Padasalai's Telegram Groups!

(தலைப்பிற்கு கீழே உள்ள லிங்கை கிளிக் செய்து குழுவில் இணையவும்!)

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PLANT TISSUE CULTURE

BOOK BACK ANSWER

1. Totipotency refers to
a) capacity to generate genetically identical plants.
b) capacity to generate a whole plant from any plant cell / explant.
c) capacity to generate hybrid protoplasts.
d) recovery of healthy plants from diseased plants

2. Micro propagation involves
a) vegetative multiplication of plants by using micro-organisms.
b**) vegetative multiplication of plants by using small explants.**
c) vegetative multiplication of plants by using microspores.
d) Non-vegetative multiplication of plants by using microspores and megaspores.

3. Match the following :

Column A	Column B
1) Totipotency	A) Reversion of mature cells into meristerm
2) Dedifferentiation	B) Biochemical and structural changes of cells
3) Explant	C) Properties of living cells develops into entire plant
4) Differentiation	D) Selected plant tissue transferred to culture medium

	1	2	3	4
a)	**C**	**A**	**D**	**B**
b)	A	C	B	D
c)	B	A	D	C
d)	D	B	C	A

4. The time duration for sterilization process by using autoclave is ___minutes and the temperature is ___
a) 10 to 30 minutes and 125° C **b) 15 to 30 minutes and 121° C**
c) 15 to 20 minutes and 125° C d) 10 to 20 minutes and 121° C

5. Which of the following statement is correct
a) Agar is not extracted from marine algaesuch as seaweeds.
b) Callus undergoes differentiation and produces somatic embryoids.
c) Surface sterilization of explants is done by using mercuric bromide
d) P^H of the culture medium is 5.0 to 6.0

6. Select the incorrect statement from given statement

a) A tonic used for cardiac arrest is obtainedfrom Digitalis purpuria

b**) Medicine used to treat Rheumatic painis extracted from Capsicum annum**

c) An anti malarial drug is isolated from Cinchona officinalis.

d) Anti-cancinogenic property is not seen in Catharanthus roseus.

7. Virus free plants are developed from

a) Organ culture **b) Meristem culture**

c) Protoplast culture d) Cell suspension culture

8. The prevention of large scale loss of biologicalinterity

a) Biopatent b) Bioethics **c) Biosafety** d) Biofuel

9. Cryopreservation means it is a process topreserve plant cells, tissues or organs

a) at very low temperature by using ether.

b) at very high temperature by using liquidnitrogen

c) at very low temperature of -196 by using liquid nitrogen

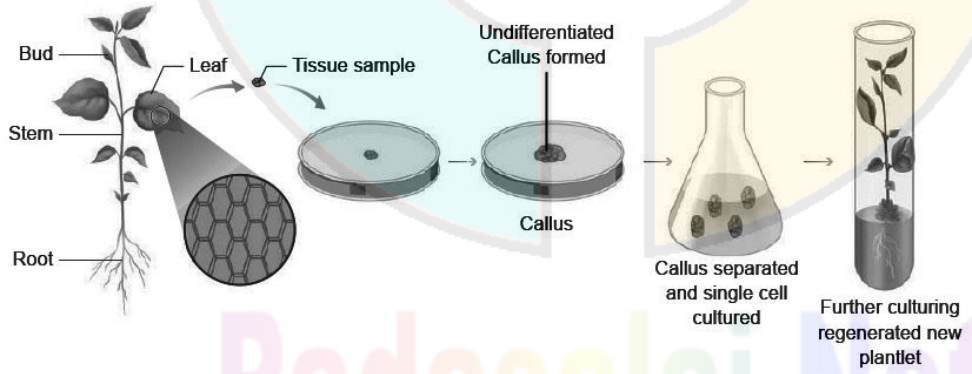
d) at very low temperature by using liquidnitrogen

10. Solidifying agent used in plant tissue culture is

a) Nicotinic acid b) Cobaltous chloride

c) EDTA **d) Agar**

11. What is the name of the process givenbelow? Write its 4 types.



The name of the process is basic steps in plant tissue culture technology.

Types of Plant tissue cultures

Based on the explants some other plant tissue culture types are

1.Organ culture 2.Meristem culture

3.Protoplast culture 4.Cell culture.

12. How will you avoid the growing of microbes in nutrient medium during culture process? What are the techniques used to remove the microbes?

Sterilization is a process to avoid the growing of microbes in nutrient medium during culture process.

Sterilization is a technique to get rid of microbes such as bacteria & fungi in the culture medium

The techniques used to remove the microbes in nutrient medium

- Culture media are dispensed in glass containers, plugged with non-absorbent cotton or sealed with plastic closures.
- Then sterilized using autoclave at 15 psi (121°C) for 15 to 30 minutes.
- The plant extracts, vitamins, amino acids and hormones are sterilized by passing through Millipore filter with 0.2 mm pore diameter.
- Then added to sterilized culture medium inside Laminar Airflow Chamber under sterile Condition.

13. Write the various steps involved in cell suspension culture.

- The culture of single cells or aggregates of cells in vitro in liquid medium is known as cell suspension culture.
- The cell suspension is prepared by transferring a portion of callus to the liquid medium and agitated using rotary shaker instrument.
- The cells are separated from the callus tissue and used for cell suspension culture.
- Cell suspension culture can be useful for the production of secondary metabolites like alkaloids, flavonoids, terpenoids, phenolic compounds and recombinant proteins.

14. What do you mean Embryoids? Write its application.

Somatic embryogenesis is the formation of embryos from the callus tissue directly and these embryos are called **Embryoids** or from the *in vitro* cells directly form pre-embryonic cells which differentiate into embryoids

Applications of somatic embryogenesis

- It provides potential plantlets which after hardening period can establish into plants.
- Somatic embryoids can be used for the production of synthetic seeds.
- Somatic embryogenesis is now reported in many plants. Example: Allium sativum, Hordeum vulgare, Oryza sativa, Zea mays.
- Synthetic seeds are produced by encapsulation of embryoids in agarose gel or calcium alginate.

15. Give the examples for micro propagation performed plants.

Pineapple, banana, strawberry and potato are the examples for micro propagation performed plants.

16. Explain the basic concepts involved in plant tissue culture.

Basic concepts of plant tissue culture are totipotency, differentiation, dedifferentiation and redifferentiation.

Totipotency

The property of live plant cells that they have the genetic potential when cultured in nutrient medium to give rise to a complete individual plant.

Differentiation

The process of biochemical and structural changes by which cells become specialized in form and function.

Redifferentiation

The further differentiation of already differentiated cell into another type of cell. For example, when the component cells of callus have the ability to form a whole plant in a nutrient medium, the phenomenon is called redifferentiation.

Dedifferentiation

The phenomenon of the reversion of mature cells to the meristematic state leading to the formation of callus is called dedifferentiation.

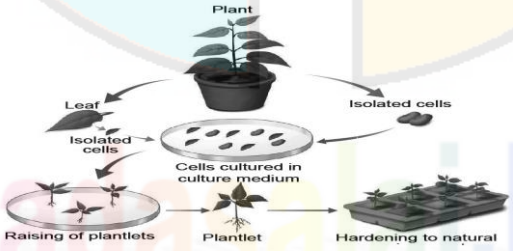
These two phenomena of redifferentiation and dedifferentiation are the inherent capacities of living plant cells or tissue. This is described as totipotency.

17. Based on the material used, how will you classify the culture technology? Explain it.

Based on the explants the culture technology types are 1.Organ culture 2.Meristem culture 3.Protoplast culture 4.Cell culture.

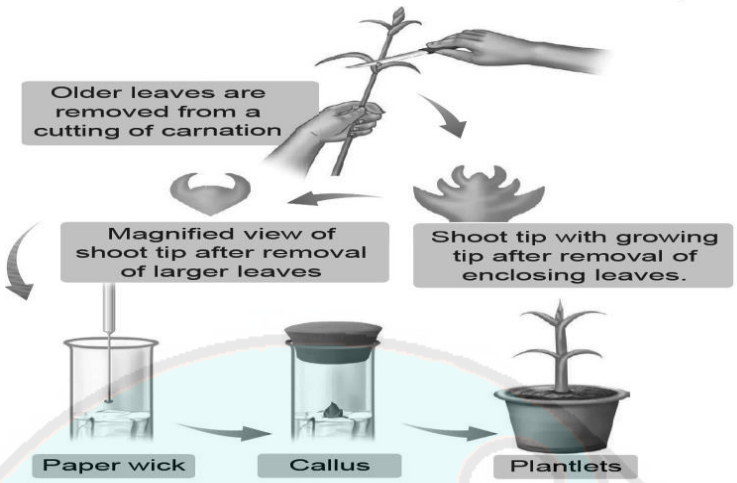
1.Organ culture:

- The culture of embryos, anthers, ovaries, roots, shoots or other organs of plants on culture media is called organ culture.



