



**SRI BALAJI VIDYAPEETH (SBV)**

(Deemed to be University)

U/S 3 of UGC Act 1956

Puducherry-607402

This document contains the details of the  
**Certificate Course in Natural Product Extraction and HPLC,**  
conducted by Centre for Interdisciplinary Research Facility (CIDRF),  
Sri Balaji Vidyapeeth, Deemed to be University.

REGISTRAR  
SRI BALAJI VIDYAPEETH  
(Deemed University u/s 3 of UGC ACT, 1956)  
Accredited by NAAC with 'A' Grade  
Pillaiyarkuppam, Pondicherry-607 402.

(This document is attested from pages 1-9 )

NAAC 2020



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U/S 3 of UGC Act 1956  
Puducherry-607402

### **Criteria 1**

#### **Metrix 1.3 : Curriculum Enrichment**

##### **1.3.2**

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#### **Details of Certificate Course in Natural Product Extraction and HPLC**

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2. Course Content
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4. Questionnaire
5. Enrolled list of students

**REGISTRAR**  
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(Deemed University u/s 3 of UGC ACT, 1956)  
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Pillaiyarkuppam, Pondicherry - 607 402.



**CENTRAL INTER-DISCIPLINARY RESEARCH FACILITY**

**SRI BALAJI VIDYAPEETH, PUDUCHERRY**



**CERTIFICATE COURSE**

**ON NATURAL PRODUCT EXTRACTION AND HPLC ANALYSIS I<sup>st</sup>.**

### **COURSE CONTENT:**

#### **Natural Product Extraction:**

- Extraction methods for Natural products
- Value of natural products on therapeutic usage
- Extraction techniques

#### **HPLC:**

- Introduction to chromatography
- Principles of liquid chromatography
- Basics of HPLC
- HPLC components and their functions
- Applications of HPLC
- HPLC columns
- Separation modes
- Sample preparation
- Method development
- Sample analysis
- Quantification
- Method validation & recovery studies





This document is attached from page 1-0



**SRI BALAJI VIDYAPEETH**  
DEEMED TO BE UNIVERSITY  
ACCREDITED WITH 'A' GRADE BY NAAC  
RANKED 10 ALL INDIA BY NIRF 2021



# CENTRAL INTER-DISCIPLINARY RESEARCH FACILITY

A Constituent Unit of Sri Balaji Vidyapeeth (SBV)

Deemed to be University,  
Puducherry

## CERTIFICATE COURSE IN NATURAL PRODUCT EXTRACTION AND HPLC ANALYSIS

*This is to certify that*

*Mr./ Mrs./ Ms./ Dr. ... DAISY PRECILLA S ...*

*has successfully completed / assisted the*

### CERTIFICATE COURSE IN NATURAL PRODUCT EXTRACTION AND HPLC ANALYSIS

*with TWO credits, conducted by the Central Inter-Disciplinary Research Facility (CIDRF),*

*Sri Balaji Vidyapeeth, Deemed-to-be University, Puducherry,*

*from 13<sup>th</sup> December to 15<sup>th</sup> December*

REGISTRAR  
SRI BALAJI VIDYAPEETH  
DEEMED TO BE UNIVERSITY  
(1956)  
ACCREDITED BY NAAC WITH 'A' GRADE  
Puducherry - 607 402

*[Signature]*  
Dr. Mangaiyarkarasi N.  
Course Co-ordinator

*[Signature]*  
Dr. Anitha T.S  
Course Co-ordinator

*[Signature]*  
Dr. Balasubramanian  
Director, CIDRF, SBV





**Certificate course in Basic Mammalian Cell Culture for Bio-Medical Research**  
 Assessment questionnaire (Batch: January 2020)  
 Course Code: 1901609001



