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# SYNTHESIS OF TiO<sub>2</sub> NANO PARTICLES BY HYDROTHERMAL SYNTHESIS AND BIOLOGICAL SYNTHESIS

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## Abstract

Titanium dioxide naturally occurs in the form of an oxide of titanium whose chemical formula is given as TiO<sub>2</sub>. TiO<sub>2</sub> pigments are used in paints and coatings, plastics, paper, building materials, cosmetics, pharmaceuticals, foods and many other commercial products. TiO<sub>2</sub> when ground to fine particles can be used as pigments for paints, it also acts as a strong antimicrobial agent so it has a wide application in the antimicrobial coatings. TiO<sub>2</sub> nano particle synthesis was carried out by using hydrothermal method. In hydrothermal synthesis the precursor used was Titanuimisobutoxide, CetylTrimethyl Ammonium Bromide (CTAB) was used as the surfactant for improving the particle agglomeration in the synthesis of TiO<sub>2</sub> nano particles. Liquor ammonia was used as the reducing agent to reduce Titanium isobutoxide into TiO<sub>2</sub> nano particles. The synthesis was carried out in autoclave at a temperature of 180°C. Characterisation of nano particles were done by UV visible spectroscopy, Particle sizer, and zeta potential test was carried out to find the stability of particles. The TiO<sub>2</sub> particles showed good antimicrobial activity towards staphylococcus bacteria when tested in laminar flow chamber.

**Keywords:** TiO<sub>2</sub>, Nanoparticles, antimicrobial activity, coatings, hydrothermal