RR COLLEGE OF PHARMACY

Chikkabanavara, Bangalore-560090
Accredited by NAAC with 'A' Grade

INTERNAL QUALITY ASSURANCE CELL (IQAC)

CHECKLIST FOR COURSE FILES

Academic Year: 2023-24

Subject: Molecular Pharmaceutics **Subject Code:** MPH201T

Sl. No	Contents	Present	Review remarks
1.	Student List	Yes	
2.	College Calendar of events	Yes	
3.	University Calendar of events	Yes	
4.	Time table		
	• Class Timetable	Yes	
	• Individual Timetable	Yes	
5.	Syllabus copy	Yes	
6.	Lesson Plan	Yes	
7.	Introduction of the subject	Yes	
	• Significance of the subject	Yes	
	• Programme outcome	Yes	
	• Programme specific outcome	Yes	
	• Course outcome	Yes	
8.	Proctor list	NA	
9.	Question Bank (Module wise)	Yes	
10.	Question Paper & Schemes		
	1st IA Test	Yes	
	2nd IA Test	Yes	
	(Add if 3rd Test)	Yes	
11.	Old Question Paper	Yes	
12.	Course Material (Class PowerPoint Presentations/Handouts/Worksheets)	Yes	
13.	Assignments, Quizzes, Class Tasks	Yes	
14.	IA marks		
	• 1st Test (In One Sheet)	Yes	
	• 2nd Test	Yes	
	• Final Marks	Yes	
15.	Attendance Sheet	Yes	
16.	Students Feedback	Yes	
17.	Previous semester result analysis	Yes	

Name of the Faculty
Dr H Abdul Thorol

Signature with Date

Name of the reviewer
Dr HINDUSTAN ABDUL AHAD

Signature with Date

RR COLLEGE OF PHARMACY

Chikkabanavara, Bengaluru-560090
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PRINCIPAL OFFICE

M.PHARM (PH. COLOGY)
I YEAR 2023-24(I & II SEM)

Sr.No	REG.NO	STUDENT NAME
1.	23PP001	ARAVINDA M S
2.	23PP002	BHOOMIKA B R
3.	23PP003	CHIDANANDA
4.	23PP004	KARTHIK M R
5.	23PP005	NANDINI N
6.	23PP006	PALLAVI R
7.	23PP007	POOJA GANESH
8.	23PP008	PRUTHVI PATIL
9.	23PP009	PULA GOWTHAMUNI
10.	23PP010	R POOJITHA
11.	23PP011	RAJA GANESAN
12.	23PP012	SAI DEEPIKA G N
13.	23PP013	SAURABH KUMAR
14.	23PP014	SPARSHA K
15.	23PP015	VEERESH

M.PHARM (PH.CEUTICS)
I YEAR 2023-24(I & II SEM)

Sr.No	REG.NO	NAME OF THE STUDENTS
1.	23PU001	APARNA P R
2.	23PU002	ARCHANA S L
3.	23PU003	BHARGAVI M S
4.	23PU004	G JYOTHEESH
5.	23PU005	GANUGAPENTA NIKHIL KUMAR
6.	23PU006	MANJUNATH R MANNAMMANAVAR
7.	23PU007	MOHANRAJA P R
8.	23PU008	POOJARLA VENKAT
9.	23PU009	PUSHPA M G
10.	23PU010	RAKESH S P
11.	23PU011	RASHMITHA R
12.	23PU012	SHRISHTI GANDHI
13.	23PU013	SHUBHAKARA M S
14.	23PU014	SIRIN NISHA
15.	23PU015	TARASHREE C

M.PHARM (PH.COGNOSY)
I YEAR 2023-24(I & II SEM)

Sr.No	REG.NO	NAME OF THE STUDENTS
1	23PG001	ARCHANA KUMARI
2	23PG002	BHAVANA G K

PRINCIPAL
R.R. College of Pharmacy
Chikkabanavara, Bangalore

2. Calendar of Events (College and University)

RR COLLEGE OF PHARMACY
Chikkabanavara, Bangalore-560090
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INTERNAL QUALITY ASSURANCE CELL (IQAC)

Part-2

College calendar of events for the academic year 2023 – 2024

(Tentative)

w.e.f 1st June 2024

For ALL the programs

(Even sem B.Pharm, Pharm.D and M.Pharm)

Month	Week No	Day and Date						Details
		Mon	Tue	Wed	Thu	Fri	Sat	
JUNE 2024	1						1	RGUHS-exams till this month end. BPharm and MPharm {regular} PharmD {supplementary}
	2	3	4	5	6	7	8	5th-Environment day , Tree plantation
	3	10	11	12	13	14	15	12th- Ethical clearance meeting-5th PharmD
	4	17-H	18	19	20	21	22	17TH – Bakrid 22nd- IQAC meeting
	5	24	25	26	27	28	29	24th-commencement of classes. PharmD 29th- Practice dept seminar/workshop/conf
JULY 2024	6	1	2	3	4	5	6	5th- Ceutics PG dept seminar/workshop/conf
	7	8	9	10	11	12	13	2nd week- Commencement of classes-BPharm 13th-- Ceutics PG dept seminar/workshop/conf 13th- Cology PG dept seminar/workshop/conf
	8	15	16	17-H	18	19	20	15th-18th Skill development program 17th-Muharram*
	9	22	23	24	25	26	27	22nd-26th -1st FDP 27th- Practice dept seminar/workshop/conf 27th- Ceutics dept seminar/workshop/conf
	10	29	30	31				29th- Certificate program on time management

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Chikkabanavara, Bangalore-560090
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INTERNAL QUALITY ASSURANCE CELL (IQAC)

								30th- Certificate program on stress management 31st- Entrepreneurship and employability skills certificate program
AUG. 2024	7				1	2	3	2nd- Cology dept seminar/workshop/conf
	8	5	6	7	8	9	10	5th-9th-2nd FDP 10th- Chemistry dept seminar/workshop/conf 10th-Cognosy dept seminar/workshop/conf
	9	12	13	14	15-H	16	17	15th -Independence day
	10	19	20	21	22	23	24	24th- Practice dept seminar/workshop/conf 24th-- Ceutics dept seminar/workshop/conf 24th- Cology dept seminar/workshop/conf
	11	26	27	28	29	30	31	27th-Cognosy dept seminar/workshop/conf 31st - Chemistry dept seminar/workshop/conf
SEP. 2024	12	2	3	4	5	6	7	2nd-6th-1st sessional exams-BPharm, MPharm and 2nd sessional for PharmD 7th- Ganesha Chaturthi
	13	9	10	11	12	13	14	9th-11th-SDP 14th-1st PTM
	14	16-H	17	18	19	20	21	16th-Eid e Milad
	15	23	24	25	26	27	28	28th-Cognosy dept seminar/workshop/conf
	16	30						30th – Bpharm Project model presentation
OCT. 2024	17		1	2H	3	4	5	2nd-Gandhi Jayanthi / Mahalaya Amavasye
	18	7	8	9	10	11-H	12-H	11th – Mahanavami, Ayudha Pooja 12th – Vijaya Dashami
	19	14	15	16	17-H	18	19	17th – Maharishi Valmiki Jayanthi 18th - MPharm-model project presentation
	20	21	22	23	24	25	26	21st-2nd sessional exams- -BPharm, MPharm and 3rd sessional for PharmD
	21	28	29	30	31			28th-29th MPharm-model project presentation
NOV.	22					1-H	2-H	1st- Kannada Rajyothsava 2nd- Balipadyami

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INTERNAL QUALITY ASSURANCE CELL (IQAC)

2024	23	4	5	6	7	8	9	4th-2nd PTM
	24	11	12	13	14	15	16	
	25	18-H	19	20	21	22	23	18th – Kanakadasa Jayanthi
	26	25	26	27	28	29	30	Academic end RGUHS university exams
DEC. 2024	27	2	3	4	5	6	7	RGUHS university exams-ALL programs
	28	9	10	11	12	13	14	RGUHS university exams-ALL programs
	29	16	17	18	19	20	21	RGUHS university exams-ALL programs
	30	23	24	25-H	26	27	28	Christmas
	31	30	31					
Total No. of Working days : Days 102								

Signature of the IQAC Co-ordinator

R.R College of Pharmacy IQAC Bangalore

Signature of The Principal

PRINCIPAL
R.R. College of Pharmacy
Chikkabanavara, Bangalore

ರಾಜೀವ್ ಗಾಂಧಿ ಆರೋಗ್ಯ ವಿಜ್ಞಾನಗಳ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಕರ್ನಾಟಕ,
4ನೇ ಟಿ ಬ್ಲಾಕ್, ಜಯನಗರ, ಬೆಂಗಳೂರು – 560 041
Rajiv Gandhi University of Health Sciences, Karnataka
4th 'T' Block, Javanagar, Bangalore – 560 041

Ref No: RGUHS/AC2-ADM/COE/2023-2024

Date:09.10.2023

NOTIFICATION

Sub: Calendar of Events for Admission for Academic Year 2023-24

Calendar of Events for admission to 2nd Year B.Pharm Course (Lateral Entry), M.Pharm & Pharm D (Post Baccalaureate) Courses for the academic year 2023-24 is hereby notified as follows.

