

Article

TiO₂ nanoparticles; it's antibacterial, anticancer and nanotoxicological impacts

* Yadav R.,¹ Saurabh Y.,³ Saran D.,⁴ Padam A.,² Sudhir S.,² Agarwal S.C.,³ Angarwal A.⁵

¹Department of Biotechnology, R.B.S. College, Agra, India.

²Central Drug Research Institute (CDRI), Lucknow, India

³Department of Chemistry, Agra College, Agra, India,

⁴Department of Physics, Institute of Basic Science, Dr. B.R.A. University, Agra, India

⁵Faculty of Engineering and Technology, Department of Chemistry, Agra

College, Agra, India

Abstract

We present the fabrication of water-soluble and biocompatible TiO₂ nanoparticles, its characterization and the photocatalytic capability towards antibactericidal, anticancer and toxicological action. The titanium dioxide nanoparticles at low pH have been synthesized by using sol-gel method. Normally they are typically insoluble in water. These are made water soluble by surface modification and characterized by XRD and TEM techniques. The XRD patterns revealed exclusive formation of anatase phase. XRD calculation (Scherrer's formula) and Transmission Electron Microscopic measurement are in good agreement. The particle size 20-30 nm shows better antibacterial, anticancer (Cervical cancer, Lung cancer, Breast cancer) and nanotoxicology effects.

Key Words: Surface modification, XRD technique, TEM, Reactive Oxygen species (ROS), Nanoparticles (nps)