2.Meristem Culture:

- The culture of any plant meristematic tissue on culture media is called meristem culture.



3.Protoplast Culture:

- Protoplasts are cells without a cell wall but bounded by a plasma membrane.
- Using protoplasts, regenerate whole plants from single cells and also develop somatic hybrids.

The steps involved in protoplast culture.

i. Isolation of protoplast:

- The leaf tissue are used for isolation of protoplast. The leaf tissue is immersed in 0.5% Macrozyme and 2% Onozuka cellulase enzymes dissolved in 13% sorbitol or mannitol at pH 5.4. It is then incubated over-night at 25°C. After, protoplasts are obtained. These are then transferred to 20% sucrose solution to retain their viability. They are then centrifuged to get pure protoplasts.

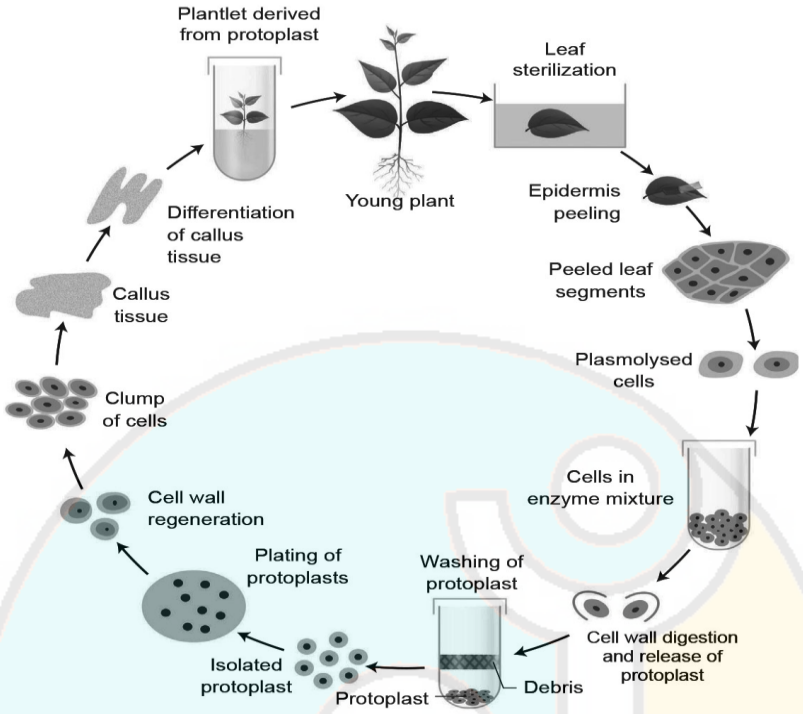
ii. Fusion of protoplast:

- It is done through a suitable fusogen of PEG (Polyethylene Glycol).
- The isolated protoplast are incubated in 25 to 30% concentration of PEG with Ca++ ions.
- The protoplast shows agglutination (the formation of clumps of cells) and fusion.

iii. Culture of protoplast:

- MS liquid medium is used with some modification in droplet, plating or micro-drop array techniques. Protoplast viability is tested with fluorescein diacetate before the culture.
- The cultures are incubated in continuous light 1000-2000 lux at 25°C. The cell wall formation occurs within 24-48 hours. The first division of new cells occurs between 2-7 days of culture.

iv. Selection of somatic hybrid cell: The fusion product of protoplasts without nucleus of different cells is called a cybrid. Following this nuclear fusion happen. This process is called somatic hybridization.



4. Cell Suspension Culture

- The culture of single cells or aggregates of cells in vitro in liquid medium is known as cell suspension culture.
- The cell suspension is prepared by transferring a portion of callus to the liquid medium and agitated using rotary shaker instrument.
- The cells are separated from the callus tissue and used for cell suspension culture.

18. Give an account on Cryopreservation.

Cryopreservation, also known as Cryo-conservation, is a process by which protoplasts, cells, tissues, organelles, organs, extracellular matrix, enzymes or any other biological materials are subjected to preservation by cooling to very low temperature of –196°C using liquid nitrogen.

At this extreme low temperature any enzymatic or chemical activity of the biological material will be totally stopped and this leads to preservation of material in dormant status.

Later these materials can be activated by bringing to room temperature slowly for any experimental work.

Protective agents like dimethyl sulphoxide, glycerol or sucrose are added before cryopreservation process. These protective agents are called cryoprotectants, since they protect the cells, or tissues from the stress of freezing temperature.

19. What do you know about Germplasm conservation. Describe it.

Germplasm conservation refers to the conservation of living genetic resources like pollen, seeds or tissue of plant material maintained for the purpose of selective plant breeding, preservation in live condition and used for many research works.

Germplasm conservation resources is a part of collection of seeds and pollen that are stored in seed or pollen banks, so as to maintain their viability and fertility for any later use such as hybridization and crop improvement. Germplasm conservation may also involve a gene bank, DNA bank of elite breeding lines of plant resources for the maintenance of biological diversity and also for food security.

20. Write the protocol for artificial seed preparation.

Artificial seeds or synthetic seeds (synseeds) are produced by using embryoids (somatic embryos). This is obtained through in vitro culture. They may even be derived from single cells from any part of the plant. Later divide to form cell mass containing dense cytoplasm, large nucleus, starch grains, proteins, and oils etc.,

To prepare the artificial seeds different inert materials are used for coating the somatic embryoids like agrose and sodium alginate.

Establishment of callus tissue

Induction of somatic embryo genesis

Maturation of somatic embryos

Encapsulation of somatic embryosby the use of agrose & sodium alginate

Test for embryoid to plant conversion

Green house & field planting

OTHER IMPORTANT QUESTION

21. [i] Mention the property that enables the explants to regenerate into a new plant?

[ii] A banana herb is virus infected. Describe the method that will help in obtaining healthy banana plants from this diseased plant? [OR] How is it possible to recover healthy banana plants from a diseased but desirable quality banana plant.Explain?

- [i] Totipotency
- [ii] Healthy banana plants can be obtained from diseased plants by meristem culture. Although the plant is virus infected the apical & axillary meristem is free of virus. This meristem is removed from the plant & grown in vitro by micropropagation. The plants produced are virus free

22. Why do we add dimethyl sulphoxide, glycerol or sucrose before cryopreservation?

- Protective agents like dimethyl sulphoxide, glycerol or sucrose are added before cryopreservation process.
- These protective agents are called cryoprotectants, since they protect the cells, or tissues from the stress of freezing temperature.

23. What are embryoids?

The callus cell undergoes differentiation and produces somatic embryos known as embryoids.

Somatic embryogenesis is the formation of embryos from the callus tissue directly and these embryos are called **Embryoids** or from the *in vitro* cells directly form pre-embryonic cells which differentiate into embryoids

23. By using gene manipulation research we produce varieties of organism. What is the need of biosafety in it?

- Safety aspects associated with contamination, infection or mutation of process strains.
- Safety aspects associated with the industrialuse of microorganisms containing *in vitro*recombinants.
- Pathogenicity of living organisms andviruses - natural and genetically modified-to infect humans, animals and plants tocause diseases.
- Toxicity of allergy associated with microbialproduction.
- Increasing number of antibiotic resistantpathogenic microorganisms.
- Problems associated with the disposal ofspent microbial biomass and purification ofeffluent from biotechnological process.

24. How to remove cell wall of a plant cell?

Small bits of planttissue like leaf tissue are used for isolation ofprotoplast.

The leaf tissue is immersed in 0.5%Macrozyme and 2% Onozuka cellulase enzymesdissolved in 13% sorbitol or mannitol at pH 5.4.It is then incubated over-night at 25°C.

After agentle teasing of cells, protoplasts are obtained,and these are then transferred to 20% sucrosesolution to retain their viability.

They are thencentrifuged to get pure protoplasts as differentfrom debris of cell walls.

25. **List out the ethical issue of genomic research.**

Privacy and fairness in the use of geneticinformation, including the potential forgenetic discrimination in employment andinsurance.

The integration of new genetic technologies,such as genetic testing, into the practice ofclinical medicine.