Sl. No.	DESCRIPTION OF EVENTS	SCHEDULE
1.	Tentative last date of admission subject to last date of seat allotment by KEA and a) Online uploading of admission Statements on RGUHS website www.rguhs.ac.in. along with the latest students clear colour photos. b) email the list of students admitted to registrar@rguhs.ac.in and **vc@rguhs.ac.in**	**15.01.2024**
2.	Commencement of academic session	**18.12.2023**
3.	Online payment of admission fees payable to the university **in full** (partial payments is NOT allowed)	**20.01.2024**
4.	Getting admission register certified by the registrar or his designated Official of the university and producing the proof of having remitted the prescribed fee **in full** to the university (attested photocopies of the same to be left with university).	**22.01.2024**
5.	Last date for submission of Online entered printed admission statement with originals of the required documents including eligibility certificate (wherever applicable)	**22.01.2024**
6.	College wise verification documents for Admission approval	**February-2024**
7.	Last date of Submission of deficient documents as pointed out during verification	**15 days from the verification date**
8.	Tentative last date for hosting Admission approval statement in the university website www.rguhs.ac.in	**20 days from the date of verification**
9.	Tentative last date for posting the hard copy of Admission approval statement to the Principal of the concerned institute.	**March-2024**
10	a. Tentative date of examination - M.Pharm (**1st Semester**) b. Tentative date of examination - Lateral Entry (**B.Pharm 3rd Semester**)	**April/May-2024**
11	Tentative date of examination - Pharm D (PB) Course	**September/October-2024**

REGISTRAR

Note: Online entry for Lateral entry for (2nd B.Pharm) admissions limit as per RGUHS notification and Notification issued vide ref no. RGU / Auth / 168th Syndicate / 151/ 2021-22 dated: 05.05.2022.

Ref No: RGUHS/AC2-ADM/COE/2023-2024 Date: 07.10.2023

(for Post Graduate Degree courses)		
12	Submission of Synopsis to RGUHS	01.08.2024
13	Submission of Dissertation to RGUHS	01.10.2025
14	Submission of Dissertation to RGUHS	
	With fine of Rs. 1,500/ -per candidate	15.10.2025
	With fine of Rs. 4,000/- per candidate	30.10.2025

Note:

1. The admitting college should have been notified as affiliated to the University with permission to admit students for the concerned course for the year **2022-23** before the last date of admission.
2. Request for correction of name in the online admission statement will not be entertained. Entry of names in the online admission statement, by itself does not vest the right of admission approval. Number and the name of students uploaded in the online admission statement and email must match with each other and shall not exceed the number of sanctioned intake. Any excess admissions beyond the approved intake will be rejected.
3. If any of the above dates in Calendar of events happens to be holiday, the following Working day shall be taken into consideration **except for payment of fee and fine which is available through online payment.**
4. Admission Register shall contain the date, amount and number of the receipt corresponding to the name of the student with the signature of the student. Admission of those Students who have not paid the admission fees in full will not be approved.
5. If any student's, name's could not be uploaded in the online portal on or before last date due to any technical or whatever reasons the same can be intimated till midnight (11.59 PM) on the last date to RGUHS by sending email to Registrar /Hon'ble Vice Chancellor. The name of students in bold letters mentioning the reason for considering their admissions, **any request for admission shall not be considered after the last date.**
6. Date of verification of documents for admission approval will be intimated to the college by the university. The Principal and the concerned officials of the college must be present on the specified date and time without fail with any other document that they may wish to submit, University will go ahead with verification of documents pertaining to their college even in their absence.
7. No Correspondence regarding deficient documents except during verification. Principal is expected to keep track of the deficiencies and fulfill them well before the last date prescribed without any prompting.
8. Principal of the institutions should download admission approval of students and display the same in the college notice board and website and discharge all disapproved students immediately. The University shall not entertain any further correspondence from anybody regarding disapproved students.
9. Exact dates of commencement of Theory & Practical examinations and date of declaration of results will be notified by the Registrar (Evaluation) separately.
10. **Submission of Eligibility Certificates is mandatory of all the candidates i.e Foreign / NRI / Non Karnataka admitted for the academic year 2022-23 along with their other original documents.**

REGISTRAR

To,

ALL CONCERNED THROUGH www.rguhs.ac.in .

1. Secretary to Governor, Raj Bhavan, Bangalore 560 001.
2. Secretary to Medical Education, Dept, of H & FW, Govt, of Karnataka, Vikasa Soudha, Bangalore 560 001.
3. Director of Medical Education, Ananda Rao Circle, Bangalore 560 009.
4. The Principal of all Pharmacy Colleges affiliated to RGUHS, Bangalore
5. All officers of the University / All Sections in the University / AR's Regional Centers.
6. PA to Vice - Chancellor , Registrar, Registrar (Eva) , and Finance Officer, RGUHS, Bangalore
7. The System Analyst. RGUHS to host on the official Website.

TIME TABLE-2023-24

II-SEM M Pharm (W.E.F. 31st July 2024)

Day/Time	9:30-10:30	10:30-11:30	11:30-12:30		1:15-2:15	2:15-3:15	3:15-4:15	4:15-5:15
Monday	CADDS - MLG	ABPK - SPM	Cosmetics & cosmeceuticals - KSS		ABPK - SPM	Journal Club/Assignment	CADDS - MLG	Cosmetics & cosmeceuticals -KSS
Tuesday	Molecular Pharmaceutics - HAA	LH	Molecular Pharmaceutics - HAA		CADDS - MLG	CADDS - MLG	ABPK - SPM	Cosmetics & cosmeceuticals -KSS
Wednesday	CADDS - MLG	ABPK - SPM	Cosmetics & cosmeceuticals - KSS		Molecular Pharmaceutics - HAA	CADDS - MLG	ABPK - SPM	Molecular Pharmaceutics - HAA
Thursday	Molecular Pharmaceutics - HAA	Molecular Pharmaceutics - HAA	Molecular Pharmaceutics- Practical (HAA)		Molecular Pharmaceutics- Practical (HAA)			CADDS - MLG
Friday	ABPK - SPM	Pharmaceutics-II-Practical - SPM			Pharmaceutics-II-Practical - SPM			Cosmetics & cosmeceuticals -KSS
Saturday	Molecular Pharmaceutics - HAA	Cosmetics & cosmeceuticals -KSS	CADDS - MLG		ABPK - SPM	Seminar	Seminar	LH

Lunch break

HAA - Hindustan Abdul Ahad; KSS – Dr. K S Srilatha ; MLG - Mahalingan K; SPM - Sujatha P Muchalambe

Head
Dept of Pharmaceutics
R.R College of Pharmacy
Chikkabanavara, Bengaluru -90

PRINCIPAL
R.R. College of Pharmacy
Chikkabanavara, Bangalore

R R INSTITUTIONS
CHIKKABANAVARA
BANGALORE -560090
INDIVIDUAL Time -Table

Department	Pharmaceutics	Semester/Year	1st sem M Pharm
Academic Year	2023-24	Room No.	
Faculty name	Dr. Hindustan Abdul Ahad		

Period ⟹ / Day ⬇	I	II		III	IV	1.15 - 1.55	V	VI	VII
	9.25-10.20	10.20-11.15	11.15-11.25	11.25-12.20	12.20-01.15		1.55 – 2.50	2.50 - 3.45	3.45-4.40
Monday			BREAK			LUNCH BREAK			
Tuesday	Molecular Pharmaceutics								
Wednesday					Molecular Pharmaceutics		Molecular Pharmaceutics		
Thursday	Molecular Pharmaceutics	Molecular Pharmaceutics		Molecular Pharmaceutics			Molecular Pharmaceutics Practical		
Friday									
Saturday	Molecular Pharmaceutics								

ALLOTMENT OF SUBJECT:

Subject code	Subject	Subject Initials	Teaching Workload	SIGN
MPH204T	Cosmetics and Cosmeceuticals	CC	60 Hrs	

Additional Workload

1	HOD-Pharmaceutics			
2	Projects guiding (B.Pham, M. Pharm and PhD)			
3	Class teacher (1st sem)			
4	In charge-workshop/seminars			
5	In charge- NIRF work			
6	Practice school			
7	Journal club			
8	Seminars/Assignment			

Signature of Time Table Coordinator | Signature of HOD | Principal

Dept of Pharmaceutics
R.R.College of Pharmacy
Chikkabanavara, Bengaluru-560

PRINCIPAL
R.R. College of Pharmacy
Chikkabanavara, Bangalore

MOLECULAR PHARMACEUTICS (NANO TECHNOLOGY & TARGETED DDS) (NTDS)(MPH201T)

Scope

This course is designed to impart knowledge on the area of advances in novel drug delivery systems.

