



6 Important Methods of Plant Tissue Culture

Article Shared by **Tanya**

ADVERTISEMENTS:

The following points highlight the six important methods of tissue culture. The methods are: 1. Hanging Drop Culture 2. Double Cover Slip Method 3. Culture in Stewards Auxophyton 4. Culture in Bottles, Conical Flasks etc. 5. Culture in a Micro-Chamber 6. Culture in Petridish, Watch Glass etc..

Method # 1. Hanging Drop Culture:

The simplest method of tissue culture is hanging drop culture (Fig. 2).

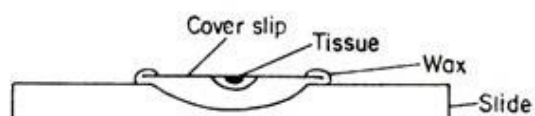


Fig. 2. Hanging drop culture of Harrison.

A portion of the tissue with 1 mm diameter is placed on a coverslip containing a drop of almost solidified medium. A 1" × 3" grooved slide is taken and the coverslip is placed over it. The rim region is sealed with wax. Harrison used this process for tissue culture. In such a culture the tissue remain viable only for few days.

ADVERTISEMENTS:

If the culture medium is changed from time to time the tissue remains viable for longer period. For subculture the tissue is divided into smaller parts and each part is sub-cultured in a new grooved slide with fresh medium. In 1955 de Ropp cultured single cells in hanging drop medium, but only few cells divided.

Method # 2. Double Cover Slip

Method:

Maximov in 1928 first used this method. In this method (Fig. 3) a small round coverslip with the tissue and the medium is placed on a large square coverslip. A drop of water or salt solution attaches the small coverslip

with the large coverslip. Double cover-slips are placed on a grooved slide and the rim of the coverslip is sealed with wax.

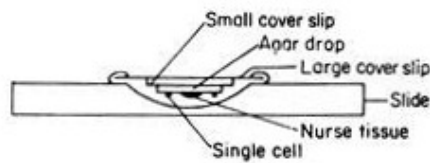


Fig. 3. Maximov's double cover slip method as used by Torrey.

When the culture medium has to be changed, then the small coverslip is carefully detached from the larger coverslip and washed with nutrient solution. The small coverslip is attached to a new larger coverslip and placed on a new grooved slide and the edge is sealed. Torrey ('57) used Maximov's double coverslip method for culture of pea root callus on agar medium.

Method # 3. Culture in Stewards Auxophyton:

Culture can be done in a tube (Fig. 4). The explant is placed in the culture tube and the nutrient medium is poured into it and the mouth of the tube is plugged. In 1952 Steward, Caplin and Miller designed a culture apparatus—called auxophyton for rapid proliferation of small explants (about 3 mg) from carrot root (conical tap root).

ADVERTISEMENTS:

They used a tube (12.5 cm long and 3.5 cm diameter) with a side neck at the middle. After introducing the explant and the medium (10 c.c.) the mouth is closed with a cotton plug, which helps gaseous exchange. About 24 such tubes can be mounted along the edge of a disc which is rotated at slight angle to the horizontal at a speed of 1-2 revolutions per minute.

The tissues are thus alternately exposed to air and the liquid medium, which flows along the tube from end to end. The apparatus is kept in a temperature controlled room and with a fluorescent light the culture tubes are uniformly illuminated.

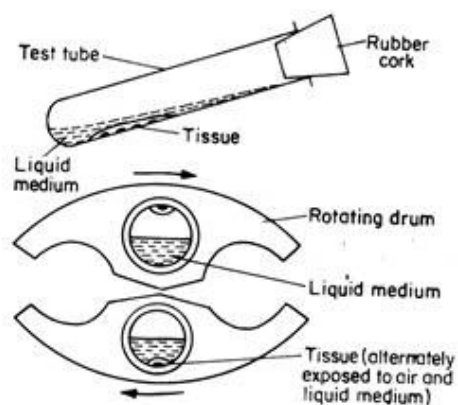


Fig. 4. Culture in a test tube.

In 1956 Steward and Shantz designed nipple flasks to culture several explants for biochemical investigations. 1000 c.c. nipple flask has ten nipples and 250 c.c. nipple flask has eight nipples.

In these flasks explants are distributed in the nipples, and when placed in a auxophyton the explants are alternately exposed to air and culture medium. The medium generally becomes turbid due to the release of free cells and cell aggregates from the explants. This suspension itself may be used for subculture.

Method # 4. Culture in Bottles, Conical Flasks etc.:

When many cells are cultured together then culture is done in a conical flask, bottle or petridish. In culture vessel containing liquid medium inoculation is given.

Cells rapidly increase on the surface of the bottle or conical flask forming monolayer. When whole surface is utilised the cell growth is reduced. If the medium is changed at an interval of 3-4 days then the tissue remains intact for a longer period.

Subculture may be done by scraping the cells from the walls of the flasks or bottles or by shaking or cells are separated by chemicals (such as, trypsin). The cells are centrifuged and cultured in a new bottle or flask. If the flasks, tubes etc. are continuously shaken then the cells increase

rapidly.

ADVERTISEMENTS:

In spinning culture 10 litre culture bottles each containing 4.5 litres of medium are placed in an apparatus at 45° angle to the horizontal and rotated at 80–120 revolutions per minutes. The mouth of the culture bottle is closed by cotton plug. Adequate gaseous exchange occurs and the cells grow very rapidly.

