A Proposal for Physical Pharmaceutics II Lab

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I. Objectives of the Virtual Lab

- The Practical course of this lab is focused on perceiving the physicochemical phenomenon and characteristics of Pharmaceutical drugs and excipients, which may directly or indirectly effect the formulation of pharmaceutical dosage forms and systems.
- In these experiments the student needs to primarily work on identifying the physicochemical properties such as viscosity, size and distribution analysis of drug particles or additive agents (excipients).
- These parameters are critical in designing and modifying the appropriate pharmaceutical dosage forms like tablets, capsules, syrups, lotions, powders, Parenterals and many more

List of experiments

1. To determine the viscosity of liquid by using Ostwald's Viscometer.
2. To determine the viscosity of semisolids by using Brookfield's Viscometer.
3. To determine the Particle size and Particle size distribution by using sieving method.
4. To determine the Particle size and Particle size distribution by using Microscopic method.
5. To determine the Particle size and Particle size distribution by using Sedimentation method (Andresen Pipette).
6. To determine the Sedimentation volume with effect of different concentrations of single Suspending agent.
7. To perform the accelerated stability studies.
8. Bulk Density and Tapped Density determination of Pharmaceutical Powders
9. Angle of repose and effect of Glidants/ lubricants on flow property of Powders
10. True Density determination of Pharmaceutical Powders

II. Target group of users

- UG (1st Year/ 2nd Year) [highest priority for development]
- UG (3rd Year/ 4th Year) [next higher priority for development]

III. Mapping of proposed lab with AICTE courses as per attached list of potential labs

- Physical Pharmaceutics II – Practical, BP407

IV. Mapping of proposed lab with universities (minimum 3 universities)

- Jamia Hamdard University School of Pharmaceutical Education & Research, New Delhi; BP407P; B. Pharm
- Panjab University Chandigarh; BP407P; B. Pharm
- BITS Pilani; BP407P; B. Pharm
- Bombay College of Pharmacy Mumbai; BP407P; B. Pharm
- L. M. College of Pharmacy Ahmedabad; BP403P; B. Pharm
- IIT BHU; PH211; B. Tech:Pharmacy Course
- Institute of Chemical Technology Department of Pharmaceutical Sciences & Technology, Mumbai; PHP1103; B.Pharm
- Jamia Hamdard University School of Pharmaceutical Education & Research, New Delhi; BP407P;
- B.Pharm
- Manipal Academy of Higher Education, Manipal; PCE203L; B.Pharm

V. **Expected timelines**

Presentation of proposal to domain experts' committee – 31st March 2022
Demo of First 3 Expts and Review – 30th June 2022
Demo of 5-6 Expts and review – 31st August 2022
Demo of 7-10 Expts and review – 31st October 2022
Final demo of 7-10 Expts – 15th November 2022
Hosting of lab (7-10 Expts) – 30th November 2022

Note 1: The LDC will coordinate the reviews and hosting

Note 2: The lab is supposed to be developed and hosted within 6 - 9 months from the date of approval

VI. **Budget** (Max. Rs 2 Lakhs per experiment with a ceiling of Rs 20 Lakhs per Lab)

Table I. Budget for < Physical Pharmaceutics II Lab>

S. No.	Equipment/Activity	Budget # (In Rupees)
1	Laptop / Machine(computer/laptop)	2.70
2	Manpower(*project engineer/scientist*)	4.80
3	Consumables (various equipment like ADME-Tox Screening System, Amino Acid Analysis System / Amino Acid Analysis Instruments etc)	4.00
4	Contingency (characterizing powder flow, powder density measurement, calculate porosity of powders etc)	4.00
5	Honorarium for Lab Developer (Rs 20k per experiment; Ceiling of Rs 2 Lakhs per lab)	2.50
6	Miscellaneous	2.00
TOTAL		20 **Lakhs**

To be released based on the recommendation of the review committee
Note: Institute overheads not to be included in the budget

VII. **Justification of the budget requirements**

(a) Details of Laptop/Machine
A laptop/computer will be required for data-keeping.

(b) Details of Manpower (number, cost per man-months etc.)

i. Total man-months required
1 project staff

ii. No. of project staff, cost per man-months
1 project engineer/scientist (~Rs. 40k per month)

iii. Honoraria for other staff associated with the project
Honoraria for Faculty developing the Virtual Lab: (A maximum of Rs. 2 lakhs honorarium for the developers & Rs. 25k for reviews)
Honoraria for Other staff associated with the project
Rs. 25k honorarium for the associated staff

(c) Details of Consumables
Procurement of various equipment like ADME-Tox Screening System, Amino Acid Analysis System / Amino Acid Analysis Instruments etc

(d) Details of Miscellaneous cost

i. Internal Review (Optional, Rs 1000 per experiment)
ii. Field Trials - N.A.-
iii. Others - N.A.-

VIII. **Student Feedback and Learning**

- How will you collect feedback and use them?
    i. We will collect feedback through feedback (online/offline) form and workshops
    ii. There is also an associated email id for providing feedback
    iii. An expansion or additional explanation will be added if the need arises

- What is the actual learning component provided by the Virtual Lab?

    The learning component includes that student will study the analytical procedures for characterizing the properties of foods constituents and their interactions that affect the quality and stability of foods

- After the Virtual Lab experience, would the student be able to perform the experiment in the real lab?

    Yes, after the Virtual Lab experience, the student can perform the experiment in the real lab

ANNEXURE-I

Important information for the development of Virtual Labs

(A Virtual Lab consists of 7-10 experiments)

IX. **Link to some sample virtual labs**

https://python-iitk.vlabs.ac.in/ https://cs-iitd.vlabs.ac.in/ https://plchla-coep.vlabs.ac.in/

X. **Technology Used**

- We will use HTML, CSS and Java Script for front-end design (free and open source)
- For Back-end we will use JSON (Free and open-source Software)

XI. **Required Components for virtual experiments**

- Step by step procedure similar to a physical lab will be drafted for the virtual lab
- Online manual with aim/objective and underlying theory
- Pre-test for understanding current status of user
- Simulator for learning the concept of food technology
- Post-test questions to check the understanding of student after using virtual lab
- Related resources (web & NPTEL lectures)
- Additional help/feedback