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DEPARTMENT OF BOTANY

HANDS ON TRAINING ON PLANT TISSUE CULTURE TECHNIQUE 2018-19

PROGRAM OVERVIEW

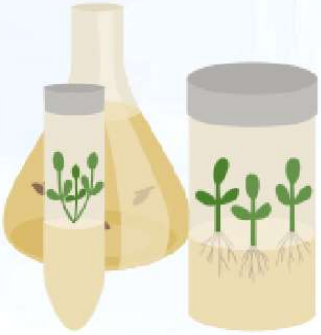
General Introduction
Media Preparation
Sterilization Technique
Explant Preparation
Inoculation Technique
Incubation and Observation
Identification

Prof. M. P. Dhore
Principal, Shri Shivaji Science College, Nagpur.

Prof. R. N. Deshmukh
Head, Dept. of Botany, Shri Shivaji Science College, Nagpur

Trainer & Convener

Prof. Punita S. Tiwari
Dept. of Botany, Shri Shivaji Science College, Nagpur



Students are Encouraged to apply

NOTICE

All the students of B.Sc. SEM VI, Botany are here by informed that Department of Botany is organising Workshop on Plant Tissue Culture technique. Interested students can contact coordinator Dr Punita Tiwari.

Date: 28-29 Jan 2019

Venue: Department of Botany

Head, Dept of Botany

Prof. R.N.Deshmukh

HEAD
DEPARTMENT OF BOTANY
SHRI SHIVAJI EDUCATION SOCIETY
AMRAVATI'S SCIENCE COLLEGE
CONGRESS NAGAR, NAGPUR

Science College, Congress Nagar, Nagpur
SEAL

Coordinator

Prof. P. S. Tiwari

Report On Plant Tissue Culture Techniques Training Program
Academic Year 2018-19

Organized by:
Department of Botany, SSES Amravati's Science College, Congress Nagar

Objective:
To provide practical training in Plant Tissue Culture Techniques to B.Sc. III students and enhance their understanding of tissue culture methodologies.

Conducted by:
Prof. Punita Tiwari, Professor, Department of Botany

Participants:
B.Sc. III year students of SSES Amravati's Science College, Congress Nagar; students from Matagujari College, Jabalpur (as part of student-faculty exchange program); students of INSPIRE camp (Junior college).

Workshop Overview:
The training program encompassed a comprehensive curriculum designed to familiarize students with various aspects of plant tissue culture techniques. Spanning over 3 to 15 days, the workshop covered the following key areas:

1. **Media Preparation:**

Hands-on Experience: Through practical exercises, students were immersed in the intricacies of formulating culture media tailored for tissue culture experiments. By meticulously measuring and mixing ingredients such as agar, macro- and micronutrients, vitamins, and growth regulators, participants grasped the importance of precise media composition in supporting optimal plant growth and development.

2. **Sterilization Technique:**

Ensuring Aseptic Conditions: Demonstrations and guided practice sessions underscored the criticality of maintaining a sterile environment throughout tissue culture procedures. Students were acquainted with sterilization techniques for laboratory equipment, culture vessels, and media, learning essential protocols to mitigate microbial contamination and safeguard the integrity of experimental setups.

3. **Explant Preparation:**

Precision and Sterility: Practical sessions equipped students with the proficiency to meticulously select, sterilize, and prepare plant explants for culture initiation. Through hands-on demonstrations, participants honed their skills in excising healthy tissue samples and implementing stringent sterilization protocols to minimize the risk of introducing pathogens or contaminants.

4. **Inoculation Technique:**

Aseptic Handling: Practical training modules focused on refining students' abilities to inoculate explants onto prepared culture media with precision and aseptic technique. By mastering the art of handling sterile instruments and manipulating delicate plant tissues under laminar flow hoods, participants acquired the dexterity necessary to minimize contamination risks and optimize culture success rates.

5. **Incubation and Observation:**

Monitoring Growth Dynamics: Participants actively engaged in monitoring the growth and development of cultures under controlled environmental conditions. Through systematic observation and documentation, students gained proficiency in recognizing and interpreting various stages of culture progression, from the initiation of callus formation to the emergence of differentiated shoots and roots, thereby reinforcing theoretical concepts with practical application.

