# BYISINTHESIS OF TITANIUM DIOXIDE NANOPARTICLES OF USING LATEX OF *Jatropha curcas*

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**Introduction.** Titanium dioxide ($TiO_2$) is an important non-toxic pigment used in the manufacture of many everyday substances such as paints and cosmetics. In the last years, $TiO_2$ have becomes important due to their numerous applications. Its properties of resistance and tolerance to high temperature of there it's utility in applications of implants and aeronautics [1]. The recent discovery of the biosynthesis of metal nanoparticles points towards new biotechnological methods in materials science [2,3]. The use of microorganisms such as bacteria, yeast, fungi, actinomycetes and plants has been described for the formation of nanoparticles and their applications. In recent years, plant mediated biological synthesis of nanoparticles is gaining importance due to its simplicity by eliminating the elaborate process of maintaining cell cultures and eco-friendliness. Although biosynthesis of metallic nanoparticles by plant such as *alfalfa, aloe vera, cinnamomum camphora, neem, emblica officianalis, lemongrass* and *Jatropha curcas* have been reported the potential of plants as biological materials for the synthesis of nanoparticles is yet to be fully explored. *Jatropha curcas* has emerged as an important agent reducing and stabilizing of nanoparticles metallic. Latex and seed extract of *J. curcas* has been utilized in the synthesis of gold, silver and lead nanoparticles. Present investigation, we reporting simple and rapid synthesis of $TiO_2$ nanoparticles utilizing latex of *Jatropha curcas*.

**Methods.** Crude latex was obtained by cutting the leafs of *J. curcas* plants. The latex was stored at −20 ◦C until use. Titanium (lll) chloride 99%solution was purchased from Sigma–Aldrich Chemical. All the aqueous solutions were prepared using de-ionized water.
The latex was prepare to 1% for the synthesis, the volume of latex and titanium was varied until obtain 1000µl this solution was mixed and stirring for 60 minutes at room temperature.
The nanoparticles were characterized with techniques as UV–VIS absorption spectroscopy, Scanning electron microscopy (SEM) analysis

**Results**
The figure 1 shows Uv-Vis absorption spectra of solution prepared from *J. curcas* latex and Titanium chloride shows two broad peaks at 280 and 365nm respectively. The peak at 365nm is attributed to the excitation of surface Plasmon resonance (SPR) of titanium dioxide.

To corroborate the presence of $TiO_2$, we analyzed by SEM-EDS. Fig. 2 shows micrographs of $TiCl_3$ exposed to Latex of *J. curcas*. EDS analysis confirmed the presence of titanium dioxide (Fig. 2a) and protein residues. In the Fig. 2b we observe the small nanoparticles incorporating the protein residues and in fig. 2c) we observe a particle with an average size of 40nm.

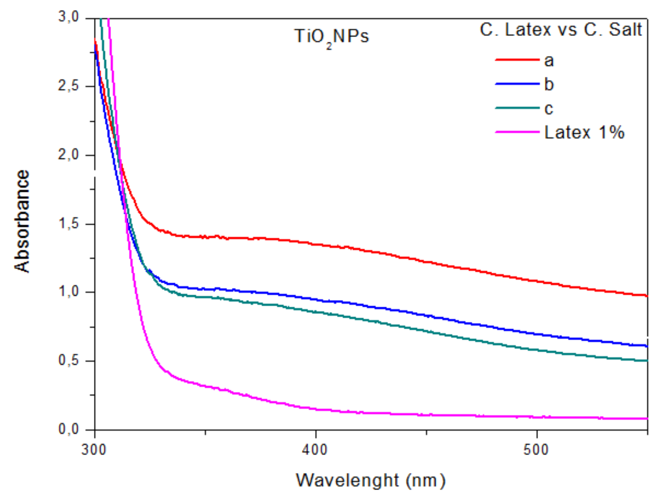


**Fig.1** Spectra of absorption UV-vis of the titanium dioxide nanoparticles synthesized with latex to 1% at room temperature.

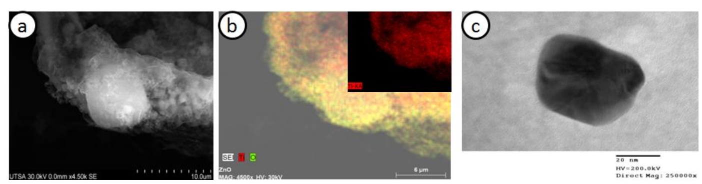


**Fig.2** a) EDS map showing detection of titanium dioxide nanoparticles, b) Micrograph of the nanoparticles synthesized with latex to 1%, c) Image SEM of titanium dioxide nanoparticles with an average size of 40nm.

**Conclusions.** Present green synthesis shows that the environmentally benign and renewable latex of *J. curcas* can be used as an effective reducing agent for the synthesis of titanium dioxide. .

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