Ethical issues surrounding the design andconduct of genetic research with people,including the process of informed consent

26. Define plant tissue culture.

Growing plant protoplasts, cells, tissues or organs away from their natural or normal environment, under artifi cial condition, is known as Tissue Culture. It is also known as *in vitro* (*In vitro* is a Latin word, it means that - in glass or in test-tube) growth of plant protoplasts, cells, tissues and organs.

27. Difine Explant.

Explant: The tissue taken from a selected plant transferred to a culture medium often to establish a new plant.

28. Define Sterilization.

Sterilization is the technique employed to getrid of microbes such as bacteria and fungi in theculture medium, vessels and explants.

29.Name the Medium for plant tissue culture.

MS nutrient medium (Murashige and Skoog 1962)
B5 medium (Gamborg.et.al 1968),
White medium (white 1943),
Nitsch's medium (Nitsch & Nitsch 1969).

30. Define Agar.

Agar: A complex mucilaginous polysaccharide obtained from marine algae (sea weeds) used as solidifying agent in media preparation.

31. Define Inoculation

Transferring the explants to sterile glass tube containing nutrient medium

32.Define Callus.

Callus is a mass of unorganized growth of plant cells or tissues in *in vitro* culture medium.

33. Define Hardening

The plantlets developed *in vitro* require ahardening period and so are transferred togreenhouse or hardening chamber and then tonormal environmental conditions.

Hardening is the gradual exposure of *in vitro*developed plantlets in humid chambers indiffused light for acclimatization so as to enablethem to grow under normal field conditions.

34. Write the Applications of Plant Tissue Culture

Plant tissue culture techniques have several applications such as:

i. Improved hybrids production throughsomatic hybridization.

ii. Somatic embryoids can be encapsulatedinto synthetic seeds (synseeds). Theseencapsulated seeds or synthetic seeds helpin conservation of plant biodiversity.

iii. Production of disease resistant plantsthrough meristem and shoot tip culture.

iv. Production of stress resistant plants likeherbicide tolerant, heat tolerant plants.

v. Micropropagation technique to obtainlarge numbers of plantlets of both crop andtree species useful in forestry within a shortspan of time and all through the year.

vi. Production of secondary metabolites fromcell culture utilized in pharmaceutical,cosmetic and food industries.

35. Write the Advantages of Artificial seeds

Artificial seeds have many advantages over the true seeds

1. Millions of artificial seeds can be producedat any time at low cost.
2. They provide an easy method to producegenetically engineered plants with desirable traits.
3. It is easy to test the genotype of plants.
4. They can potentially stored for long timeunder cryopreservation method.
5. Artificial seeds produce identical plants
6. The period of dormancy of artificial seeds isgreatly reduced, hence growth is faster witha shortened life cycle.

36. Explain parts of patent.

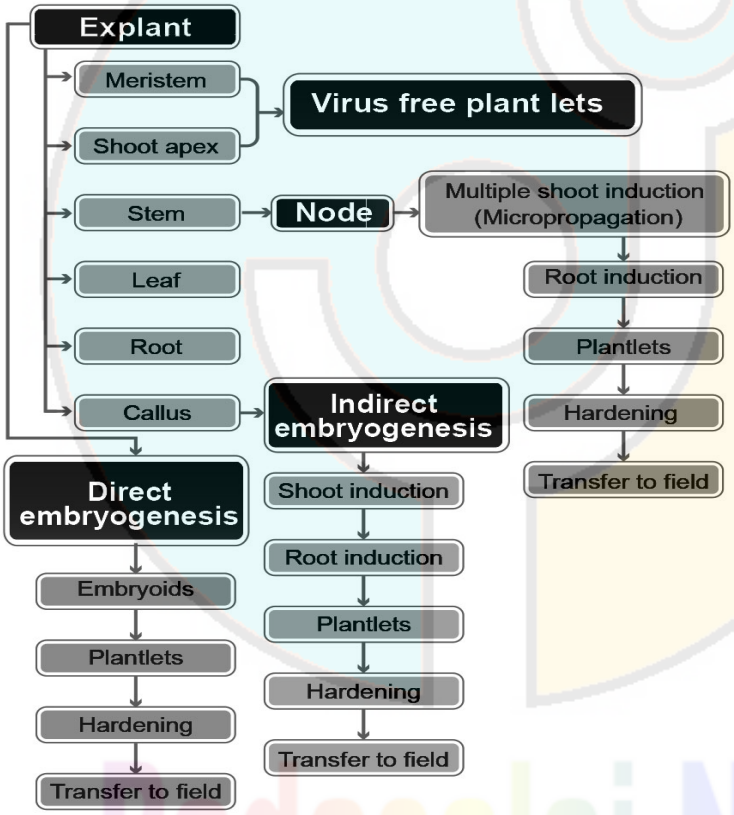
A patent consists of three parts: the grant,specifications and claims.

- **The grant** is filled at the patent office whichis not published. It is a signed document,actually the agreement that grants patentright to the inventor.
- **The specification** and claims are publishedas a single document which is made publicfrom the patent office. The specification partis narrative in which the subject matter ofinvention is described as how the inventionwas carried out.
- **The claim** specifically defines the scope ofthe invention to be protected by the patentwhich the others may not practice.

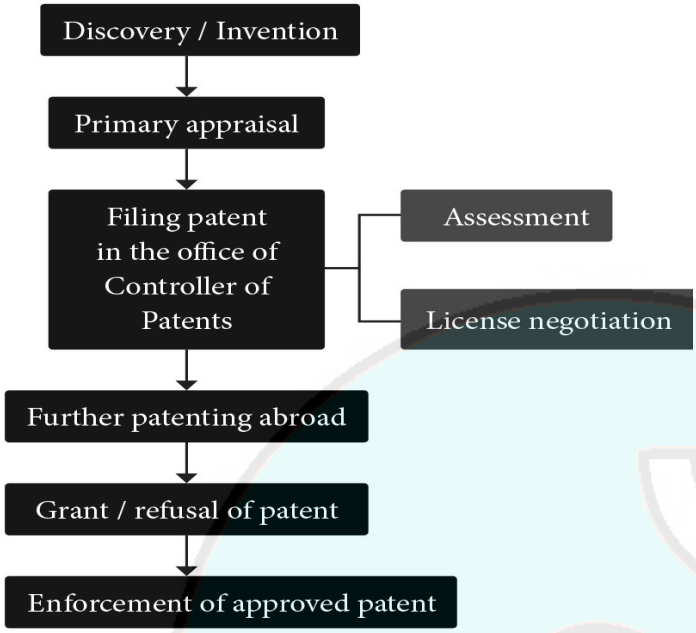
37. Biosafety guidelines are being implemented by:

The Institutional Bio-safety Committees(IBSCs) monitor the research activity atinstitutional level.
The Review Committee on GeneticManipulation (RCGM) functioning inthe Department of Biotechnology (DBT)monitors the risky research activities in thelaboratories.
The Genetic Engineering ApprovalCommittee (GEAC) of Ministry ofEnvironment and Forest has the powerto permit the use of Genetically ModifiedOrganism (GMO) at commercial level andopen field trials of transgenic materialsincluding agricultural crops, industrialproducts and health care products.