Outcomes:

- Enhanced practical skills and theoretical understanding of plant tissue culture techniques among participating students.
- Exposure to real-world applications through industrial visits, facilitating a deeper appreciation of the subject.
- Strengthened intercollegiate ties through the participation of students from Matagujari College, Jabalpur, and INSPIRE camp.

Procedure:

- Selection of Mother Plant:
  A suitable mother plant of Vigna radiata L. was selected.
- Explant Preparation:
  Hypocotyl and leaf explants were excised from 3-4 days old seedlings obtained from seeds purchased from a local shop.
- Surface Sterilization:
  The explants were surface sterilized using 0.1% mercuric chloride ($HgCl_2$) for 5 minutes followed by rinsing with sterile double-distilled water 4-5 times.
- Inoculation:
  The sterilized explants were aseptically inoculated onto solidified MS (Murashige and Skoog) medium containing 3% sucrose and 0.8% agar, with a pH adjusted to 5.6-5.8 using 1 N HCl and 1 N NaOH.
- Media Specifications:
  The medium was supplemented with 0.1mg/L of auxin (2,4-Dichlorophenoxyacetic acid) and 5mg/L of cytokinin (6-benzylaminopurine - BAP).
- Incubation:
- The inoculated cultures were incubated under white fluorescent light with a light/dark cycle of 16hr/8hr at 23-27°C.

Results:

- The experiment revealed that the combination of 5mg/L BAP and 0.1mg/L 2,4-D in MS media yielded the best callus response, particularly in leaf explants compared to hypocotyl explants.
- Callus obtained from leaf explants was observed to be more abundant in quantity compared to hypocotyl explants.
- The colour of callus varied from white to light green and yellowish-green.
- The callus obtained exhibited friable characteristics, indicating meristematic activity and regenerative capacity.

Out of 20 students who participated, we divided them into 5 groups, and the respective group results are presented below:

- Group 1: Medium supplemented with BAP alone showed callus proliferation.
- Group 2: Medium supplemented with 2,4-D alone showed callus proliferation.
- Group 3: Medium supplemented with BAP in combination with 2,4-D showed callus proliferation.
- Group 4: Shoot regeneration was observed in the medium without hormone and ½ MS medium without hormone.
- Group 5: The induction of shoot & roots in hormone-free medium is due to the activation of endogenous levels of hormones in the regenerating callus.

Conclusion:

The training program provided students with valuable insights into plant tissue culture techniques, highlighting the importance of these techniques in modern agriculture and biotechnology. The successful execution of the experiment underscores the potential for further research and application of tissue culture in various fields.:
The Plant Tissue Culture Training Program proved to be a valuable learning experience for the students. The hands-on training, coupled with theoretical insights and industrial exposure, has equipped them with essential skills and knowledge to pursue further studies or careers in the field of biotechnology and plant sciences.

Outcomes:

- Enhanced practical skills and theoretical understanding of plant tissue culture techniques among participating students.
- Exposure to real-world applications through industrial visits, facilitating a deeper appreciation of the subject.

