



St Xavier's College (Autonomous)  
5, Mahapalika Marg, Mumbai-400001

**Experimental validation of silver and platinum integrated plasmonic  
gold nanorods: A robust and scalable process**

A dissertation submitted to St Xavier's College- Autonomous

For the partial fulfilment of the degree of Master of Science in Biotechnology

By

Manali Nitin Patwardhan

MSc. (Biotechnology)

2019-2020

Under the guidance of

Prof. Rohit Srivastava

Indian Institute of Technology Bombay

Powai, Mumbai 400 076

**POST GRADUATE DEPARTMENT OF  
BIOTECHNOLOGY**

St Xavier's College (Autonomous)

5, Mahapalika Marg, Mumbai -400001



**CERTIFICATE**

This is to certify that Ms. Manali Nitin Patwardhan, student of MSc (Biotechnology) - Semester IV, at the Post Graduate Department of Biotechnology, St. Xavier's College (Autonomous) has submitted the dissertation work titled "Experimental validation of silver and platinum integrated plasmonic gold nanorods: A robust and scalable process" for the partial fulfilment of the Master's degree in Science in Biotechnology, during the academic year 2019-2020.

Date:

Place:

*KR Gokarn*

**Dr. Karuna Gokarn**

**Head of the Department, PGDBT**

POST GRADUATE DEPARTMENT  
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### CERTIFICATE OF COMPLETION

This is to certify that Ms. Manali Nitin Patwardhan, student of MSc (Biotechnology), St Xavier's College (Autonomous) has completed four months training/ Research Project at the NanoBios lab, (Indian Institute of Technology Bombay) during the academic year 2019-2020.

She has completed the dissertation work entitled "Experimental validation of silver and platinum integrated plasmonic gold nanorods: A robust and scalable process" for the partial fulfilment of MSc. (Biotechnology) degree. She has been familiarized with the following techniques during this project:

- 1) Synthesis and optimization of gold nanorods
- 2) Characterization techniques- UV-Vis spectroscopy, Transmission Electron Microscopy, Fourier Transform Infra- Red spectroscopy

This carefully written report represents the experiments and literature related to the same carried out by her during the period from 1st December 2019 to 31st March 2020.

I found Manali to be a sincere and hardworking student. Her overall conduct was good.

PI/supervisor  
Date

Signature

प्रा. रोहित श्रीवास्तव  
Prof. Rohit Srivastava  
विभागाध्यक्ष/Head  
जेव विज्ञान एवं जेव अभियांत्रिकी विभाग  
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Seal of the institute

29<sup>th</sup> July 2020