38. Draw the flow chart of plant regeneration pathway

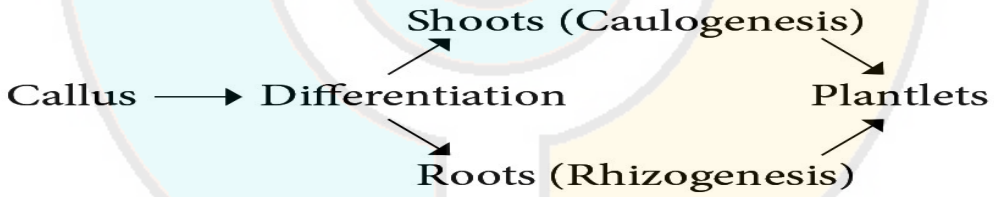


40. Give the flow chart of general steps in patenting



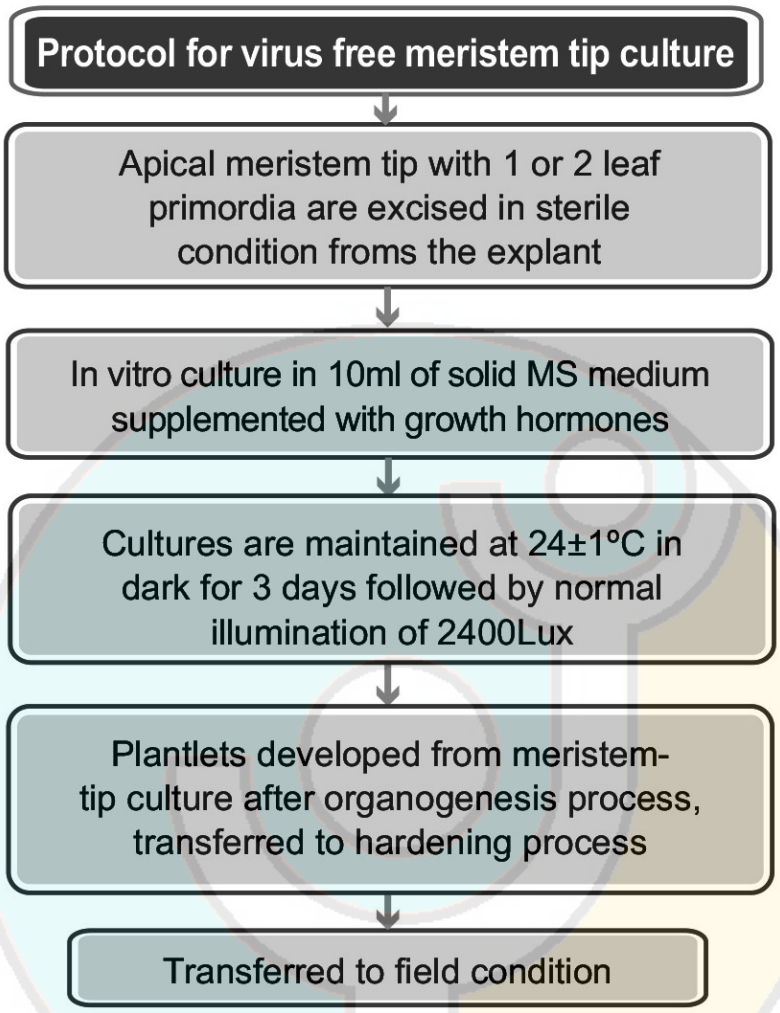
41. Describe organogenesis

The morphological changes occur in the callus leading to the formation of shoot and roots is called organogenesis.

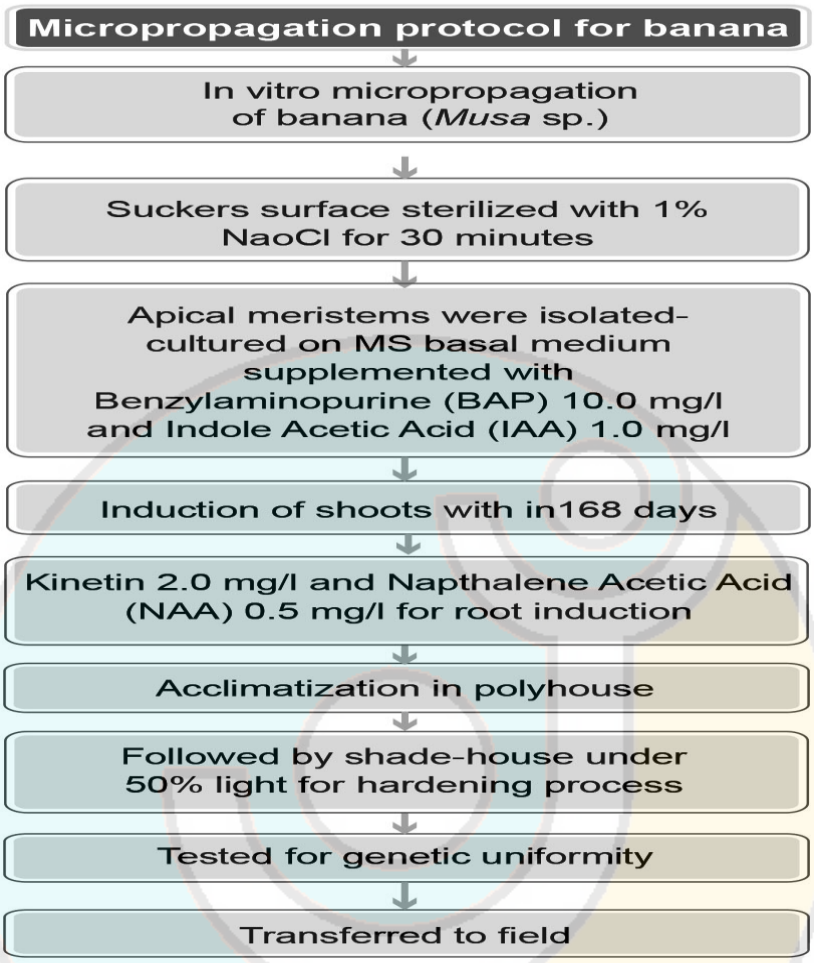


- Organogenesis can be induced in vitro by introducing plant growth regulators in the MS medium.
- Auxin and cytokinins induce shoot and root formation.

42. Write the schematic diagrammatic representation of micro propagation protocol for virus-free meristem tip culture.



43. Write the schematic diagrammatic representation of micro propagation protocol for Banana.



44. State the three fundamental principles of plant tissue culture

- The plant part (explant) must be selected and isolated from the rest of plant body.
- The explant must be maintained in controlled physically and chemically defined conditions.
- Aseptic condition must be maintained, in the laboratory.

45. Differentiate Somaclonal variations and Gametoclonal variation.

Somaclonal variations: Somatic variations found in plants regenerated in vitro somatic (i.e. variations found in leaf, stem, root, tuber or propagule)

Gametoclonal variations: Gametophytic variations found in plants regenerated in vitro gametic origin (i.e. variations found in gametes and gametophytes)

46. Define secondary metabolites.

Secondary metabolites are chemical compounds that are not required by the plant for normal growth and development but are produced in the plant as 'byproducts' of cell metabolism. For Example: Biosynthesis and isolation of indole alkaloids from *Catharanthus roseus* plant cell culture.

47. Describe the Knop's solution

Nutrient solution used in growth experiments of plants which contains: Calcium nitrate 3.0 g Magnesium sulfate 1.0 g Potassium nitrate 1.0 g Dibasic Potassium phosphate 1.0 g Sucrose 50.0 g (optimal) Deionized water 1000.0 ml.

48. What is cybrid ?

The fusion product of protoplasts without nucleus of different cells is called a cybrid.

49. How is IPR protected?

The IPR is protected by different ways like patents, copyrights, trade secrets and trademarks, designs and geographical indications.

50. What is the function of GEAC?

It regulate -manufacturing, use, import, export and storage of hazardous microbes or genetically modified organisms (GMOs) and cells in the country.

It approves - activities involving large scale use of hazardous microbes, and recombinants in research & Industrial production.

It is responsible - for approval of proposals relating to release of GEO and products into the environment including experimental field trials **(Biosafety Research Level - trial – I and II known as BRL - I and BRL - II)**

51. What is Patency?

It is a special right to the discoverer/inventorthat has been granted by the governmentthrough legislation for trading new articles.

A patent is a personal property whichcan be licensed or sold by the person ororganisation just like any other property.

Patent terms give the inventor the rights toexclude others from making, using or sellinghis invention.

It is difficult to keep secret certain inventionsand therefore, guidance should be obtainedfrom a qualified patent attorney.

R.UTHAYAKUMAR
P.G. Asst. in Botany
Sri Venkateshwara Vidhyalayaa Higher Secondary School,
Thasampalayam, Gobi – 638 476.
7810917500

Class : XII **Bio – Botany** **Marks : 35**

Plant Tissue Culture

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I. Choose the correct answer: **8x1=8**

1. The prevention of large scale loss of biological interity

   (a) Biopatent (b) Bioethics (c) Biosafety (d) Biofuel

2. Solidifying agent used in plant tissue culture is

   (a) Nicotinic acid (b) Cobaltous chloride (c) EDTA (d) Agar

3. Protoplast are the cells devoid of _____

   (a) Cell wall (b) Cell membrane

   (c) Plasma membrane (d) both A and B

4. A widely used fusogen in protoplast culture is _____

   (a) Polymethyl glycol (b) Polyethylene glycol

   (c) Polyethylene chloride (d) Polyvinyl chloride

5. Identify the mismatched pair:

   (a) Digoxin - Digitalis purpuria (b) Codeine - Capsicum annum

   (c) Vincristine - Catharanthus roseus (d) Quinine - Cinchona officinalis

6. Synseeds are developed by encapsulating embryoids with _____.

   (a) Sodium chloride (b) Potassium iodide

   (c) Sodium alginate (d) Potassium dichromate

7. Virus free plants are developed from

   (a) Organ culture (b) Meristem culture

   (c) Protoplast culture (d) Cell suspension culture

8. The time duration for sterilization process by using autoclave is _____ minutes and the temperature is _____

   (a) 10 to 30 minutes and 125° C (b) 15 to 30 minutes and 121° C

   (c) 15 to 20 minutes and 125° C (d) 10 to 20 minutes and 121° C

II. Answer the following any four questions. 4x2=8

9. Name the two inherent capacity responsible for cellular totipotency.
10. Give the examples for micro propagation performed plants.
11. Why do we add dimethyl sulphoxide, glycerol or sucrose before cryopreservation?
12. Name the Medium for plant tissue culture.
13. Define Callus.
14. How is IPR protected?