Name or UID of the student: \_\_\_\_\_

- 1) Culture media is added to cells
  - a) To support growth and propagation of cells.
  - b) To support contamination with microbes
  - c) As a coloring agent for visualization
  - d) All of the above
  - e) Don't understand the question
- 2) Which microscopic technique is "routinely" used for monitoring cell growth?
  - a) Electron microscopy
  - b) Phase Contrast Microscopy
  - c) Fluorescent microscopy
  - d) Stereomicroscopy
  - e) Don't understand the question
- 3) Cryopreservant is used while freezing cells
  - a) To maintain stability of cells that are frozen
  - b) To prevent cell damage while freeze-thawing cycle
  - c) To prevent drying of cells due to low temperature
  - d) All of the above
  - e) Don't understand the question
- 4) 'Passaging' in cell culture is
  - a) Splitting of cells between flasks
  - b) Addition of media into flasks
  - c) Providing PBS wash to culture flasks
  - d) Incubating cells with passage of time
  - e) Don't understand the question
- 5) Which reagent is used during passaging?
  - a) Trypsin-EDTA
  - b) Trypsin-HCl
  - c) Trypsin-activated charcoal
  - d) Trypsin-Ringer solution
  - e) Don't understand the question
- 6) What % of confluency is generally considered for passaging?
  - a) Less than 50%
  - b) 50-60%
  - c) 60-70%
  - d) Above 70%
  - e) Don't understand the question
- 7) Which of these is TRUE?
 

A normal adult human cell DOES NOT have \_\_\_\_\_

  - a) Anchorage dependence
  - b) Immortality
  - c) Growth factor dependence
  - d) Specialized function
  - e) Don't understand the question
- 8) Confluency refers to the percentage of
  - a) Flask with culture medium
  - b) Viable cells in the culture flask.
  - c) Culture area occupied by the cells in a flask
  - d) Area below the line of a growth curve
  - e) Don't understand the question
- 9) Which of the following is not a component of the 'basal media' in mammalian cell culture
  - a) Fetal bovine serum
  - b) Amino acids
  - c) Vitamins
  - d) None of the above
  - e) Don't understand the question
- 10) Contamination that cannot be visualized in a standard inverted microscope is
  - a) Bacteria
  - b) Fungi
  - c) Virus
  - d) Yeast
  - e) Don't understand the question

Pre-Test	Post-Test

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- 11) Ideally in cell culture, antibiotics should
  - a) Always be used
  - b) **Never be used**
  - c) Used during contamination
  - d) Used during weekends
  - e) Don't understand the question
  
- 12) When thawing cryopreserved animal cells you should
  - a) Thaw slowly at 4°C
  - b) Thaw rapidly at 100°C
  - c) Thaw rapidly at 37°C
  - d) Not worry about temperature
  - e) Don't understand the question
  
- 13) When cryofreezing, it is best to have cells that are of
  - a) Low passage number & low viability
  - b) **Low passage number & high viability**
  - c) High passage number & low viability
  - d) High passage number & high viability
  - e) Don't understand the question
  
- 14) CO<sub>2</sub> used in an incubator to culture mammalian cells is
  - a) To maintain the pH of the medium
  - b) To slow down the cell growth
  - c) To improve solubility of nutrients
  - d) To prevent contamination
  - e) Don't understand the question
  
- 15) The phenomenon where normal cells stop proliferating once they come in contact with each other is
  - a) Contact supposition
  - b) Contact antagonism
  - c) Contact concession
  - d) **Contact inhibition**
  - e) Don't understand the question
  
- 16) Which of the following is NOT the major function of the serum in cell culture?
  - a) Stimulate cell growth
  - b) **Enhance cell separation**
  - c) Promotion of cell detachment
  - d) Provide protein supplementation
  - e) Don't understand the question
  
- 17) Plotting a semi-logarithmic graph of the rate of cell proliferation over time produces a
  - a) Log Phase
  - b) Contact Inhibition
  - c) Cell Viability
  - d) Growth Curve
  - e) Did not understand the question
  
- 18) Animal cell culture normally employs \_\_\_\_\_ of CO<sub>2</sub> for growth
  - a) 1%
  - b) 5%
  - c) 10%
  - d) 50%
  - e) Did not understand the question
  
- 19) 'Hayflick's Limit' is the limit of cell divisions beyond which cells
  - a) start to age
  - b) become cancerous
  - c) become dormant
  - d) start to die
  - e) Did not understand the question
  
- 20) Trypan Blue is used to assess the \_\_\_\_\_ of cells in cell culture
  - a) Sensitivity
  - b) Immortality
  - c) Viability
  - d) Specificity
  - e) Did not understand the question