Objectives

Upon completion of the course student shall be able to understand
The various approaches for development of novel drug delivery systems.
The criteria for selection of drugs and polymers for the development of NTDS The formulation and evaluation of novel drug delivery systems.

THEORY
60 Hrs

12 hrs

1. **Targeted Drug Delivery Systems: C**oncepts, Events and biological process involved in drug targeting. Tumor targeting and Brain specific delivery.

12hrs

2. **Targeting Methods**: introduction preparation and evaluation. Nano Particles & Liposomes: Types, preparation and evaluation

12hrs

3. **Micro Capsules / Micro Spheres:** Types, preparation and evaluation , Monoclonal Antibodies ; preparation and application, preparation and application of Niosomes, Aquasomes, Phytosomes, Electrosomes.

12hrs

4. **Pulmonary Drug Delivery Systems** : Aerosols, propellents, ContainersTypes, preparation and evaluation, Intra Nasal Route Delivery systems; Types, preparation and evaluation

12hrs

5. **Veterinary Drug Delivery Systems:** Tablets and bolus, Feed additives, Drinking water medication, Oral paste and gels, Drenchers and Tubing product

REFERENCES:

1. Y W. Chien, Novel Drug Delivery Systems, 2nd edition, revised and expanded,Marcel

Dekker, Inc., New York, 1992.
2. S.P.Vyas and R.K.Khar, Controlled Drug Delivery - concepts and advances, VallabhPrakashan, New Delhi, First edition 2002.
3. N.K. Jain, Controlled and Novel Drug Delivery, CBS Publishers & Distributors, NewDelhi, First edition 1997 (reprint in 2001).

Journals

1. Indian Journal of Pharmaceutical Sciences (IPA)
2. Indian drugs (IDMA)
3. Journal of controlled release (Elsevier Sciences) desirable
4. Drug Development and Industrial Pharmacy (Marcel & Decker) desirable

ADVANCED BIOPHARMACEUTICS & PHARMACOKINETICS (MPH202T)

Scope

This course is designed to impart knowledge and skills necessary for dose calculations, dose adjustments and to apply biopharmaceutics theories in practical problem solving. Basic theoretical discussions of the principles of biopharmaceutics and pharmacokinetics are provided to help the students' to clarify the concepts.

Objectives

At completion of this course it is expected that students will be able understand –

The basic concepts in biopharmaceutics and pharmacokinetics.

The use raw data and derive the pharmacokinetic models and parameters the best describe the process of drug absorption, distribution, metabolism and elimination.

The critical evaluation of biopharmaceutic studies involving drug product equivalency.

The design and evaluate dosage regimens of the drugs using pharmacokinetic and biopharmaceutic parameters.

The potential clinical pharmacokinetic problems and apply basic pharmacokinetic The principles to solve them

THEORY **60 Hrs 12hrs**

1. **Drug Absorption From The Gastrointestinal Tract**: Gastrointestinal tract, Mechanism of drug absorption, Factors affecting passive drug absorption, pH–partition theory of drug absorption. Factors affecting drug absorption: physicochemical factors:Dissolution rate, Dissolution process, Noyes–Whitney equation and drug dissolution, Factors affecting the dissolution rate. Gastrointestinal absorption: role of the dosage form: Solution (elixir, syrup and solution) as a dosage form ,Suspension as a dosage form, Capsule as a dosage form, Tablet as a dosage form ,Dissolution methods ,Formulation and processing factors, Correlation of in vivo data with in vitro dissolution data.Transport model:

P.K.M Educational Trust (R)
R.R. COLLEGE OF PHARMACY
Chikkabanavara, Bengaluru-560090
Affiliated to Rajiv Gandhi University of Health Sciences Bangalore, and recognised by PCI, NAAC 'A'

Lesson Plan

College Name: RR College of Pharmacy	Academic year :2023-2024
Programme : M.Pharm.	Semester or Year : II
Subject Name :Molecular Pharmaceutics	Subject Code: MPH201T
Total contact hours: 60	IA Marks: 35
Faculty Name : Prof. Hindustan Abdul Ahad	Reviewed by :

Significance of the Subject:
This course is designed to impart knowledge on the area of advances in novel drug delivery systems.
PROGRAM OUTCOMES (POS) 1. Pharmacy Knowledge 2. Planning Abilities 3. Problem analysis 4. Modern tool usage 5. Leadership skills 6. Professional Identity 7. Pharmaceutical Ethics 8. Communication 9. The Pharmacist and society 10. Environment and sustainability 11. Life-long learning
Programme Specific outcomes(PSOs)
PSO1: Know the various approaches for development of novel drug delivery systems.
PSO2: Know the criteria for selection of drugs and polymers for the development of NTDS.
PSO3: Know the formulation and evaluation of novel drug delivery systems
Course Outcomes
CO 1: Understand the various approaches for the development of targeted drug delivery systems.
CO 2: Explain the types of targeting methods of nanoparticles and liposomes.
CO 3: Understand the various approaches for development and evaluation of Microcapsules/ microspheres, Monoclonal Antibodies, Niosomes, Aquasomes, Phytosomes, Electrosomes
CO 4: Explain approaches for the development and evaluation of pulmonary drug delivery systems.
CO 5: Access the various approaches for development of veterinary drug delivery systems.

RR College of Pharmacy:: Lesson Plan 2023-24

Class: M. Pharm (Pharmaceutics) Sub: Molecular Pharmaceutics Faculty: Dr. Hindustan Abdul Ahad

Class No	Unit No. and Hours	Topic to be covered	Date		Status/ Remarks
			Planned	Time	
1	Unit-I (12h)	Targeted Drug Delivery Systems : Introduction	23/7/24	9.30-10.30	
2		Concepts of TDDS	23/7/24	10.30-11.30	
3		Events of TDDS	24/7/24	1.15-2.15	
4		Biological process involved in drug targeting.	25/7/24	4.15-5.15	
5		Biological processes and applications	30/7/24	9.30-10.30	
6		Tumor targeting	30/7/24	11.30-12.30	
7		Tumor targeting methods.	31/7/24	1.15-2.15	
8		Explanation of tumor targeting methods.	31/7/24	4.15-5.15	
9		Brain specific delivery.	1/8/24	9.30-10.30	
10		Brain specific delivery.	1/8/24	10.30-11.30	
11		Brain specific delivery.	6/8/24	9.30-10.30	
12		Applications	6/8/24	11.30-12.30	
13	Unit-II (12h)	Targeting Methods Introduction	7/8/24	1.15-2.15	
14		Nano Particles: Introduction	7/8/24	4.15-5.15	
15		Preparation of Nano Particles	8/8/24	9.30-10.30	
16		Preparation of Nano Particles	8/8/24	10.30-11.30	
17		Preparation of Nano Particles	10/8/24	9.30-10.30	
18		Evaluation of Nano Particles	13/8/24	9.30-10.30	
19		Evaluation of Nano Particles	13/8/24	11.30-12.30	
20		Liposomes - types	14/8/24	1.15-2.15	
21		Preparation of liposomes	14/8/24	4.15-5.15	
22		Preparation of liposomes	20/8/24	9.30-10.30	
23		Evaluation of liposomes	20/8/24	11.30-12.30	
24		Evaluation of liposomes	21/8/24	1.15-2.15	
25	Unit-III (12h)	Microspheres- Introduction, Concept	21/8/24	4.15-5.15	
26		Types and Preparation	22/8/24	9.30-10.30	
27		Evaluation	22/8/24	10.30-11.30	
28		Monoclonal Antibodies preparation	24/8/24	9.30-10.30	
29		Monoclonal Antibodies application	27/8/24	9.30-10.30	
30		Preparation of Niosomes,	27/8/24	11.30-12.30	
31		Application of Niosomes	28/8/24	1.15-2.15	
32		Preparation of Aquasomes.	28/8/24	4.15-5.15	
33		Application of Aquasomes.	29/8/24	9.30-10.30	
34		Preparation of Phytosomes.	29/8/24	10.30-11.30	
35		Application of Phytosomes.	3/9/24	9.30-10.30	
36		Preparation and application of Electrosomes.	3/9/24	11.30-12.30	
37	Unit-IV (12h)	Pulmonary DDS : Introduction	4/9/24	1.15-2.15	
38		Aerosols	4/9/24	4.15-5.15	
39		Types	5/9/24	9.30-10.30	
40		Materials for aerosol	5/9/24	10.30-11.30	
41		Propellants	10/9/24	9.30-10.30	
42		Various types Propellants	10/9/24	11.30-12.30	
43		Containers Types	11/9/24	1.15-2.15	
44		Preparation	11/9/24	4.15-5.15	
45		Evaluation	12/9/24	9.30-10.30	
46		Intra Nasal Delivery systems: Preparation	12/9/24	10.30-11.30	
47		Intra Nasal Delivery systems: Preparation	14/9/24	9.30-10.30	
48		Evaluation	17/9/24	9.30-10.30	
49	Unit-V (12h)	Veterinary DDS: Introduction	17/9/24	11.30-12.30	
50		Tablets	18/9/24	1.15-2.15	
51		Bolus	18/9/24	4.15-5.15	
52		Feed Additives	19/9/24	9.30-10.30	
53		Drinking water medication	19/9/24	10.30-11.30	
54		Oral paste	24/9/24	9.30-10.30	
55		Drenchers	24/9/24	11.30-12.30	
56		Tubing product	25/9/24	1.15-2.15	
57		Revision	25/9/24	4.15-5.15	
58		Revision/Old QP	26/9/24	9.30-10.30	
59		Revision/Old QP	26/9/24	10.30-11.30	
60		Revision/Old QP	28/9/24	9.30-10.30	

