

Titanium Dioxide Modified with Glutathione as Potential Drug Carrier with Reduced Toxic Properties

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Abstract : The paper presents a process to obtain glutathione-modified titanium oxide nanoparticles. The processes were carried out in a microwave radiation field. The influence of the molar ratio of glutathione to titanium oxide and the effect of the fold of NaOH vs. stoichiometric amount on the size of the formed TiO₂ nanoparticles was determined. The physicochemical properties of the obtained products were evaluated using dynamic light scattering (DLS), transmission electron microscope-energy-dispersive X-ray spectroscopy (TEM-EDS), low-temperature nitrogen adsorption method (BET), X-Ray Diffraction (XRD), and Fourier-transform infrared spectroscopy (FTIR) microscopy methods. The size of TiO₂ nanoparticles was characterized from 30 to 336 nm. The release of titanium ions from the prepared products was evaluated. These studies were carried out using different media in which the powders were incubated for a specific time. These were: water, SBF, and Ringer's solution. The release of titanium ions from modified products is weaker compared to unmodified titanium oxide nanoparticles. The reduced release of titanium ions may allow the use of such modified materials as substances in drug delivery systems.

Keywords : titanium dioxide, nanoparticles, drug carrier, glutathione

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