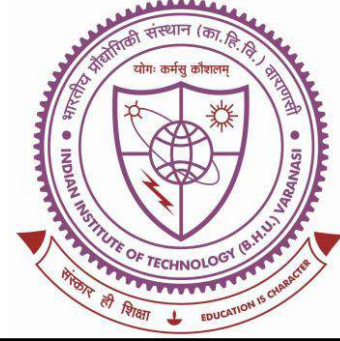


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DECLARATION BY THE CANDIDATE

I, **Satheeshkumar S.**, certify that the work embodied in this Ph.D. thesis is my own bona fide work and carried out by me under the supervision of **Prof. Sushil K. Singh** for a period of about **4 years 9 months** from **July, 2013** to **April, 2018** at the **Department of Pharmaceutical Engineering & Technology, 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 and given credit to the research workers wherever their works have been cited in my work in this thesis. I further declare that, I have not willfully copied any other's work, paragraphs, text, data, results, etc. reported in the journals, books, magazines, reports, dissertations, theses, etc., or available at websites and have not included them in this Ph.D. thesis and have not cited as my own work.

Date:

Place: IIT (BHU), Varanasi

Satheeshkumar S.

CERTIFICATE BY THE SUPERVISOR AND HEAD OF THE DEPARTMENT

It is certified that the above statement made by the student is correct to the best of our knowledge.

**Prof. Sushil K. Singh
(Supervisor)**

**Prof. Sushil K. Singh
(Head of the Department)**