



# FACULTY OF PHARMACY

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Department of Science & Technology, TIFAC-CORE in New Drug Delivery Systems, DST, New Delhi  
Q.I.P. (Pharmacy) Center, AICTE.

Date: 20/5/16

## CERTIFICATE

This is to certify that thesis entitled "**Bioavailability Enhancement of Poorly Bioavailable Anti-viral Drugs Using Natural Bioenhancers**" submitted for the degree of Doctor of Philosophy in Pharmacy by Mr. Karan comprises the original research work carried out by him under my supervision and guidance and no part of this work has been previously submitted for any degree.

**Research Guide**

Dr. (Ms.) Rajashree C. Mashru  
Associate Professor  
Department of Pharmacy

**Head**

Department of Pharmacy

**Dean**

Faculty of Pharmacy  
The Maharaja Sayajirao University of Baroda  
Vadodara 390001, Gujarat, India

# DECLARATION

I, **Karan**, hereby declare that the thesis work entitled "**BIOAVAILABILITY ENHANCEMENT OF POORLY BIOAVAILABLE ANTI-VIRAL DRUGS USING NATURAL BIOENHANCERS**" which is submitted to The Maharaja Sayajirao University of Baroda, for the award for Doctor of Philosophy in Pharmacy comprises the project work carried out by me at Faculty of Pharmacy, The Maharaja Sayajirao University of Baroda under the supervision and guidance of Dr. (Ms.) Rajashree C. Mashru, Associate Professor, Faculty of Pharmacy, The Maharaja Sayajirao University of Baroda, Vadodara 390001, Gujarat, India.

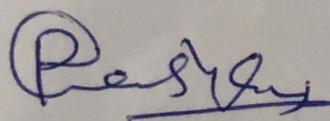
I further declare that the results of this work have not been previously submitted for any degree.

Date: 20/May/2016

Karan  
Karan

Place: Vadodara

Certified by and forwarded through the research guide,



**Dr. (Ms.) Rajashree C. Mashru**

**Associate Professor,**

**Faculty of Pharmacy,**

**The Maharaja Sayajirao University of Baroda**

**Vadodara 390001, Gujarat, India**



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Date:

## CERTIFICATE

This is to certify that the following enlisted publications (Two research papers, two review papers and one book chapter) belong to my Ph.D. student Mr. Karan who wishes to submit thesis entitled "**Bioavailability enhancement of poorly bioavailable anti-viral drugs using natural bioenhancers**" to The Maharaja Sayajirao University of Baroda, Vadodara for the award of Ph.D. in Pharmacy.

1. **Karan Mittal**, Chintan Vora, Riddhish Patadia, Rajashree Mashru, Myriad molecules to overcome efflux drug transporters and drug metabolizing enzymes: a journey from synthetic to natural. Critical Reviews™ in Therapeutic Drug Carrier Systems. 32 (5), 2015. (Review)
2. **Karan Mittal**, Arti Thakkar, Rajashree Mashru, Challenges in Oral Delivery: Role of P-Gp Efflux Pump, Current drug therapy, 9(1); 47-55. (Review)
3. **Karan Mittal**, Chintan Vora, Riddhish Patadia, Rajashree Mashru, A newfangled study using risk silhouette and uncertainty approximation for quantification of acyclovir in diverse formulation, Journal of Pharmaceutical Analysis, 5 (1), 58-69, 2014. (Research)
4. **Karan Mittal**, Chintan Vora, Riddhish Patadia, Rajashree Mashru, Risk outlining and uncertainty contour for quantification of acyclovir using LC-MS: solicitation to in-vitro cell lines studies. 10 (2) 2015. (Research)
5. **Karan Mittal**, Arti Thakkar, Rajashree Mashru, Novel and Nanostructured Drug Delivery Strategies for Enhancing Bioavailability of BCS Class III Drugs, Vol.4: Nanostructured Drug Delivery of the Series "Nanobiomedicine (Vol. 6)" (Book Chapter)

Research Supervisor

**Dr. (Ms.) Rajashree C. Mashru**  
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Vadodara 390001, Gujarat, India

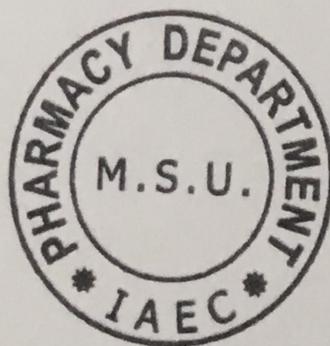
**Institutional Animal Ethics Committee**  
**Pharmacy Department**  
**(Reg. No. 404/01/a/CPCSEA)**  
**The Maharaja Sayajirao University of Baroda**  
**Vadodara**

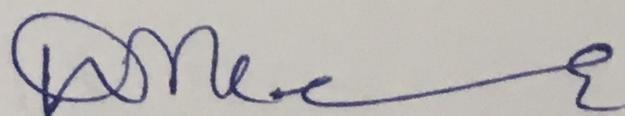


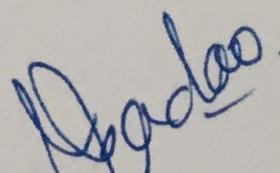
**CERTIFICATE**

This is to certify that the following project has been approved by the Institutional Animal Ethics Committee (IAEC), Pharmacy Department.

**Protocol No.** : MSU/IAEC/2014-15/1405  
**Project title** : Bioavailability enhancement of some poorly bioavailable anti-viral drugs using natural bio enhancers.  
**Chief Investigator** : Karan  
**Research Guide** : Dr. Rajashree C Mashru



  
**Dr. N.H. Kelawala** 22-11-14  
(CPCSEA Main Nominee)

  
**Prof. M.R. Yadav**  
(Chairman, IAEC)

Date of Approval: 22 / 11 / 2014