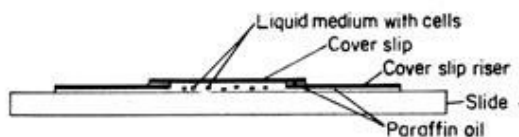


Fig. 5. Culture in a microchamber

Method # 5. Culture in a Micro-Chamber:

Jones, Hildebrandt, Riker and Wu ('60) cultured cells from a callus of the hybrid *Nicotiana tabacum* × *N. glutinosa* in a microchamber, which was sealed with inert mineral oil (Fig. 5). Cells can be minutely observed in such a culture. G.G. Rose ('54) used perfusion chamber for tissue culture of

animal cells.

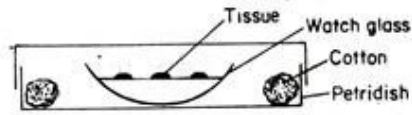


Fig. 6. FehI's method of organ culture

Method # 6. Culture in Petridish, Watch Glass etc.:

Organ may be cultured in a petridish or watch glass (Fig. 6). The petridish may be incubated in a humified incubator. For culture of small number of cells petridish is recommended.

Home >> Biology >> Botany >> Plant Tissue Culture

>> Methods

From the Web

Ads by Revcontent

Ora Si
Possono
Perdere

Chocoslim

Dimagrime
nto Per
Pigri! -21kg

Alfemminile

Il Metodo
Efficace
Per

Lumiskin

I 5
Dimagrime
nti Vip Più

Top Five

Bitcoin-
Milionario
Non Vuole

Millionaire Blue...

Italy:
Market
Failure,

World News

Amici, Non
Avrete
Bisogno
Del Viagra
Se Farete
Questa
Cosa Una
Volta Al

Perta di
peso per i
pigri! Fino a

Naturestore

Giorno

TestoUltra



Welcome to BiologyDiscussion! Our mission is to provide an online platform to help students to share notes in Biology. This website includes study notes, research papers, essays, articles and other allied information submitted by visitors like YOU.

Before sharing your knowledge on this site, please read the following pages:

1. [Content Guidelines](#)
2. [Privacy Policy](#)
3. [TOS](#)
4. [Disclaimer Copyright](#)

**Share Your
Knowledge**

**Share Your
Word File**

**Share Your
PDF File**

**Share Your PPT
File**

QUESTIONS

What happens to the respiratory process in a man going up a hill? **2** Answer

What would happen if HCl were not secreted in the stomach? **0** Answers

How to get good marks in Biology exam? **8** Answer

Explain the transpiration pull theory. **0** Answers

Where are the pollen grains formed in the flower? **2** Answer

ABOUT US

[Home](#)

[Publish
your
Articles](#)

[Privacy
Policy](#)

[Contact
Us](#)

SUGGESTIONS

[Report
Spelling
and
Grammat
ical
Errors](#)

[Suggest
Us](#)

 AdChoices

[Tissue Culture](#)

[Cell Culture Method](#)

 AdChoices

[Method Technique](#)

[Culture Plate](#)

NEW QUESTION S AND ANSWERS AND FORUM CATEGORI ES

[Animal
Kingdom](#)

Biodiversity

Biological
Classificati
on

Biology An
Introduction
12

Biology An
Introduction

Biology in
Human
Welfare
175

Biomolecul
es

Biotechnolo
gy 43

Body Fluids
and
Circulation

Breathing
and
Exchange
of Gases

Cell 217

Cell-
Structure
and
Function

Chemical
Coordinatio
n

Digestion
and
Absorption

Diversity in
the Living
World 12
6

Ecology

93

Ecosystem

Environmental
Issues

Evolution

Excretory
System

Flowering
Plants

Food
Production

Genetics
and
Evolution

110

Human
Health and
Diseases

Human
Physiology

259

Human
Reproducti
on

Immune
System

Living
World

Locomotion
and
Movement

Microbes in
Human
Welfare

Mineral
Nutrition

Molecular
Basis of
Inheritance

Neural
Coordinatio
n

Nutrition

Organisms
and
Population

Photosynth
esis

Plant
Growth and
Developme
nt

Plant
Kingdom

Plant
Physiology
262

Principles
and
Processes

Principles
of
Inheritance
and
Variation

Reproducti
on **245**

Reproducti
on in
Animals

Reproducti
on in
Flowering
Plants

Reproducti
on in
Organisms

Reproducti
ve Health

[Respiration](#)[Structural](#)[Organisatio](#)[n in](#)[Animals](#)[Transport](#)[in Plants](#)[Trending](#)[14](#)

This is a question and answer forum for students, teachers and general visitors for exchanging articles, answers and notes. Answer Now and help others.

[Answer Now](#)

Here's how it works:

Anybody can
ask a question

Anybody can
answer

The best answers are
voted up and rise to the top

Forum Categories

Animal Kingdom	Biodiversity	Biological Classification	Biology An Introduction 12	Biology An Introduction
Biology in Human Welfare 175	Biomolecules	Biotechnology 43	Body Fluids and Circulation	Breathing and Exchange of Gases
Cell 217	Cell- Structure and Function	Chemical Coordination	Digestion and Absorption	Diversity in the Living World 126
Ecology 93	Ecosystem	Environmental Issues	Evolution	Excretory System
Flowering Plants	Food Production	Genetics and Evolution 110	Human Health and Diseases	Human Physiology 259
Human Reproduction	Immune System	Locomotion and Movement	Living World	Microbes in Human Welfare
Mineral Nutrition	Moleculr Basis of Inheritance	Neural Coordination	Nutrition	Organisms and Population
Photosynthesis	Plant Growth and Development	Plant Kingdom	Plant Physiology 262	Principles and Processes
Principles of Inheritance and Variation	Reproduction 245	Reproduction in Animals	Reproduction in Flowering Plants	Reproduction in Organisms
Reproductive Health	Respiration	Structural Organisation in Animals	Transport in Plants	Trending 14