

# Development of TiO<sub>2</sub> Nanoparticles Impregnated Surgical Silk Suture - A Novel Approach

## APPLICATION

This proposal aims to develop a new method to enhance the performance of surgical silk sutures by coating the silk threads with nano films of titanium dioxide (TiO<sub>2</sub>). Further the developed TiO<sub>2</sub> coated silk suture with excellent antibacterial activity and biocompatibility could be used for different surgical operations.

COMPANY NAME	TECHNOLOGY READINESS LEVEL (TRL)	INTELLECTUAL PROPERTY
<b>Kodigerao Innoventures Pvt Ltd</b>	<b>TRL: 5 (The proof of concept of the product has been developed and Biocompatibility Testing &amp; In-Vitro Preclinical Safety Tests of Coated Suture is currently being carried out)</b>	<b>Indian Patent</b> Application no: 202031005561
<b>FOUNDER'S NAME</b>		
Vidya KC		

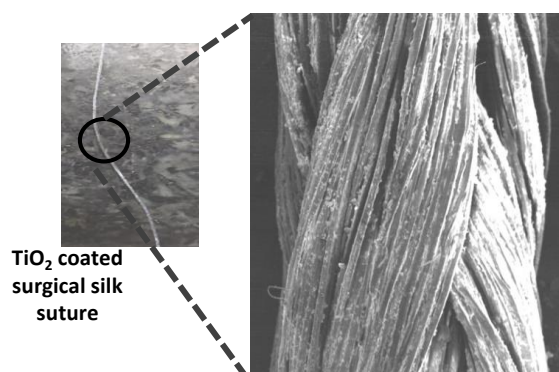
## PROBLEM ADDRESSED

There is a growing demand of economical methods of wound healing in the field of surgery and health care where application of surgical suture plays an important role. Conventionally used surgical silk sutures are braided and multifilament which leads to the formation of bacterial colonisation (biofilm) resulting in tissue reaction and Surgical Site Infection (SSI) and less susceptibility for antibiotics and antiseptics. Due to increase in number of surgeries and burn cases, there has been a high growth of the suture market. Nevertheless due to the high fabrication cost of non-absorbable sutures manufacturers have been encouraging hospitals to switch to absorbable sutures as they are time saving and are more efficient clinically. However, there is a concern lies for the braided and multifilament nature of the suture which can cause severe infection to the surgery site. Thus there is a urgent need of absorbable sutures which will be cost effective, biocompatible in nature, with excellent antibacterial activity.

## ABOUT THE TECHNOLOGY

The project majorly focuses on enlarging the performance of the surgical silk suture by using nano films of titanium dioxide coating on the silk threads. The deposition of the thin layer of TiO<sub>2</sub> nanoparticles on surgical silk suture has been done with the help of (atomic layer deposition) ALD. The TiO<sub>2</sub> coated silk sutures would not have the capillarity property of the suture, hence no bacterial colonisation and no biofilm formation resulting in decrease in the rate of Surgical Site Infection (SSI), due to the antibacterial property. In addition TiO<sub>2</sub> impregnated silk would be a widely available novel suture material in the market due to its antibacterial property, biocompatibility, self-cleaning property (due to photocatalytic activity) good physical and handling properties of surgical silk and in addition is cost effective to the patients.

## PRODUCT IMAGE



## USP

- TiO<sub>2</sub> coated surgical silk suture would not have the capillarity property of the suture, hence no bacterial colonisation and no biofilm formation.
- Antibacterial property leads to the decrease the chances of Surgical Site Infection (SSI).
- Biocompatible in nature along with self-cleaning and UV protective properties
- Low fabrication cost on comparison to the commercialized sutures available in the market.

## FUNDS RAISED/ACHIEVEMENTS

- Supported under BIRAC BIG worth INR 44.83 Lakhs

## END USERS/CUSTOMERS

- PHCs, Private practitioners, Patients, Tertiary care hospitals, dental clinics