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Bloom's Taxonomy Level	
L1-Remembering L2-Understanding L3-Applying L4-Analysing L5-Evaluating L6-Creating	
Text Books:	
1	Y W. Chien, Novel Drug Delivery Systems, 2nd edition, revised and expanded, Marcel Dekker, Inc., New York, 1992.
2	S.P.Vyas and R.K.Khar, Controlled Drug Delivery - concepts and advances, VallabhPrakashan, New Delhi, First edition 2002.
3	3. N.K. Jain, Controlled and Novel Drug Delivery, CBS Publishers & Distributors, NewDelhi, First edition 1997 (reprint in 2001).
Journals:	
1	Indian Journal of Pharmaceutical Sciences (IPA)
2	Indian drugs (IDMA)
3	Journal of controlled release (Elsevier Sciences) desirable 4. Drug Development and Industrial Pharmacy (Marcel & Decker) desirable
Reference Books:	
1	Y W. Chien, Novel Drug Delivery Systems, 2nd edition, revised and expanded, Marcel Dekker, Inc., New York, 1992.
2	S.P.Vyas and R.K.Khar, Controlled Drug Delivery - concepts and advances, Vallabh Prakashan, New Delhi, First edition 2002.
3	N.K. Jain, Controlled and Novel Drug Delivery, CBS Publishers & Distributors, NewDelhi, First edition 1997 (reprint in 2001).

Self-Study topics (not included in syllabus)			
Sl.No.	**Self-Study topics**	**Suggested reference**	**Cos**
1	Micro Spheres	Y W. Chien, Novel Drug Delivery Systems, 2nd edition, revised and expanded, Marcel Dekker, Inc., New York	Co1
2	Aerosols	N.K. Jain, Controlled and Novel Drug Delivery, CBS Publishers & Distributors, NewDelhi, First edition 1997 (reprint in 2001).	Co3
3	Veterinary Tablets	S.P.Vyas and R.K.Khar, Controlled Drug Delivery - concepts and advances, Vallabh Prakashan, New Delhi, First edition 2002.	Co5

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	✓										✓	✓	✓	✓	✓
CO2	✓										✓	✓	✓	✓	✓
CO3	✓										✓	✓	✓	✓	✓
CO4	✓										✓	✓	✓	✓	✓
CO5	✓										✓	✓	✓	✓	✓

Curricula Gap Analysis

Sl.No.	Curricula Gap	Action taken	Date-Month-Year	Resource Person with designation	% of students present	Relevance to POs, PSOs
1	Industrial visit Vs. Industrial application	Conducted Guest lecture / Industrial Expert.	28th Sep 2024	Dr. KUSR Teja Microlabs Bagalur	100%	PSO1 & PSO-2

Signature of Faculty	Signature of HOD

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RR COLLEGE OF PHARMACY

Chikkabanavara, Bengaluru-560090
Accredited by "NAAC" with Grade "A"

INTERNAL QUALITY ASSURANCE CELL (IQAC)

PROCTOR COMMITTEE

NAME OF THE PROCTOR: DR. HINDUSTAN ABDUL AHAD

I. SEM M. PHARM 2023-24

DEPT. OF PHARMACEUTICS

Sl. no	Reg. no	Name of the student	Phone. No.	Signature
1.	23PU001	APARNA P R	7034596765	
2.	23PU002	ARCHANA S L	8296028945	
3.	23PU003	BHARGAVI M S	9986407518	
4.	23PU004	G JYOTHEESH	7729877210	
5.	23PU005	GANUGAPENTA NIKHIL KUMAR	9391036521	
6.	23PU006	MANJUNATH R MANNAMMANAVAR	8095420105	
7.	23PU007	MOHANRAJA P R	8884141250	
8.	23PU008	POOJARLA VENKAT	8202720658	
9.	23PU009	PUSHPA M G	6361190300	
10.	23PU010	RAKESH S P	9591066176	
11.	23PU011	RASHMITHA R	9148306686	
12.	23PU012	SHRISHTI GANDHI	7470488845	
13.	23PU013	SHUBHAKARA M S	8861448852	
14.	23PU014	SIRIN NISHA	7602608668	
15.	23PU015	TARASHREE C	8088226930	

PRINCIPAL
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Chikkabanavara, Bangalore

M. Pharm II Sem (Pharmaceutics)
Molecular Pharmaceutics
Question bank

1. Define Targeted Drug Delivery Systems (TDDS). Why are they significant in modern drug delivery?
2. Explain the biological processes involved in drug targeting.
3. What are the key events that occur in the process of drug targeting?
4. Discuss the mechanisms involved in tumor targeting for drug delivery.
5. What strategies are used for brain-specific drug delivery systems?
6. What are the advantages and limitations of drug targeting to the brain?
7. How does the tumor microenvironment affect targeted drug delivery?
8. Explain the concept of "active" and "passive" targeting. Give examples of both.
9. What are the main methods used in drug targeting?
10. Describe the preparation techniques for targeted drug delivery systems.
11. What are the key evaluation parameters for assessing the efficiency of drug-targeting systems?
12. Explain how nanoparticles can be used for targeted drug delivery.
13. How do targeting ligands improve the specificity of drug delivery systems?
14. Discuss the preparation and evaluation of liposomes in drug delivery.
15. What are the key challenges in targeting drugs to specific tissues or cells?
16. How is the stability of drug-targeting systems evaluated?
17. Define nanoparticles and explain their role in drug delivery.
18. Discuss the different types of nanoparticles used for drug delivery.
19. What are liposomes, and why are they significant in drug delivery systems?
20. Explain the types of liposomes used in pharmaceutical applications.
21. Describe the methods for preparing liposomes.
22. Discuss the methods used to evaluate the drug release from liposomal formulations.
23. What are the advantages of using nanoparticles in drug delivery compared to conventional drug formulations?
24. Describe the size, surface charge, and material properties of nanoparticles that affect their drug delivery potential.
25. What are the challenges associated with the use of liposomes in drug delivery?
26. How are the drug loading efficiency and release profiles of nanoparticles evaluated?
27. Microcapsules and Microspheres
28. What are microcapsules and microspheres, and how do they differ?
29. Discuss the types of microcapsules and microspheres used in drug delivery.
30. Explain the preparation techniques for microcapsules and microspheres.
31. What are the key evaluation parameters for microcapsules and microspheres?
32. What are the applications of monoclonal antibodies in drug delivery?
33. How are monoclonal antibodies prepared, and what are their advantages in targeting specific diseases?
34. Describe the preparation and application of niosomes in drug delivery.
35. What are aquasomes, and how are they used in drug delivery systems?
36. Explain the preparation and applications of phytosomes in drug delivery.
37. What are electrosomes, and how are they used in pharmaceutical formulations?
38. Pulmonary Drug Delivery Systems
39. Explain the principle behind pulmonary drug delivery.
40. What are the advantages of using the pulmonary route for drug administration?
41. What are the types of containers used in aerosol-based drug delivery systems?
42. Discuss the role of propellants in aerosol formulations for pulmonary drug delivery.
43. What are the preparation methods for aerosol formulations used in pulmonary drug delivery?
44. How are the aerosol particle size and drug release profile evaluated?
45. Explain the different types of intranasal drug delivery systems and their preparation methods.
46. What are the key factors that affect the efficacy of intranasal drug delivery systems?
47. What is gene therapy? Differentiate between ex-vivo and in-vivo gene therapy.
48. What are the potential target diseases for gene therapy?
49. Explain the two main types of gene expression systems used in gene therapy.
50. Describe the role of viral and non-viral gene transfer methods in gene therapy.
51. How are liposomal formulations used in gene delivery systems?
52. Discuss the challenges in the clinical application of gene therapy. How do viral vectors compare to non-viral methods in gene transfer?

