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It is further certified that the student has fulfilled all the requirements of Comprehensive Examination, Candidacy and SOTA for the award of Ph.D. Degree.

**Prof. Sanjay Singh\***  
Supervisor

**Dr. Ashish Kumar Agrawal**  
Co-Supervisor

\* Presently, Vice Chancellor, Babasaheb Bhimrao Ambedkar University (a Central University), Lucknow, U.P., India

## DECLARATION BY THE CANDIDATE

I, **Krishna Kumar Patel**, certify that the work embodied in this thesis is my own bona fide work and carried out by me under the supervision of **Prof. Sanjay Singh** and co-supervision of **Dr. Ashish Kumar Agrawal** from **July, 2014 to September, 2019** at the *Department of Pharmaceutical Engineering and Technology*, Indian Institute of Technology (BHU), Varanasi. The matter embodied in this thesis has not been submitted for the award of any other degree/diploma. I declare that I have faithfully acknowledged and given credits 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 journals, books, magazines, reports dissertations, theses, *etc.*, or available at websites and have not included them in this thesis and have not cited as my own work.

Date:

Signature of the Student

Place:

**(Krishna Kumar Patel)**

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## CERTIFICATE BY THE SUPERVISOR(S)

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

**Prof. Sanjay Singh\***  
Supervisor

**Dr. Ashish Kumar Agrawal**  
Co-Supervisor

**Signature of Head of the Department**

\* Presently, Vice Chancellor, Babasaheb Bhimrao Ambedkar University (a Central University), Lucknow, U.P., India

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**Name of the Student:** Krishna Kumar Patel

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