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DECLARATION BY THE CANDIDATE

I, **Hitesh Kumar Dewangan**, certify that the work embodied in this Ph.D. thesis is my own bonafide work and carried out by me under the supervision of **Prof. Sanjay Singh** from **August, 2013 to June, 2018** at the **Department of Pharmaceutical Engineering & Technology**, Indian Institute of Technology (B.H.U.), 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 Ph.D. thesis and have not cited as my own work.

Date:

Place:

(Hitesh Kumar Dewangan)

CERTIFICATE FROM THE SUPERVISOR

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

**(Prof. Sanjay Singh)
Supervisor**

**(Prof. Sanjay Singh)
Head of the Department**