III. Answer the following any three questions.
Question No. 18 is compulsory. 3x3=9

15. How synthetic seeds are developed?
16. What do you mean Embryoids? Write its application. (any 2)
17. List out the ethical issue of genomic research.
18. Describe organogenesis.
19. Give the flow chart of general steps in patenting

IV. Answer the following questions. 2x5=10

20. a) Explain the basic concepts involved in plant tissue culture

(OR)

b) Write the Applications of Plant Tissue Culture

21. a) Write the schematic diagrammatic representation of micro propagation protocol for Banana.

(OR)

b) 1. Define Agar.
2. Define Inoculation
3.Define Hardening

******All the Best******

Chapter 10: Economically Useful Plants and Entrepreneurial Botany

1. Consider the following statements and choose the right option.
i) Cereals are members of grass family.
ii) Most of the food grains come from monocotyledon.
a) (i) is correct and (ii) is wrong
b) Both (i) and (ii) are correct
c) (i) is wrong and (ii) is correct
d) Both (i) and (ii) are wrong

2. Assertion: Vegetables are important part of healthy eating.
Reason: Vegetables are succulent structures of plants with pleasant aroma and flavours.
a) Assertion is correct, Reason is wrong
b) Assertion is wrong, Reason is correct
c) Both are correct and reason is the correct explanation for assertion.
d) Both are correct and reason is not the correct explanation for assertion.

3. Groundnut is native of _____
a) Philippines b) India
c) North America **d) Brazil**

4. Statement A: Coffee contains caffeine
Statement B : Drinking coffee enhances cancer
a) A is correct, B is wrong
b) A and B – Both are correct
c) A is wrong, B is correct
d) A and B – Both are wrong

5. Tectona grandis is coming under family
a) Lamiaceae b) Fabaceae
c) Dipterocaipaceae d) Ebenaceae

6. Tamarindus indica is indigenous to
a) Tropical African region
b) South India, Sri Lanka
c) South America, Greece
d) India alone

7. New world species of cotton
a) Gossipium arboretum
b) G.herbaceum
c) Both a and b
d) G.barbadense

8. Assertion: Turmeric fights various kinds of cancer
Reason: Curcumin is an anti-oxidant present in turmeric
a) Assertion is correct, Reason is wrong
b) Assertion is wrong, Reason is correct
c) Both are correct
d) Both are wrong

9. Find out the correctly matched pair.

a) Rubber - Shorea robusta
b) Dye - Lawsonia inermis
c) Timber - Cyperus papyrus
d) Pulp - Hevea brasiliensis

10. Observe the following statements and pick out the right option from the following:
Statement I – Perfumes are manufactured from essential oils.
Statement II – Essential oils are formed at different parts of the plants.
a) Statement I is correct
b) Statement II is correct
c) Both statements are correct
d) Both statements are wrong

11. Observe the following statements and pick out the right option from the following:
Statement I: The drug sources of Siddha include plants, animal parts, ores and minerals.
Statement II: Minerals are used for preparing drugs with long shelf-life.
a) Statement I is correct
b) Statement II is correct
c) Both statements are correct
d) Both statements are wrong

12. The active principle trans-tetra hydro canabial is present in
a) Opium b) Curcuma
c) Marijuana d) Andrographis

13. Which one of the following matches is correct?
a) Palmyra - Native of Brazil
b) Saccharun - Abundant in Kanyakumari
c) Steveocide - Natural sweetener
d) Palmyra sap - Fermented to give ethanol

14. The only cereal that has originated and domesticated from the New world.
a) Oryza sativa b)Triticum asetumn
c) Triticum duram **d) Zea mays**

Botanical name	Uses
Rice / Paddy - ***Oryza sativa***	**1. Rice** is the easily digestible calorie rich cereal food which is used as a staple food in Southern & North East India. **2. Flaked rice** (Aval), **Puffed rice** / **parched rice** (Pori) are used as breakfast cereal or as snack food in different parts of India. **3. Rice bran oil** obtained from the rice bran is used in culinary and industrial purposes. **4. Husks** are used as fuel, and in the manufacture of packing material and fertilizer.
Wheat - ***Triticum aestivum***	**1**. Wheat is the staple food in Northern India. **2. Wheat flour** is suitable to make bread and other bakery products. **3**. Processed wheat flour, that has little fibre, is called **Maida.** which is used extensively in making parota, naan and bakery products. **4. Malted wheat** is a major raw material for producing alcoholic beverages and nutritive drinks.
Finger Millet – Ragi ***Eleusine coracana***	1. It is used as a staple food in many southern hilly regions of India. 2. **Ragi grains** are made into porridge and gruel. 3. **Ragi malt** is the popular nutrient drink. It is used as a source of fermented beverages.
Sorghum - ***Sorghum vulgare***	1. It is fed to poultry, birds, pigs and cattle and a source of fermented alcoholic beverage.
Foxtail Millet - ***Setaria italic***	1. It supports in strengthening of heart and improves eye sight. 2. Thinai porridge is given to lactating mother.

Kodo Millet - ***Paspalum scrobiculatum***	1. Kodo millet is ground into flour and used to make pudding. 2. Good diuretic and cures constipation. Helps to reduce obesity, blood sugar and blood pressure.
Kodo Millet - ***Vigna mungo***	1. Black gram is eaten whole or split, boiled or roasted or ground into flour. 2. Black gram batter is a major ingredients for the preparation of popular Southern Indian breakfast dishes. 3. Split pulse is used in seasoning Indian curries.
Red gram - ***Cajanus cajan***	1. Red gram is a major ingredient of sambar, a characteristic dish of Southern India. 2. Roasted seeds are consumed either salted or unsalted as a popular snack. 3. Young pods are cooked and consumed.
Green gram - ***Vigna radiate***	1. It can be used as roasted cooked and sprouted pulse. 2. Green gram is one of the ingredients of pongal, a popular breakfast dish in Tamil Nadu. 3. Fried dehulled and broken or whole green gram is used as popular snack. 4. The flour is traditionally used as a cosmetic, especially for the skin.
Lady's finger / Okra - ***Abelmoschus esculentus***	1. The fresh and green tender fruits are used as a vegetable. 2. Often they are sliced and dehydrated to conserve them for later use. 3. It has most important nutrients.
Mango (National fruit of India) ***Mangifera indica***	1. Mango is the major table fruit of India, which is rich in beta carotenes. 2. It is utilized in many ways, as dessert, canned, dried and preserves in Indian cuisine. 3. Sour, unripe mangoes are used in chutneys, pickles, side dishes, or may be eaten raw with salt and chili. 4. Mango pulp is made into jelly. 5. Aerated and non-aerated fruit juice is a popular soft drink.

Cashew nut : ***Anacardium occidentale***	1. Cashews are commonly used for garnishing sweets or curries, or ground into a paste that forms a base of sauces for curries or some sweets. 2. Roasted and raw kernels are used as snacks.
Sugarcane : ***Saccharum officinarum***	1. Sugar cane is the raw material for extracting white sugar. 2. Sugarcane supports large number of industries like sugar mills producing refined sugars, distilleries producing liquor grade ethanol and millions of jaggery manufacturing units. 3. Fresh sugarcane juice is a refreshing drink. 4. Molasses is the raw material for the production of ethyl alcohol.
Palmyra (State tree of Tamil Nadu): ***Borassus flabellifer***	1. Exudate from inflorescence axis is collected for preparing palm sugar. 2. Inflorescence is tapped for its sap which is used as health drink. 3. Sap is processed to get palm jaggery or fermented to give **toddy**. 4. Endosperm is used as a refreshing summer food. 5. Germinated seeds have an elongated embryo surrounded by fleshy scale leaf which is edible.
Groundnut / Peanut: ***Arachis hypogaea***	1. Nuts contain about 45% oil. 2. The kernels are also rich sources of phosphorous and vitamins, particularly thiamine, riboflavin and niacin. 3. It is premium cooking oil because it does not smoke. 4. Lower grade oil is used in manufacture of soaps and lubricants.
Sesame / Gingelly: ***Sesamum indicum***	1. Sesame oil is used for mostly culinary purposes in India. 2. Lower grades are used in manufacture of soaps, in paint industries, as a lubricant and as an illuminant. 3. In India, the oil is the basis of most of the scented oils used in perfumes. 4. Sesame seed snacks are popular throughout India.

