



University of Mumbai's
NEP 2020 Based Curriculum

Vertical 04: Skill Enhancement Courses (SEC)

**Name of the Course: Tools and Techniques in Plant Science
(Practical)**

60 Hours

Credits: 02

Subject:	Botany
Class:	F. Y. B.Sc.
Semester:	I

Paper: Tools and Techniques in Plant Science (Practical)

Module Number: 05

Module's Name: Basic Molecular Technique

Self Assessments

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Self-Assessment Terminal Questions

Module 5: Basic Molecular Technique

5.1 Genomic DNA Extraction:

Multiple-Choice Questions (MCQs) (05)

- What is the primary purpose of genomic DNA extraction from plant tissues?**
 - To remove proteins from the solution
 - To extract high-quality DNA for manipulation experiments
 - To precipitate lipids
 - To neutralize polysaccharides
- Which of the following is used as a detergent in the CTAB extraction method?**
 - Sodium chloride
 - SDS
 - Tris buffer
 - EDTA
- What is the role of β -mercaptoethanol in the DNA extraction process?**
 - Precipitate proteins
 - Break disulfide bonds in proteins
 - Chelate magnesium ions
 - Maintain pH balance
- Which technique separates proteins from nucleic acids during DNA extraction?**
 - Alcohol precipitation
 - Silica-gel membrane
 - Phenol-chloroform extraction
 - Anion-exchange chromatography
- An A260/A280 spectrophotometric ratio of ~1.8 indicates**
 - Contamination with RNA
 - Pure protein sample

- c) Good quality DNA
- d) Presence of polysaccharides

Short Answer Questions (05)

1. Describe the main steps involved in the process of DNA extraction.
2. What are the components of an extraction buffer, and what are their functions?
3. Explain the importance of RNase A treatment in DNA extraction.
4. How does phenol-chloroform extraction help in DNA purification?
5. What precautions should be taken during the DNA extraction process to avoid contamination and degradation?

Long Answer Questions (05)

1. Describe the conventional DNA extraction protocol using CTAB. What are the key reagents, and what role do they play in the process?
2. Compare and contrast DNA extraction using conventional methods versus commercially available kits.
3. Explain the significance of each component in the DNA extraction process (e.g., detergents, reducing agents, salts). How do these components facilitate the extraction of high-quality DNA?
4. Discuss how the yield and purity of DNA vary between different tissue types and extraction methods. What factors influence these variations?
5. How can the purity of extracted DNA be evaluated? What spectrophotometric measurements are typically used, and what do they indicate?

Viva-Based Questions (05)

1. Why is it important to extract high-quality DNA in molecular biology experiments?
2. What is the role of chaotropic salts in silica-gel membrane technology?
3. Why is it necessary to keep plant tissues cold during the initial grinding process in DNA extraction?
4. How does anion-exchange chromatography separate DNA from other cellular components?

5. What are the critical differences between ethanol and isopropanol in DNA precipitation?

MCQ Answer Key:

1. b) To extract high-quality DNA for manipulation experiments
2. b) SDS
3. b) Break disulfide bonds in proteins
4. c) Phenol-chloroform extraction
5. c) Good quality DNA