RR College of Pharmacy, Chikkabanavara, Bengaluru-90
II. Sessional Exam (theory) October -2024:: Year: II Sem M. Pharm (Pharmaceutics)
Sub: Molecular Pharmaceutics (Nano Tech & Targeted DDS)

Date: 3rd Oct 2024 **Max. Marks: 30M**
Day: Monday **Duration: 1h: 30M**

The answer to be specific to the question asked, draw a neat label wherever necessary

Q.No	Question	Mapping
Answer ALL of the following		5X6=30 M
1	Discuss the formulation and application of any one intranasal drug delivery system.	CO-4
2	Explain different types of containers that are used in the packaging of Aerosols. Write a note on propellants.	CO-3
3	Write the preparation and application of monoclonal Antibodies and evaluation.	CO-4
4	Describe feed additives, drenchers, and tubing products used to deliver drugs to animals. Tablets and bolus?	CO-4
5	Explain in detail all parameters that have to be considered in the formulation of Aerosols	CO-3

RR College of Pharmacy, Chikkabanavara, Bengaluru-90
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RR College of Pharmacy, Chikkabanavara, Bengaluru-90
I. Sessional Exam (theory) August-2024
Year: II Sem M. Pharm (Pharmaceutics)
Sub: Molecular Pharmaceutics (Nano Tech & Targeted DDS)

Date: 26th Aug 2024 — Max. Marks: 30M
Day: Monday — Duration: 1h: 30M

The answer to be specific to the question asked, draw a neat label wherever necessary

Q.No	Question	Mapping
Answer ALL of the following		5X6=30M
1	Discuss the concepts and events involved in the biological processes involved in the drug targeting	CO-4
2	Explain the evaluation of Liposomes	CO-3
3	Write the technique of preparing aquasomes	CO-4
4	Describe various techniques in brian targeted of drugs	CO-4
5	Explain any 2 methods of preparing phytosomes	CO-3

RR College of Pharmacy, Chikkabanavara, Bengaluru-90
I. Sessional Exam (theory) August-2024
Year: II Sem M. Pharm (Pharmaceutics)
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RR College of Pharmacy, Chikkabanavara, Bengaluru-90
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Dr. M.G.R. Medical University of Health Sciences, Karnataka
Second Semester M. Pharm Degree Examination - 30-May-2023

Time: Three Hours | Max. Marks: 75 Marks

MOLECULAR PHARMACEUTICS (NANO TECH AND TARGETED DDS)

Q.P. CODE: 5169

Your answers should be specific to the questions asked.
Draw neat, labeled diagrams wherever necessary.

Answer All The Questions | 10 X 7.5 = 75 Marks

1. Describe the concept and biological process involved in drug targeting.
2. Describe any one techniques employed for the formulation of microspheres. What are the merits and demerits of microspheres?
3. Define 'aerosols'. Describe in detail the manufacturing of aerosols.
4. Differentiate between noisome and liposomes. Describe the preparation of niosomes.
5. Add a note on Drenchers, tubing product tablets and bolus for veterinary usage.
6. Explain the of metered dose inhalers with its advantages by giving examples.
7. Explain in brief the method of preparation and applications of Solid lipid nanoparticles.
8. Explain the hybridoma technique of producing monoclonal antibodies with its applications.
9. Explain any two methods of preparation of liposomes.
10. Write a note any one approache for tumor and brain targeting.

* * * * *

Rajiv Gandhi University of Health Sciences, Karnataka

Second Semester M. Pharm Degree Examination - 02-Nov-2023

Max. Marks: 75 Marks

me: Three Hours

MOLECULAR PHARMACEUTICS (NANO TECH AND TARGETED DDS)

Q.P. CODE: 5169

Your answers should be specific to the questions asked.
Draw neat, labeled diagrams wherever necessary.

10 X 7.5 = 75 Marks

swer All The Questions

. Describe the "Blood brain barrier". Explain how drugs can be targeted to the brain?

. Define "Liposomes". Classify them. Explain any one method of their preparation in detail.

. Explain in detail all the parameters that have to be considered in the formulation of aerosols.

. Define nanoparticles. Explain the evaluation parameters for drug loaded nanoparticles.

. Explain in detail coacervation and phase separation technique for the preparation of microparticles. Write the applications of microparticles.

. Describe the preparation and applications of phytosomes.

. Discuss different targeting techniques with reference to levels of targeting.

. Describe production of monoclonal antibodies with the help of a neat flow chart.

. Describe feed additives drenchers and tubing products used for delivering drugs to animals.

). Explain different types of containers that are used in the packaging of aerosols. Write a note on propellants.

* * * * *

Dr. M.G.R. Medical University, Karnataka

Second Semester M. Pharm Degree Examination - 16-Nov-2022

Time: Three Hours **Max. Marks: 75 Marks**

MOLECULAR PHARMACEUTICS (NANO TECH AND TARGETED DDS)

Q.P. CODE: 5169

Your answers should be specific to the questions asked.
Draw neat, labeled diagrams wherever necessary.

Answer All The Questions **10 x 7.5 = 75 Marks**

1. Discuss the concepts and biological process involved in drug targeting.
2. Define nanoparticles. Explain their preparation and applications.
3. Discuss the materials, methods of preparation and any three applications of microspheres for drug delivery.
4. Describe the formulation of any two types of aerosol drug delivery systems with its advantages.
5. Write a note on any two tumor targeting.
6. Describe tablets boluses and Drenchers as veterinary formulations.
7. Discuss various methods of drug targeting to brain. Explain any one method.
8. Define phytosomes. Write their advantages and preparations.
9. Write the preparations and applications of monoclonal antibodies.
10. Discuss formulation and applications of any one intranasal drug delivery system.

* * * * *

Rajiv Gandhi University of Health Sciences, Karnataka

Second Semester M. Pharm Degree Examination - 11-Nov-2021

ne: Three Hours

Max. Marks: 75 Marks

MOLECULAR PHARMACEUTICS (NANO TECH AND TARGETED DDS)

Q.P. CODE: 5169

Your answers should be specific to the questions asked.
Draw neat labeled diagrams wherever necessary.

swer All The Questions

10 X 7.5 = 75 Marks

Discuss the concept of TDDS and explain the biological process involved in brain specific delivery.

What are the types of nano particles and explain any one method of preparation and evaluation.

What are the different types of micro capsules? Explain the concept of monoclonal antibodies, their application.

Classify propellants and various evaluation tests of an aerosol products.

Explain assay one tumor targeting drug delivery system with its applications.

Write preparation and applications of liposomes.

Define intranasal drug delivery system. Give account on intra-nasal route delivery system.

Explain different types of containers and propellants used in an aerosol formulation.

Briefly discuss on drinking water medications tablets and bolus used in veterinary drug delivery system.

). Write a note on preparation and advantages of Aquasomes.

* * * * *

Rajiv Gandhi University of Health Sciences, Karnataka

Second Semester M. Pharm Degree Examination - 04-Nov-2024

Time: Three Hours **Max. Marks: 75**

Marks

MOLECULAR PHARMACEUTICS (NANO TECH AND TARGETED DDS)

Q.P. CODE: 5169

Your answers should be specific to the questions asked.
Draw neat, labeled diagrams wherever necessary.

Answer All The Questions **10 x 7.5 = 75 Marks**

1. Discuss any five advantages, limitations and types of drug targeting.
2. Discuss the advantages liposomes. Describe any one approache to achieve targeted liposomal drug delivery.
3. Describe the anatomical considerations for pulmonary drug delivery. Describe the evaluation tests for aerosols.
4. Describe the formulation of solid lipid nanoparticles. Discuss their applications.
5. Write a note on preparation and applications phytosomes.
6. Define 'microcapsule'. Give advantages and applications of microcapsules.
7. What are monoclonal antibodies? Discuss the advantages and limitations of monoclonal antibodies.
8. Write a note on feed additives, oral pastes and gels as veterinary formulations.
9. Discuss any three formulations of intranasal drug delivery.
10. Write in detail brain-specific drug delivery.

* * * * *

ajiv Gandhi University of Health Sciences, Karnataka

Second Semester M. Pharm. Degree Examination - 17-Dec-2020

: Three Hours

Max. Marks: 75 Marks

MOLECULAR PHARMACEUTICS (NANO TECH AND TARGETED DDS)

Q.P. CODE: 5169

Your answers should be specific to the questions asked.
Draw neat, labeled diagrams wherever necessary.

wer All The Questions

10 x 7.5 = 75 Marks

Discuss the events and biological process involved in drug targeting.

Discuss the preparation of Monoclonal Antibodies and explain any three applications in drug targeting.

Discuss any one method of preparation and advantages of niosomes.

Classify liposomes. Mention the various methods of preparing liposomes and discuss any one method in detail.

Classify different Intranasal route of drug delivery systems. Describe metered dose inhalers.

Explain preparation and *in-vitro* evaluation of microcapsule.

Describe drenches tubing and drinking water medication veterinary formulations.

Give the preparation and applications of aquasomes.

Write a note on preparation and advantages of Phytosomes.

Write the preparation and evaluation of monoclonal antibodies.

* * * * *

- Veterinary medicine is the branch of medicine that deals with the prevention, diagnosis and treatment of disease, disorder and injury in non-human animals.

