

# Seminar

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## Institute for Plasma Research

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**Title :** Effect of Iron Content Titanium Dioxide Nanoparticles on Potential of Mitochondrial System

**Speaker:** Dr. Tejal Barkhade  
Central University of Gujarat, Gandhinagar

**Date :** 10th September 2021 (Friday)

**Time :** 03.30 PM

**Venue :** Online - Join the talk:

[https://meet.ipr.res.in/Dr.TejalBarkhade\\_PDFTalk](https://meet.ipr.res.in/Dr.TejalBarkhade_PDFTalk)

### **Abstract :**

In present study, synthesis of TiO<sub>2</sub> and Fe content TiO<sub>2</sub> nanoparticles was done by sol-gel process. The characterization data of synthesized nanoparticles was carried out by XRD, XPS, FTIR, Raman microscopy, DRS, HR-TEM, PL Spectroscopy, and AFM. Further, the effect of synthesized nanoparticles on mitochondria were studied using many spectroscopic and microscopic methods. The interaction of TiO<sub>2</sub> nanoparticles with the mitochondrial membrane leads to the overproduction of ROS by disturbing membrane homeostasis which is the main cause of toxicity. The results of flow cytometry and confocal imaging confirmed that mitochondrial membrane potential (MMP) was altered and damaged in isolated mitochondria over TiO<sub>2</sub> exposure. The other studies such as swelling of mitochondria, surface-enhanced activity, membrane fluidity, membrane protein denaturation, AFM for mitochondrial morphological analysis and complex II activity were taken into consideration for toxicological assessment. TiO<sub>2</sub> induces mitochondrial swelling via a decrease in absorbance at 540 nm, promoting membrane fluidity. This affected the activity of complex II and increases the ROS generation via a non-specific approach instead of a definite one in a dose-dependent manner. While Fe incorporation helps to reduce the toxicity of parent TiO<sub>2</sub> NPs on mitochondrial system.

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