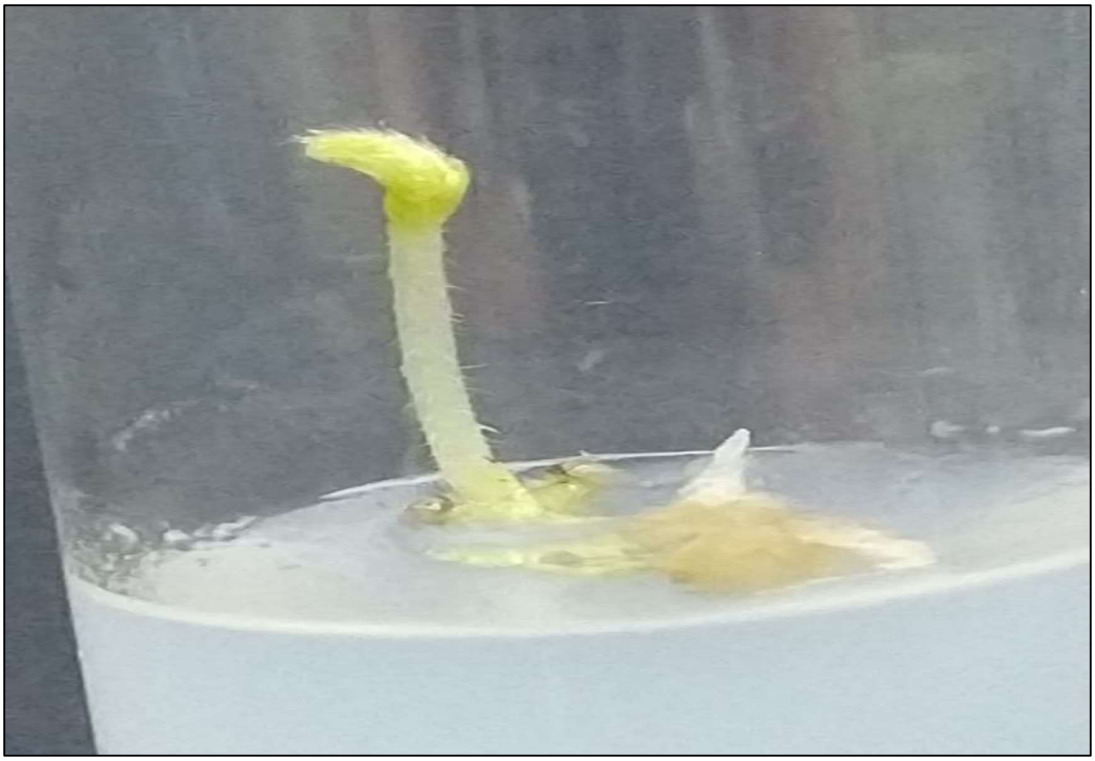
Acknowledgment:

We would like to acknowledge the support rendered by the faculty members during the execution of this experiment. Additionally, we express our gratitude to the college administration for providing the necessary facilities and resources.

Dr. P.S. Tiwari, Convener & Trainer of the Plant Tissue Culture Workshop, along with the Enthusiastic Participants Engaged in Hands-on Learning.

Comprehensive Guide on Plug, Media and Explant Preparation: Essential Techniques for Plant Tissue Culture Initiatives

Mastering the Art of Inoculation: Step-by-Step Guide on the Inoculation of Explants in Plant Tissue Culture



Optimizing Growth: Understanding the Dynamics of Incubation and Its Impact on Tissue Culture Response

Response and Result

List of Participants:

Ku	Jadhav	A	A	
Ku	Jogi	S	P	
Ku	Kadwe	A	S	
Ku	Kale	A	D	
Ku	Kanfade	S	S	
Ku	Kannake	M	B	
	Khobragade	A	R	
Ku	Kholkhute	S	A	
Ku	Khune	V	I	
	Khursange	V	K	
Ku	Lamse	P	A	
~~Ku~~	~~Selotkar~~	~~C~~	~~R~~	
Ku	Pimpalshende	M	D	
Ku	Bhatt	D	D	
Ku	Kohale	S	P	
Ku	Kurve	A	S	
Ku	Landge	S	S	
	Lanjewar	S	A	
Ku	Laxane	N	S	
Ku	Madavi	K	B	
Ku	Mahale	S	M	
Ku	Mansata	M	G	
	Meshram	P	V	
Ku	Muley	P	A	
Ku	Pahade	S	S	
	Palandurkar	S	S	
Ku	Parihar	M	J	
Ku	Patil	S	B	
Ku	Pokale	K	D	
Ku	Ramteke	S	A	
Ku	Rathod	P	G	
Ku	Saonerkar	S	R	
	Sharma	Z	S	
	Shende	J	B	
	Singh	K	V	
	Tamboli	C	P	
	Thakre	A	C	
Ku	Thul	R	G	
Ku	Uikey	C	D	
	Wanjari	K	D	
Ku	Yadav	R	R	

Action Taken Report

The Plant Tissue Culture Training Program led by Prof. Punita Tiwari significantly enhanced B.Sc. III students' practical skills and theoretical understanding of tissue culture techniques. Key areas covered included media preparation, sterilization, explant handling, and observation. The program yielded successful callus proliferation results and fostered valuable intercollegiate collaboration and industrial exposure. Overall, it provided students with essential skills for further studies or careers in biotechnology and plant sciences.

FEEDBACK FORM

Sr.No.	Question	Response		
		Good	Better	Average
1)	Overall effectiveness of the training program?			
2)	Relevance of practical sessions?			
3)	Clarity of experimental results?			
4)	Faculty support and guidance?