Types of dosage forms

- Tablets and Boluses
- Capsules
- Feed Additives
- Drinking Water Medication
- Parenteral Dosage forms
- Oral Pastes and Gel
- Drenches and Tubing Products
- Tablet and Boluses: Solid dosage form like compressed tablet is most common in case of humans. They are less popular in animals because administration is uncertain.
- It is uncertain because one cannot be sure the tablet is swallowed, spit out, or drop from mouth after administration.
- Typically the tablet are chewed by the animals and due to undesirable taste of certain drug the animals can spit out that tablet from the mouth,
- this will result in loss of dosage form.
- To avoid this
    - flavoring agents
    - Sweeteners can be added
- Capsules: A typical gelatin capsules used for humans can be used also in veterinary medicines. Capsules are mainly used for dog and cat. There are some vitamin and mineral supplement capsule formulated for cattle.

E.g., Antimicrobial Vitamin & Mineral

- Feed Additives: Feed additive are preparations used in veterinary medicine to deliver the API via the water or food given to the animals. They may be either solid or liquid and sometimes also called as premix.

- Feed additives
- They are mainly of three types

Type A – Contain one or more API

- Product are diluted with water or food and then consumed

Type B – Contains API+ nutrients (>25% of total weight)

- Product are diluted with water or food and then consumed

Type C – only Nutrients

- Product are diluted with water or food and then consumed

The are prepared by compression or molded

- Feed additives
- They are mainly of three types

Type A – Contain one or more API

- Product are diluted with water or food and then consumed

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- Product are diluted with water or food and then consumed

Type C – only Nutrients

- Product are diluted with water or food and then consumed

The are prepared by compression or molded

PARENTERAL DOSAGE FORMS:

- Injectables:
  - Solution
  - Suspension
  - Emulsions
  - Dry powders (to be reconstituted)

Intra-mammary infusion: Available for lactating and non-lactating cow. Lactating cow intra mammary infusion should demonstrate fast and even

distribution of the drug and a low degree of binding to under tissue. These properties result in lower concentration of drug residue in milk.

antibiotics, such as streptomycin, ampicillin, cloxacillin, penicillin, and tetracycline

- Intra-vaginal Delivery Systems
- Polyurethane sponges containing synthetic progestin
- Silicon based insert containing natural progesterone
- Biodegradable inserts of progestin (PCL intra-vaginal insert).

Implants

- They are compressed tablet or dispersed matrix system in which the drug is uniformly dispersed in non-degradable polymer.
- Oral Pastes and Gel… Pastes and gels are semi-solid masses that can be administered from a flexible tube, syringe, package or other specialized dosing devices. Three types of vehicles are used to formulate a paste or gel.
    - Aqueous base
    - Oil base
    - Organic base
- Oil Base: It consist of vegetable oil thickened with agents such as aluminum monosterate, colloidal silica and xanthan gum. Lubricant property make the formulation less adhesive then water base.
- E.g., Glycerin, Propylene glycol, Polyethylene glycol with corboxyvinyl polymer provide the organic base.
- Oral Pastes and Gel… Pastes and gels are semi-solid masses that can be administered from a flexible tube, syringe, package or other specialized dosing devices. Three types of vehicles are used to formulate a paste or gel.
    - Aqueous base
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    - Organic base
- Oil Base: It consist of vegetable oil thickened with agents such as aluminum monosterate, colloidal silica and xanthan gum. Lubricant property make the formulation less adhesive then water base.

- E.g., Glycerin, Propylene glycol, Polyethylene glycol with corboxyvinyl polymer provide the organic base.

Drenches : Administration of the drug to animal by pouring the liquid medication down an animal's throat is called "Drenching". Drenches are dispensed via the syringe or drenching gum .

- E.g., Ivermectin Drench
- Tubing: Horses are administered certain medication by running the lubricated tube up through the nostrils and down into the stomach. A funnel is attached to the tube is held above the horse head and the liquid medication is poured down the tube. This is called "tubing".

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ALLIED HEALTH SCIENCES | POLYTECHNIC | EDUCATION | DEGREE | PUC

SEMINAR ON

PHYTOSOMES

SUBJECT: MOLECULAR PHARMACEUTICS

PRESENTED BY
APARNA PR
2ND SEM M PHARM
DEPT. OF PHARMACEUTICS

GUIDED BY
DR. HINDUSTAN ABDUL AHAD, M PHARM, PHD, FAGE
HOD, DEPT. OF PHARMACEUTICS
RRCOP

CONTENTS

INTRODUCTION

- The term "phyto" means plant and "some" means cell-like.
- Phytosomes are little cell like structures.
- This is advanced form of herbal formulations which contains the bioactive phytoconstituents of herbal extracts surrounded and bound by a lipid.
- Most of bioactive constituents are water soluble compounds like flavonoids, glycosides.
- Because of their water soluble property and lipophilic outer layer it shows better absorption and produce better bioavailability.

Structure of Phytosomes

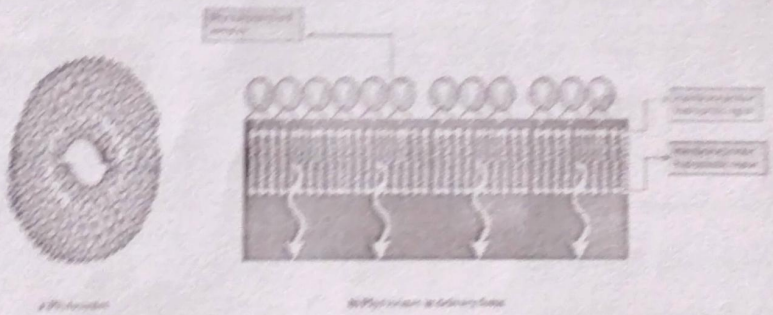
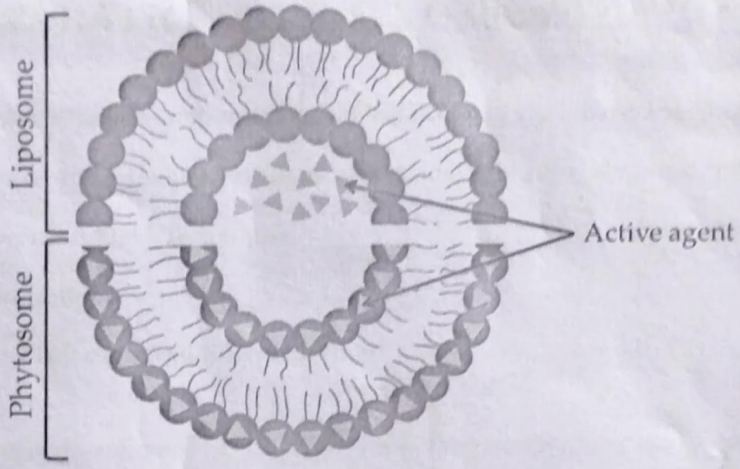


Figure 1: Phytosomes (active complex)

Difference b\w phytosomes and liposomes

PHYTOSOME	LIPOSOME
In this the active chemical constituent molecules are anchored through chemical bonds to the polar head of phospholipids.	In this active principles is dissolved in the medium of cavity or in the layer of membrane.
Chemical bonds are formed.	No chemical bonds are formed.
In phytosome, phosphatidylcholine and plant compound form 1:1 or 2:1 complex depending on substance	In this hundred or thousands of phosphatidylcholine molecules surround the water soluble molecule.
Phytosomes are much better absorbed than liposomes showing better bioavailability.	Bioavailability of liposomes is less than phytosomes
Contents of phospholipids is less higher.	Contents of phospholipid is much higher

 5



 6

ADVANTAGES

- Enhanced absorption of herbal constituent.
- As the absorption of active constituents is improved, its dose requirement is also reduced.
- Phosphotidylcholine acts as hepatoprotective, giving synergistic effect.
- It shows better stability profile.
- It assures proper delivery of drugs to the respective tissues.
- Entrapment efficiency is high.
- Phyotosomes are also superior to liposomes in skin care products.

DISADVANTAGES

- When administered orally or topically they limit their bioavailability
- Phytoconstituents is quickly eliminated from phytosome.
- Stability problem.

COMPONENTS

1. **Phospholipids:** soya phosphatidylcholine, egg phosphatidylcholine, dipalmityl phosphatidyl choline, disteryl phosphatidylcholine, phosphatidylethanolamine.
2. **Phytoconstituents:** Alkaloids, Resin and Resin combination, Carbohydrates and its derived products, Volatile oil
3. **Aprotic solvent:** Dioxone, acetone, methylene chloride.
4. **Non-solvent:** n-hexane.
5. **Alcohol:** ethanol, methanol.

