

CANDIDATE'S DECLARATION

I, **Sharad Verma**, certify that the work embodied in this Ph.D. thesis is my own bonafide work carried out by me under the supervision of **Dr. Abha Mishra** for a period of about 4 years 10 months from July 2010 to May 2015 at **School of Biochemical Engineering, Indian Institute of Technology (Banaras Hindu University), Varanasi**. The matter embodied in this Ph.D. thesis has not been submitted for the award of any other degree/diploma.

I declare that I have faithfully acknowledged, given credit to and referred to the research workers wherever their works have been cited in the text and the body of the thesis. I further certify that I have not willfully lifted up some other's work, paragraph, text, data, results, etc., reported in the journals, books, magazines, reports, dissertations, thesis, etc., or available at web-sites and included them in this Ph.D. thesis and cited as my own work.

Date:

Place: IIT (BHU), Varanasi

(Sharad Verma)

CERTIFICATE FROM THE SUPERVISOR

This is to certify that the above statement made by the candidate is correct to the best of our knowledge.

Supervisor Signature

Dr. Abha Mishra

Signature of the Co-ordinator

School of Biochemical Engineering

IIT (BHU), Varanasi