TiO₂NPs and Starch@TiO₂NPs do not affect cell viability or sensitivity to antibiotics in MS and a clinical strain of *S. aureus*. On the other hand, ESBL-*E. coli* turns 100% sensitive to the tested antibiotics after 24 h of incubation with VitB2 and VitB2@TiO₂NPs. Interestingly, an inhibitory effect by Starch and Starch@TiO₂NPs in *E. coli* ATCC and ESBL-*E. coli* after 24 h of incubation was detected. The microdilution method to check the MIC of these nanoparticles is being carried out to expand this study.

Keywords: Vitamin B2; Starch; TiO₂ nanoparticles; *Escherichia coli*; *Staphylococcus aureus*.

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Conflicts of Interest

The authors declare no conflict of interest.