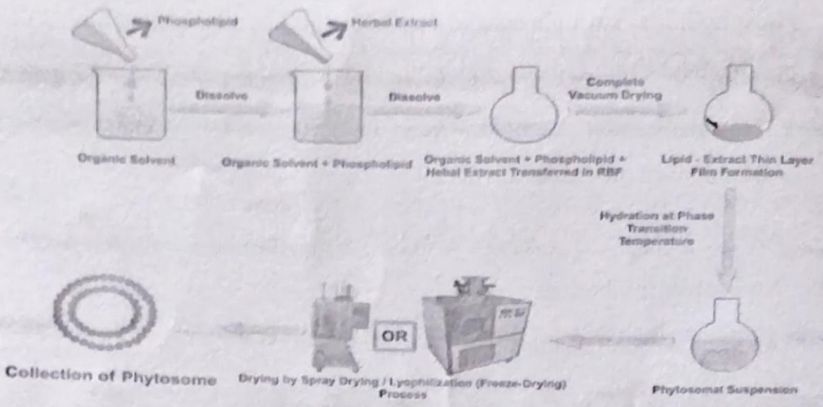
 9

PREPARATION OF PHYTOSOME

- **Solvent Evaporation Method**
- **Antisolvent Precipitation Method**
- **Supercritical Fluid Techniques**
- **Lyophilization**
- **Ethanol Injection And Ether Injection**

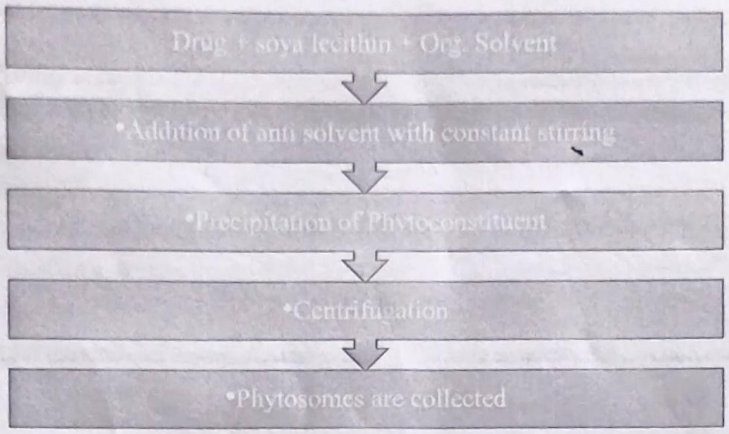
 10

SOLVENT EVAPORATION METHOD



- Phytosome vesicles were made by thin layer rotary evaporator vacuum method.
- The phytosomal complex was mixed in anhydrous ethanol in 250 ml round bottom flask.
- The flask was attached to a rotary evaporator. The solvent will evaporate at a temperature about 60°C forming thin layer film around the flask.
- The film is hydrated by phosphate buffer having pH 7.4, and the lipid layer will peel off in phosphate buffer forming vesicle suspension.
- The phytosomal suspension was subjected to probe sonication with 60% amplitude.
- Phytosomal suspension will be stored in the refrigerator for 24 hrs, before characterization

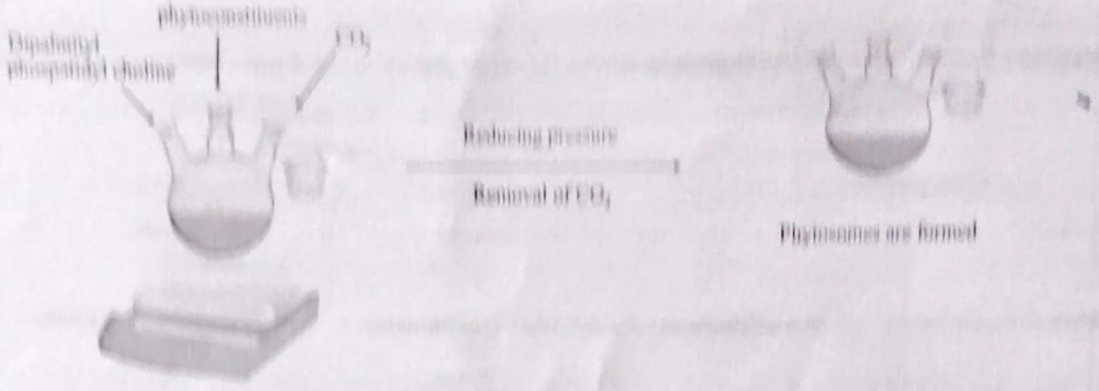
ANTI SOLVENT PRECIPITATION METHOD



SUPERCRITICAL FLUID TECHNIQUES

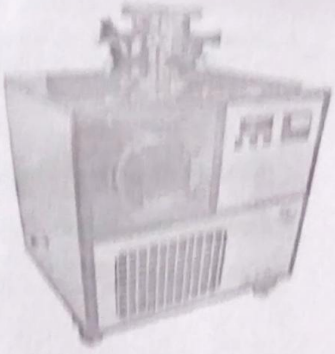
- Supercritical fluid techniques, particularly using supercritical carbon dioxide (SC-CO_2), are advanced methods for the preparation of phytosomes.
- In 3 neck round bottom flask Di palmityl phospotidil choline, liquid CO_2, Phytoconstituents are taken stirred at certain rpm using magnetic stirrer
- Reducing the pressure CO_2 the rapid change in solvent properties induces the precipitation of the phytosomes.

SUPERCRITICAL FLUID TECHINIQUES



LYOPHILIZATION

- Make a solution of natural or synthetic phospholipids and phytoconstituents in various solvents
- Add the phytoconstituent solution to a phospholipid solution
- Stir to form a complex
- Freeze the vials for 4 hours
- Place the vials in a lyophilizer with a condenser
- Lyophilize for one day at a pressure of 40 mbar and a shelf temperature of 40°C
- Dry the sample for a second day at 25°C
- Remove the sample from the freeze dryer and place it in a desiccator



ETHANOL INJECTION AND ETHER INJECTION

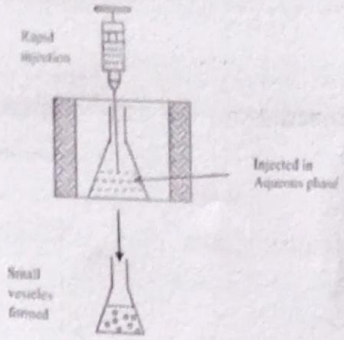
ETHANOL INJECTION

- A phospholipid solution in ethanol is injected into a stirred aqueous solution.
- The ethanol diffuses into the solution, causing the phospholipids to precipitate and form bilayer fragments.
- These fragments then fuse to form phytosomes, which can be obtained after the ethanol evaporates.

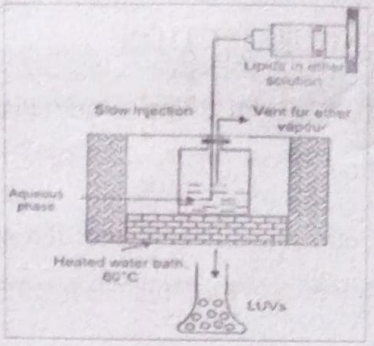
ETHER INJECTION

- Lipids dissolved in ether or a mixture of diethyl ether and methanol are slowly injected into an aqueous phase that contains the components to be encapsulated.
- The aqueous phase is heated to a temperature between 55–65°C to help the solvent evaporate from the phytosomes.

Ethanol injection



Ether injection



EVALUATION OF PHYTOSOMES

- Particle size
- Entrapment Efficiency
- FTIR Spectrographic Analysis
- Differential Scanning Calorimetry (DSC)
- Drug content
- Scanning Electron Microscopy
- Stability study

PARTICLE SIZE

- The average diameter and zeta potential of the phytosome loaded may be each measured employing a Zetasizer ZEN 3600 at a fixed scattering angle of 90° at 25°C.

ENTRAPMENT EFFICIENCY

- Phytosome loaded can be diluted 1 fold with 10ml of solvent and so centrifuged 18,000 rpm for 1½ hour at -4°C using cooling centrifuge machine.
- The supernatent was isolated and the quantity of free drug may be determined by UV/Visual spectrometry.

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- To determine the entire quantity of drug 0.1ml of the phytosome loaded suspension can be diluted in fuel, adusting the volume to 10ml.
- The entrapment efficiency may be calculated according to the subsequent formula.

$$\text{Entrapment efficiency}(\%) = \frac{(\text{total amount of drug}) - (\text{amount of free drug})}{(\text{total amount of drug})} \times 100$$

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APPLICATION OF PHYTOSOMES

- Enhancing Bioavailability
- Delivery of large and diverse drugs, eg. peptides and proteins
- Hepato-Protective
- Approved for cosmetic and pharmaceutical applications
- Low-risk profile
- Toxicological properties have been well documented
- High market attraction

REFERENCE

1. Gandhi A, Dutta A, Pal A, Bakshi P. Recent trends of phytosomes for delivering herbal extract with improved bioavailability. Journal of pharmacognosy and phytochemistry. 2012;1(4):06-14.
2. Singh RP, Gangadharappa HV, Mruthunjaya K. Phytosome loaded novel herbal drug delivery system: A review. Int Res J Pharm. 2016;7(6):15-21.
3. https://www.slideshare.net/Sujit1225/phytosomes-163984529
4. Sharma D, Bhujbale AA. Phytosomes is a novel drug delivery system based herbal formulation: An review. PharmaTutor. 2018 Jun 7;6(3):23-6.