  
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 SRI BALAJI VI
   
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# CENTRAL INTER-DISCIPLINARY RESEARCH FACILITY

SRI BALAJI VIDYAPEETH, PUDUCHERRY



## CERTIFICATE COURSE

ON NATURAL PRODUCT EXTRACTION AND HPLC ANALYSIS 13<sup>th</sup>,  
14<sup>th</sup> & 15<sup>th</sup> December 2019

### PRE-TEST

1. HPLC stands for
  - a. High Pressure Liquid Chromatography
  - b. High Performance Liquid Chromatography **(Ans: b)**
  - c. Both (a) and (b)
  - d. High Placed Liquid Chromatography
2. HPLC methods include
  - a. Liquid/liquid (Partition) Chromatography
  - b. Liquid/solid (Adsorption) Chromatography **(Ans: d)**
  - c. Ion exchange and size exclusion chromatography
  - d. All of the above
3. The eluent strength is the measure of
  - a. Solvent adsorption energy
  - b. Solvent absorption energy **(Ans: a)**
  - c. Solvent diffusivity
  - d. Solvent mixing index
4. In reverse phase HPLC, there is a
  - a. Non polar solvent/polar column
  - b. Polar solvent/ non polar column **(Ans: b)**
  - c. Non polar solvent/non polar column
  - d. Any of the above
5. Which of the following(s) is/are the advantage of HPLC over traditional LPLC (Low Pressure Liquid Chromatography)?
  - a. Great sensitivity and reusable columns

b. Ideal for ionic species and large molecules **(Ans: d)**

- c. Sample recovery  
d. All of the above
6. What is 'simplification' when referred to in drug development terms?
- Process by which a drug candidate is synthesised as simply as possible
  - Process of adding more chiral centres to a compound to make it bind more easily to its biological target **(Ans: d)**
  - Process of removing unimportant groups from a lead compound in the hope of maintaining activity but rendering the resulting compounds cheaper and easier to make
  - Process of shortening the drug development process from the discovery stage to its clinical trials stage
7. Solvent extraction is more effective when the extraction is repeated with
- Extra solvent
  - Large solvent **(Ans: c)**
  - Small solvent
  - No solvent
8. A mobile phase cannot be a:
- Gas
  - Solid **(Ans: b)**
  - Liquid
  - Solid or gas
9. What is meant by the optimum temperature of a reaction?
- The temperature that results in the maximum possible yield.
  - The temperature that results in the minimum amount of impurities **(Ans: c)**
  - The temperature that results in an acceptably high level of yield and an acceptably low level of impurities.
  - None of the above
10. Which of the following solvents is unacceptable on large scale?
- |                  |                    |
|------------------|--------------------|
| a. Heptane       | c. Xylene          |
| b. Diethyl ether | d. Dimethoxyethane |
- (Ans: c)**





# CENTRAL INTER-DISCIPLINARY RESEARCH FACILITY

## SRI BALAJI VIDYAPEETH, PUDUCHERRY



### CERTIFICATE COURSE

ON

### NATURAL PRODUCT EXTRACTION AND HPLC ANALYSIS

13<sup>th</sup>, 14<sup>th</sup> & 15<sup>th</sup> December 2019

#### Enrolled student list

S. No	Name & Designation	Day 1		Day 2		Day 3	
		FN	AN	FN	AN	FN	AN
1.	Dr. S. Kavitha	Selt	Silt	Silt	Silt	Silt	Silt
2.	Dr. R. Vaesha I. PGI - MDS.	Vaeshal	Vaeshal	Vaeshal	Vaeshal	Vaeshal	Vaeshal
3.	Ms. Daisy Prucilla & PhD Scholar, CIDRF, SBV	Daisy	Daisy	Daisy	Daisy	Daisy	Daisy
4.	Ms. Andrawi Priswas PhD scholar CIDRF, SBV	Andrawi	Andrawi	Andrawi	Andrawi	Andrawi	Andrawi
5.	ROSEMOND TRESA A	RT	RT	RT	RT	RT	RT

*[Signature]*  
 Central Inter-Disciplinary Research Facility  
 Sri Balaji Vidyapeeth  
 Ph.D. Controller, Main Road  
 Puducherry-607 402

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