Coffee: ***Coffea Arabica***	1. Drinking coffee in moderation provides the following health benefits: 2. Caffeine enhances release of acetylcholine in brain, which in turn enhances efficiency. 3. It can lower the incidence of fatty liver diseases, cirrhosis and cancer. 4. It may reduce the risk of type 2 diabetes
Cardamom: ***Elettaria cardamomum*** **"Queen of Spices"**	1. The seeds have a pleasing aroma and a characteristic warm, slightly pungent taste. 2. It is used for flavouring confectionaries, bakery products and beverages. 3. The seeds are used in the preparation of curry powder, pickles and cakes. 4. Medicinally, it is employed as a stimulant and carminative. It is also chewed as a mouth freshener.
Black Pepper: ***Piper nigrum*** **"King of Spices"** **"Black Gold of India"**	1. It is used for flavouring in the preparation of sauces, soups, curry powder and pickles. 2. It is used in medicine as an aromatic stimulant for enhancing salivary and gastric secretions and also as a stomachic. 3. Pepper also enhances the bio-absorption of medicines.
Turmeric: ***Curcuma longa***	1. Turmeric is one of the most important and ancient Indian spices and used traditionally over thousands of years for culinary, cosmetic, dyeing and for medicinal purposes. 2. It is an important constituent of curry powders. 3. Turmeric is used as a colouring agent in pharmacy, confectionery and food industry. 4. Rice coloured with turmeric (yellow) is considered sacred and auspicious which is used in ceremonies. 5. It is also used for dyeing leather, fibre, paper and toys.

Chillies / Red Pepper: ***Capsicum annuum,*** ***C. frutescens*.**	1. The fruits of *C.annuum* are less pungent than the fruits of *C.frutescens*. 2. *C.annum* includes large, sweet bell peppers. 3. Long fruit cultivars of this species are commercially known as 'Cayenne pepper' which are crushed, powdered and used as condiment. 4. Chillies are used in manufacture of sauces, curry powders and preparation of pickles.
Tamarind: ***Tamarindus indica*** **"Dates of India"**	1. It is used in flavouring sauces in the United States and Mexico. 2. In India, the fruit pulp is major ingredients for many culinary preparations. 3. Sweet tamarinds are sold as table fruits in India imported from Thailand and Malaysia
Cotton: *Gossypium* spp.	1. It is mainly used in the manufacturing of various textile, hosiery products, toys and is also used in hospitals.
Jute : *Corchorus* spp.	1. It is one of the largest exported fibre material of India. The jute industry occupies an important place in the national economy of India. 2. Jute is used for 'safe' packaging in view of being natural, renewable, bio-degradable and eco-friendly product. 3. It is used in bagging and wrapping textile. 4. About 75% of the jute produced is used for manufacturing sacks and bags. 5. It is also used in manufacture of blankets, rags, curtains etc. 6. It is also being used as a textile fibre in recent years.

Teak: ***Tectona grandis***	1. The heartwood is golden yellow to golden brown when freshly sawn, turning darker when exposed to light. Known for its durability as it is immune to the attack of termites and fungi. 2. The wood does not split or crack and is a carpenter friendly wood. 3. It was the chief railway carriage and wagon wood in India. 4. Ship building and bridge-building depends on teakwood. 5. It is also used in making boats, toys, plywood, door frames and doors.
Rubber: ***Hevea brasiliensis***	1. Tyre and other automobile parts manufacturing industries consume 70% of the rubber production. 2. Rubber is used in manufacturing footwear, wire and cable insulations, rain-coats, household and hospital goods, shock absorbers, belts, sports goods, erasers, adhesives, and rubber-bands . 3. Hard rubber is used in the electrical and radio engineering industries Concentrated latex is used for making gloves, balloons and condoms. 4. Foamed latex is used in the manufacture of cushions, pillows and life-belts.
Henna: ***Lawsonia inermis***	1. An orange dye 'Henna' is obtained from the leaves and young shoots of *Lawsonia inermis.* *2.* The principal colouring matter of leaves 'lacosone" is harmless and causes no irritation to the skin. 3. This dye has long been used to dye skin, hair and finger nails. 4. It is used for colouring leather, for the tails of horses and in hair-dyes.

Aloe: ***Aloe vera***	1. Aloin' (a mixture of glucosides) and its gel are used as skin tonic. 2. It has a cooling effect and moisturizing characteristics and hence used in preparation of creams, lotions, shampoos, shaving creams, after shave lotions and allied products. 3. It is used in gerontological applications for rejuvenation of aging skin. 4. Products prepared from aloe leaves have multiple properties such as emollient, antibacterial, antioxidant, antifungal and antiseptic. 5. Aloe vera gel is used in skin care cosmetics.
Jasmine: ***Jasminum grandiflorum***	1. Jasmine flowers have been used since ancient times in India for worship, ceremonial purposes, incense and fumigants, as well as for making perfumed hair oils, cosmetics and soaps. 2. Jasmine oil is an essential oil that is valued for its soothing, relaxing, antidepressant qualities. Jasmine blends well with other perfumes. 3. It is much used in modern perfumery and cosmetics and has become popular in air freshners, anti-perspirants, talcum powders, shampoos and deodorants

Botanical Name	Active principle / Plant part used	Medicinal Uses
Keezhanelli : ***Phyllanthus amarus***	Phyllanthin	*1. Phyllanthus* is a well-known hepato-protective plant generally used in Tamil Nadu for the treatment of Jaundice. *2.* Dr. S P Thyagarajan has scientifically proved that the extract of *P. amarus* is effective against hepatitis B virus.
Nilavembu: ***Andrographis paniculata*** **King of Bitters**	Andrographolides	1. Andrographis is a **potent hepatoprotective** and is widely used to treat liver disorders. 2. Concoction of *Andrographis paniculata* and eight other herbs (Nilavembu Kudineer) is effectively used to treat malaria and dengue
Opium poppy: ***Papaver somniferum***	Opium	1. Opium is derived from the exudates of fruits of poppy plants. 2. It was traditionally used to induce sleep and for relieving pain. 3. Opium yields **Morphine**, a strong analgesic which is used in surgery. However, opium is an addiction forming drug
Cannabis / Marijuana: ***Cannabis sativa***	**trans-tetrahydrocanabinal** (THC)	1. It is an effective pain reliever and reduces hypertension. 2. THC is used in treating **Glaucoma** a condition in which pressure develops in the eyes. 3. THC is also used in reducing nausea of cancer patients undergoing radiation and chemotherapy.

Holy basil : ***Ocimum sanctum***	Leaves and Roots	1. The leaves are stimulant, antiseptic, anti-hypertensive and anti-bacterial and expectorant used in bronchitis. 2. Decoction of roots is given as a diaphoretic in malarial fevel
Indian gooseberry : ***Phyllanthus emblica***	Fruit	1. It is a potent rejuvenator and immune modulator. 2. It has a anti-ageing properties. 3. It helps to promote longevity, enhance digestion, treat constipation and reduce fever and cough.
Indian Acalypha : ***Acalypha indica***	Leaves	1. Used to cure skin diseases caused by ringworms. 2. Powdered leaves are used to cure bedsores and infected wounds.
vilvam : ***Aegle marmelos***	Fruit	1. The unripe fruit is used to treat problems of stomach indigestion. 2. It kills intestinal parasites
Veldt grape : ***Cissus quadrangularis***	Stam and Root	1. Paste obtained from the powdered stem and root of this plant is used in bone fractures. 2. Whole plant is useful to treat asthma and stomach troubles