THANK YOU

RR College of Pharmacy, Chikkabanavara, Bangalore-90

M. Pharm, II Sem (Pharmaceutics)-2023-24

Sessional marks

Sub: Molecular Pharmaceutics (Nano Tech and Targeted DDS) **(Practical) (Max 25M)**

S.No	Reg. No	Student name	I. Sessional Exam			II. Sessional Exam			Average (25M)
			IA (15 M)	CM(10M)	Total (25 M)	IA (15 M)	CM(10M)	Total (25 M)	
1	23MP005	Aparna PR	14	9	23	14	10	24	**24**
2	23MP018	Archana SL	14	10	24	14	9	23	**24**
3	23MP011	Bhargavi MS	14	9	23	13	10	23	**23**
4	23MP007	Jyotheesh G	14	10	24	13	10	23	**24**
5	23MP002	Ganugapenta Nikhil Kumar	13	10	23	14	10	24	**24**
6	23MP003	Manjunath R Mannammanavar	13	10	23	12.5	9.5	22	**23**
7	23MP012	Mohanraja PR	13.5	9.5	23	14	10	24	**24**
8	23MP001	Poojarla Venkat	12.5	9.5	22	13	10	23	**23**
9	23MP019	Pushpa MG	14	10	24	13	10	23	**24**
10	23MP010	Rakesh SP	14	10	24	14	9	23	**24**
11	23MP013	Rashmitha R	12.5	9.5	22	14	10	24	**23**
12	23MP009	Shristhti Gandhi	13	10	23	14	10	24	**24**
13	23MP017	Subhakara MS	13	9	22	13	9	23	**23**
14	23MP004	Sirin Nisha	Ab	Ab	Ab	Ab	Ab	Ab	**Ab**
15	23MP016	Tarashree C	14	10	24	14	9	23	**24**

RR College of Pharmacy, Chikkabanavara, Bangalore-90
M. Pharm, II Sem (Pharmaceutics)-2023-24

Internal marks **(consolidated)**

S. No	Reg No	Student name	SUBJECT NAME						
			THEORY				PRACTICAL		
			Molecular Pharmaceutics (Nano Tech and Targeted DDS) **(25M)**	Advanced Biopharmaceutics & Pharmacokinetics **(25M)**	Computer-Aided Drug Delivery System **(25M)**	Cosmetic and Cosmeceuticals **(25M)**	Molecular Pharmaceutics(Nano Tech and Targeted DDS) **(25M)**	Pharmaceutics_II **(25M)**	Seminar/ Assignment **(100M)**
1	23MP005	Aparna PR	24	24	24	24	24	24	99
2	23MP018	Archana SL	24	24	24	24	24	24	98
3	23MP011	Bhargavi MS	23	24	24	24	23	24	97
4	23MP007	Jyotheesh G	24	23	23	24	24	23	97
5	23MP002	Ganugapenta Nikhil Kumar	24	24	23	24	24	24	97
6	23MP003	Manjunath R Mannammanavar	23	23	23	23	23	23	96
7	23MP012	Mohanraja PR	24	23	23	23	24	24	97
8	23MP001	Poojarla Venkat	23	23	22	23	23	23	960 96
9	23MP019	Pushpa MG	24	23	24	24	24	23	99
10	23MP010	Rakesh SP	24	23	24	24	24	24	96
11	23MP013	Rashmitha R	23	23	23	23	23	23	96
12	23MP009	Shristhti Gandhi	24	23	24	24	24	23	97
13	23MP017	Subhakara MS	23	24	23	23	23	23	
14	23MP004	Sirin Nisha	Ab	Ab	Ab	AB	Ab	AB	97
15	23MP016	Tarashree C	24	24	23	24	24	24	

II. Sem. 2024 – 2025

SUBJECT Molecular plant Pathology SUBJECT CODE MPH 201T

S. NO	USN	NAME / DATE / CLASSES	2/7/24	3/7/24	5/7/24	6/7/24	8/7/24	9/7/24	10/7/24	11/7/24	12/7/24	15/7/24	16/7/24	17/7/24	18/7/24	19/7/24	20/7/24	22/7/24	23/7/24	24/7/24	25/7/24	26/7/24	27/7/24	29/7/24	30/7/24	31/7/24	1/8/24	2/8/24	5/8/24	6/8/24	7/8/24	8/8/24
1		Aparna	A	A	A	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
2		Bhargavi	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
3		Jyothsna	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
4		C. Nikhil Kumar	A	A	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
5		Manjunath	A	A	A	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
6		Mohan Raj	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
7		Venkat	A	A	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
8		Rakesh	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
9		Rashmitha	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
10		Christ	A	A	A	A	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
11		Sagar Nisha	A	A	A	A	A	A	A	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
12		Archana	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
13		Pushpa	A	P	P	A	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
14		Sitharam	A	A	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
15		Tavagiri	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

OF STAFF

Scanned with OKEN Scanner

II. Sem.

SUBJECT Molecular Genetics

USN	NAME / CLASSES	DATE
	Aparna	
	Bhargavi	
	Jyothsna	
	C. Nikhil Kumar	
	Manjunath	
	Mohan Raj	
	Venkat	
	Rakesh	
	Rashmitha	
	Christ	
	Sim Nisha	
	Archana	
	Pushpa	
	Subhasree	
	Tanushree	

OF STAFF

R R COLLEGE OF PHARMACY

Accredited by NAAC with 'A' Grade

Internal Quality Assurance Cell

R.R. College of Pharmacy

Faculty Appraisal By Students

ACADEMIC YEAR 2023-24 | Year/Semester: 2nd Sem | Class: M Pharmaceutics

No of Respondents: 15 Class Strength: 15

Phase II

Parameters	Computer Aided Drug Delivery System- Prof.Mahalingan.K	Molecular Pharmaceutics - Dr.Hindustan Abdul	Advanced Biopharmaceutics & Pharmacokinetics- Prof.Sujatha.P. Muchalambe	Cosmetic & Cosmeceuticals - Dr.Srilatha.K.S	Pharmaceutics Practical II - Prof.Mahalingan.K
	% (Feed back)				
1. The teacher ensures punctuality towards class and subject adherence	90.0	96.0	92.0	94.0	92.0
2. The teacher communicates the lesson plan before starting the class	94.0	96.0	82.0	88.0	88.0
3. The pace of syllabus coverage is as per lesson plan	94.0	96.0	90.0	86.0	90.0
4. The teacher demonstrates good knowledge of the subject and has clarity of communication in the teaching	92.0	96.0	90.0	88.0	90.0
5. The teacher spends adequate time in the class in clarifying the doubts and matters relevant to the subject	94.0	96.0	90.0	90.0	90.0
6. The teacher motivates and stimulates to think about improving the knowledge about the subject	94.0	94.0	90.0	90.0	90.0
7. Special Classes/Skill Development Activities/ relevant to subject by teacher is useful	94.0	94.0	88.0	90.0	90.0
8. The teachers are approachable for clarification and doubts related to academic subjects	94.0	96.0	90.0	90.0	90.0
9. The internal assessment evaluation by the teacher is transparent	94.0	96.0	90.0	92.0	90.0
10. The teacher treats all the students equally	94.0	96.0	92.0	92.0	92.0
11. The teacher is effective in handling the subject.	94.0	96.0	90.0	90.0	90.0
Total Phase-II %	**93.5**	**95.6**	**89.5**	**90.0**	90.2
Phase I Total %	**92.7**	**95.7**	**88.5**	**92.0**	**90.9**
Average %	**93.1**	**95.7**	**89.0**	**91.0**	**90.5**

91.9

PRINCIPAL
R.R. College of Pharmacy
Chikkabanavara, Bangalore

R.R. Institutions

Chikkabanavara, Bangalore-560090

Internal Quality Assurance Cell

Result analysis of the Exam held during -November 2024

Department: Pharmaceutics **Class: M. Pharm -II Sem** **Academic Year: 23-24**

Sl. No	Subjects	Subject Code	Faculty name	Students appeared	Total Passed	Pass %	Overall %
1	Molecular Pharmaceutics (Nano Tech and Targeted DDS)	MPH201T	Dr. Hindustan Abdul Ahad	14	14	100	100
2	Advanced Biopharmaceutics & Pharmacokinetics	MPH202T	Mrs. Sujatha	14	14	100	
3	Computer-Aided Drug Delivery System	MPH203T	Mr. Mahalingam	14	14	100	
4	Cosmetic and Cosmeceuticals	MPH204T	Mrs. Srilatha	14	14	100	
5	Pharmaceutics-II Practical	MPH205P	Mr. Mahalingam	14	14	100	
6	Molecular Pharmaceutics-Practical	MPH2	Dr. Hindustan Abdul Ahad	14	14	100	
7	Seminar		Dr. Hindustan Abdul Ahad	14	14	100	

Academic Year	
Student Appeared	14
FC with Distinction	
First Class	08
Second Class	--
Passed	00
Failed	00

Class Teacher Name: Dr. A Abdul Ahad

Class Teacher Signature:

Head
Dept of Pharmaceutics
R.R.College of Pharmacy
Chikkabanavara, Bangalore-90

Principal
PRINCIPAL
R.R. College of Pharmacy
Chikkabanavara, Bangalore