Plant name	Botanical name	Family	Origin	Area of cultivation
Rice	*Oryza sativa*	Poaceae	South EastAsia	China, India and Thailand. Delta and irrigated regions of Tamil Nadu.
Wheat	*Triticum aestivum*	Poaceae	Fertile Crescent region	Uttar Pradesh, Punjab, Haryana, Rajasthan, Madhya Pradesh and Bihar.
Ragi	*Eleusine coracana*	Poaceae	East Africa and Asia	India
Sorghum	*Sorghum vulgare*	Poaceae	Africa.	
Foxtail Millet	*Setaria italic*	Poaceae	China	India
Kodo Millet	*Paspalum scrobiculatum*	Poaceae	West Africa	
Black gram	*Vigna mungo*	Fabaceae	India	Uttar Pradesh, Chattisgarh and Karnataka
Red gram	*Cajanus cajan*	Fabaceae	Southern India	Maharashtra, Andhra Pradesh, Madhya Pradesh, Karnataka and Gujarat.
Green gram	*Vigna radiate*	Fabaceae	India Maharashtra.	Madhya Pradesh, Karnataka and Tamil Nadu.
Lady's finger	*Abelmoschus esculentus*	Malvaceae	Tropical Africa	Assam, Maharashtra and Gujarat, Coimbatore, Dharmapuri and Vellore
Mango	*Mangifera indica*	Anacardiaceae	Southern Asia, especially Burma and Eastern India	Andhra Pradesh, Bihar, Gujarat and Karnataka. Salem, Krishnagiri, Dharmapuri

Cashew nut	*Anacardium occidentale*	Anacardiaceae	Brazil	Kerala, Karnataka, Goa, Maharashtra, Tamil Nadu, and Orissa.
Sugarcane	*Saccharum Officinarum*	Poaceae		All districts except Kanyakumari and Nilgiris of Tamil Nadu cultivate Sugarcane.
Palmyra	*Borassus flabellifer*	Arecaceae	Africa, Asia and New Guinea	Palmyra grows all over Tamil Nadu, especially in coastal districts.
Groundnut	*Arachis hypogaea*	Fabaceae	Native of Brazil.	Portuguese introduced groundnut into Africa. The Spanish took it to the South East Asia and India via Philippines. In India **Gujarat, Andhra Pradesh and Rajasthan** are top producers.
Sesame	*Sesamum indicum*	Pedaliaceae	Africa	West Bengal and Madhya Pradesh are the top producers in India during 2017-18.
Coffee	*Coffea Arabica*	Rubiaceae	Tropical Ethiopia	Baba Budan introduced coffee from Yemen to Mysore. **Karnataka** is the largest coffee producing state in India followed by **Tamil Nadu** and **Kerala**.
Cardamom	*Elettaria cardamomum*	Zingiberaceae	Southern India and Sri Lanka	Western Ghats, and North Eastern India
Black Pepper	*Piper nigrum*	Piperaceae	Western Ghats of India	Kerala, Karnataka and Tamil Nadu.

Turmeric	*Curcuma longa*	Zingiberaceae	Southern Asia	Erode in Tamil Nadu is the World's largest wholesale turmeric market.
Chillies	*Capsicum annuum*	Solanaceae	South America	
Tamarind	*Tamarindus indica*	Fabaceae	tropical Africa	India, Myanmar, south asian countries and several African and Central American countries.
Cotton	*Gossypium* spp	Malvaceae		Gujarat, Maharashtra, Andhra Pradesh and Tamil Nadu.
Jute	*Corchorus* spp	Malvaceae	(1) *C. capsularis is* Indo-Burmese origin (2) *C.olitorius* is of African origin	Gangetic plains of India & Bangladesh
Teak	*Tectona grandis*	Lamiaceae	South east Asia	Bengal, Assam, Kerala, T.N & North West India.
Rubber	*Hevea brasiliensis*	Euphorbiaceae	Brazil .	Kerala ,T.N.
Henna	*Lawsonia inermis*	Lythraceae	North Africa & South west Asia	Gujarat, Madya Pradesh and Rajasthan.
Aloe	*Aloe vera*	Asphodelaceae	Sudan	Rajasthan, Gujarat, Maharashtra, Andhra Pradesh and Tamil Nadu.
Jasmine	*Jasminum grandiflorum*	Oleaceae	North-western Himalayas	Madurai and Thovalai of Kanyakumari District

Keezhanelli	*Phyllanthus amarus*	**Phyllanthaceae**	Tropical America	
Nilavembu	*Andrographis paniculata*	Acanthaceae		
Opium poppy	*Papaver somniferum*	Papaveraceae	South Eastern Europe and Western Asia	Madhya Pradesh, Rajasthan and Uttar Pradesh
Marijuana	*Cannabis sativa*	Cannabiaceae	China	Gujarat, Himachal Pradesh, Uttarkand, Uttarpradesh and Madhaya Pradesh

1. What is Pseudo-cereal? Give an example.

The term pseudo-cereal is used to describe foods that are prepared and eaten as a whole grain, but are botanical outliers from grasses. Example: quinoa.

It is actually a seed from the *Chenopodium quinoa* plant belongs to the family Amaranthaceae. It is a gluten-free, whole-grain carbohydrate, as well as a whole protein (meaning it contains all nine essential amino acids) and have been eaten for 6,000 years in Andes hill region.

2. What are millets? What are its types? Give example for each type.

Millets (Siru Thaniyangal) : The term millet is applied to a variety of very small seeds originally cultivated by ancient people in Africa and Asia. They are gluten free and have less glycemic index.

Milletes are two types 1. Major Millets 2. MinorMillets

Major Millets example : **Finger Millet – Ragi** Botanical name : *Eleusine coracana*

Sorghum Botanical name : *Sorghum vulgare*

MinorMillets example : **Foxtail Millet Botanical name :** *Setaria italic*

Kodo Millet Botanical name : *Paspalum scrobiculatum*

3. Mention the types of fruits with example.

Depending on the climatic region in which fruit crops grow, they can be classified into temperate(apple, pear, plum) and tropical fruits (mango, jack, banana).

4. Why do we need to eat vegetables and what do they provide us?

Vegetables are the important part of healthy eating and provide many nutrients, including potassium, fi ber, folic acid and vitamins A, E and C. Th e nutrients in vegetables are vital for maintenance of our health.

5. Define Nuts.

Nuts are simple dry fruits composed of a hard shell and an edible kernel. They are packed with a good source of healthy fats, fibre, protein, vitamins, minerals and antioxidants.

6. Explain two types of Oils.

There are two kinds of oils namely, **essential oils** and **vegetable oils or fatty oils**.

The **essential oils or volatile oils** which possess **aroma evaporate or volatilize** in contact with air. Any organ of a plant may be the source of essential oil. For example, flowers of Jasmine, fruits of orange and roots of ginger.

The **vegetable oils or non-volatile oils or fixed oils** that do **not evaporate**. Whole seeds or endosperm form the sources of vegetable oils.

7. Define Spices. Give example.

Spices are accessory foods mainly used for flavouring during food preparation to improve their palatability. Spices are aromatic plant products and are characterized by sweet or bitter taste. Spices are added in minimal quantities during the cooking process. For example black pepper.

8. Define Condiments. Give example.

Condiments, on the other hand, are flavouring substances having a sharp taste and are usually added to food after cooking. For example, curry leaves.

9. What is Curcumin? Write its uses.

Curcumin extracted from turmeric is responsible for the yellow colour. Curcumin is a very good anti-oxidant which may help fight various kinds of cancer. It has anti-inflammatory, anti-diabetic, anti-bacterial, anti-fungal and anti-viral activities. It stops platelets from clotting in arteries, which leads to heart attack.

10. Write about Capsaicin.

Capsaicin is an active component of chillies. It has pain relieving properties and used in pain relieving balms. Chillies are a good source of Vitamin C, A and E.

Capsaicin is responsible for the pungency or spicy taste of chillies. Pungency of Chillies is measured in Scoville Heat Units (SHU). World's hottest chilli, Carolina reaper pepper measures 2,200,000 SHU. Naga viper chilli is the hottest in India that measures 1,349,000 SHU. Commonly used cayenne pepper measures 30,000 to 50,000 SHU.

11. Define fiber.

Botanically a fiber is a long narrow and thick-walled cell.

12. Write the four cotton species of commercial cotton.

Commercial cotton comes from four cotton species: two from the new world and two from the old world. (1) *G. hirsutum* (2) *G.barbadense* are the New world species and (3) *G. arboretum* (4) *G. herbaceum* are the old world species.

13. Write the Jute species used for cultivation.

Jute is derived from the two cultivated species (1) *Corchorus capsularis* and (2) *C.olitorius* is of African origin whereas *C. capsularis,* is believed to be Indo-Burmese origin.

14. Describe Rubber – Vulcanization.

Charles Goodyear invented vulcanization in 1839. He found that the defects in rubber articles could be overcome by heating rubber with sulphur under pressure at 1500 C. The process was called vulcanization. The name was given from the

Roman God of Fire, Vulcan. Because of this, solid rubber tyres were used for first time in 1867. That is why we smoothly travel on road.

15. How Wood pulp is manufactured? Name the plant used for Manufacture of Wood pulp.

Wood is converted into pulp by mechanical, and chemical processes. Wood of Melia azadirachta, *Neolamarkia chinensis*, *Casuarina* spp, *Eucalyptus* spp are used for making paper pulp.

16. Write the uses of Wood pulp.

Wood pulp used for Paper production. Purified dissolving pulp is used as a basic material in the manufacture of rayon or artificial silk, fabrics, transparent films (cellophane, cellulose acetate films), plastics. The viscose process of making rayon is the most common process.

17. How Perfumes are manufactured?

Perfumes are manufactured from essential oil which are **volatile** and **aromatic**. Essential oils are found at different parts of the plant such as leaves, (curry leaf, mint), flowers (rose, jasmine), fruits (citrus, straw berry) and wood (sandal, eucalyptus).

18. How Madurai malli differ from others.

Madurai malli has thick petals with long stalk equal to that of petals and the distinct fragrance is due to the presence of chemicals such as jasmine and alpha terpineol. This makes it easy to distinguish Madurai Malli from other places.

19. What is Traditional Systems of Medicines? How does it classified and what does it focuses on.

India has a rich medicinal heritage. A number of Traditional Systems of Medicine (TSM) are practiced in India some of which come from outside India.

Classification : TSM in India can be broadly classified into **institutionalized** or documented and **non-institutionalized** or oral traditions. Institutionalized Indian systems include Siddha and Ayurveda which are practiced for about two thousand years. These systems have prescribed texts in which the symptoms, disease diagnosis, drugs to cure, preparation of drugs, dosage and diet regimes, daily and seasonal regimens. Non- institutional systems, whereas, do not have such records and or practiced by rural and tribal peoples across India. The knowledge is mostly held in oral form.

Focus of TSM : The TSM focus on healthy lifestyle and healthy diet for maintaining good health and disease reversal.

20. Differentiate Biomedicines and Botanical medicines.

Medicinally useful molecules obtained from plants that are marketed as drugs are called Biomedicines. Medicinal plants which are marketed as powders or in other modified forms are known as Botanical medicines.

21. What are psychoactive drugs?

Phytochemicals / drugs from some of the plants alter an individual's perceptions of mind by producing hallucination are known as psychoactive drugs. These drugs are used in all ancient culture especially by Shamans and by traditional healers.

22. Define Entrepreneurial Botany.

Entrepreneurial Botany is the study of how new businesses are created using plant resources as well as the actual process of starting a new business.

23. Define entrepreneur.

An **entrepreneur** is someone who has an idea and who works to create a product or service that people will buy, by building an organization to support the sales.

24. Write some of the entrepreneurship activities

Some of the activities of entrepreneurship are Mushroom cultivation, Single cell protein (SCP) production, Seaweed liquid fertilizer, Organic farming, Terrarium, Bonsai and Cultivation of medicinal and aromatic plants

25. Define Organic farming.

Organic farming is an alternative agricultural system in which plants/crops are cultivated in natural ways by using biological inputs to maintain soil fertility and ecological balance thereby minimizing pollution and wastage. Indians were organic farmers by default until the green revolution came into practice

26. Why does a student or a driver prefer tea or coffee during night work?

- Coffee or tea are the non-alcoholic beverages.
- They contain alkaloids that stimulate central nervous system.
- It also possess mild diuretic properties.

27. Expand NCB ? write its role.

It is a Narcotics Control Bureau.

It is the nodal drug law enforcement and intelligence agency of IndiaIt is responsible for fighting drug trafficking and the abuse of illegal substances.

28. Write the attributes of cereals as food plants.

The prominence of cereals as food plants is due to the following attributes:

i. Greater adaptability and successful colonisation on every type of habitat.

ii. The relative ease of cultivation

iii. Tillering property that produce more branches which results in higher yield per unit area.

iv. Compact and dry grains that they can be easily handled, transported and stored without undergoing spoilage.

v. High caloric value that provides energy. The nutrients provided by cereals include carbohydrates, proteins, fibres and a wide range of vitamins and minerals.

29. Which TSM is widely practiced and culturally accepted in Tamil Nadu? - explain.

Siddha system of medicine is widely practiced and culturally accepted in Tamil Nadu. Siddha is the most popular, widely practiced and culturally accepted system in Tamil Nadu. It is based on the texts written by 18 Siddhars. There are different opinions on the constitution of 18 Siddhars.

The Siddhars are not only from Tamil Nadu, but have also come from other countries. The entire knowledge is documented in the form of poems in Tamil. Siddha is principally based on the **Pancabūta** philosophy.

According to this system three humors namely **Vātam, Pittam** and **Kapam** that are responsible for the health of human beings and any disturbance in the equilibrium of these humors result in ill health.

The drug sources of Siddha include plants, animal parts, marine products and minerals. This system specializes in using minerals for preparing drugs with the long shelf-life.

This system uses about 800 herbs as source of drugs. Great stress is laid on disease prevention, health promotion, rejuvenation and cure.

30. Explain Ayurveda system of medicine and **Folk system of medicine**

Ayurveda system of medicine

Ayurveda supposed to have originated from Brahma. The core knowledge is documented by **Charaka, Sushruta** and **Vagbhata** in compendiums written by them. This system is also based on three humor principles namely, Vatha, Pitha and Kapha which would exist in equilibrium for a healthy living. This system Uses more of herbs and few animal parts as drug sources. Plant sources include a good proportion of Himalayan plants. The **Ayurvedic Pharmacopoeia** of India lists about 500 plants used as source of drugs.

Folk system of medicine

Folk systems survive as an oral tradition among innumerable rural and tribal communities of India. A consolidated study to document the plants used by ethnic communities was launched by the Ministry of Environment and Forests,

Government of India in the form of All India Coordinated Research Project on Ethnobiology. As a result about 8000 plant species have been documented which are used for medicinal purposes. The efforts to document in several under-explored and unexplored pockets of India still continue. Major tribal communities in Tamil Nadu who are known for their medicinal knowledge include **Irulas, Malayalis, Kurumbas, Paliyans** and **Kaanis**. Some of the important medicinal plants are discussed below.

31. How will you prepare an organic pesticide for your home garden with the vegetables available from your kitchen?

1. Mix 120g of hot chillies with 110 g of garlic or onion. Chop them thoroughly.
2. Blend the vegetables together manually or using an electric grinder until it forms a thick paste
3. Add the vegetable paste to 500 ml of warm water. Give the ingredients a stir to thoroughly mix them together.
4. Pour the solution into a glass container and leave it undisturbed for 24 hours. If possible, keep the container in a sunny location. If not, at least keep the mixture in a warm place.
5. Strain the mixture. Pour the solution through a strainer, remove the vegetables and collect the vegetable-infused water and pour into another container. This filtrate is the pesticide. Either discard the vegetables or use it as a compost.
6. Pour the pesticide into a squirt bottle. Make sure that the spray bottle has first been cleaned with warm water and soap to get rid it of any potential contaminants. Use a funnel to transfer the liquid into the squirt bottle and replace the nozzle.

7. Spray your plants with the pesticide. Treat the infected plants every 4 to 5 days with the solution. After 3 or 4 treatments, the pest will be eliminated. If the area is thoroughly covered with the solution, this pesticide should keep bugs away for the rest of the season.

Avoid spraying the plants during the sunny times of the day since it could burn plants. Many other plants possess insect repellent or insecticidal properties. Combinations of these plants can be fermented and used as biopesticide.

32. How to prepare the bio-pest repellent.Explain the steps ?

Bio-pest repellent

Botanical pest repellent and insecticide made with the dried leaves of *Azadirachta indica*

Preparation of Bio-pest repellent

• Pluck leaves from the neem tree and chop the leaves finely.

• The chopped up leaves were put in a 50-liter container and fill to half with water; put the lid on and leave it for 3 days to brew.

• Using another container, strain the mixture which has brewed for 3 days to remove the leaves, through fine mesh sieve. The filtrate can be sprayed on the plants to repel pests.

• To make sure that the pest repellent sticks to the plants, add 100 ml of cooking oil and the same amount of soap water. (The role of the soap water is to break down the oil, and the role of the oil is to make it stick to the leaves).

• The stewed leaves from the mixture can be used in the compost heap or around the base of the plants.

33. What is the meaning of perfume? From which the word is derived .What is the usage in early days ?

- The word **perfume** is derived from the Latin word **Per** (through) and **fumus** (to smoke), meaning **through smoke**.
- It refers to the age-old tradition of burning scented woods at religious ceremonies.
- In early days, when people were less conscious of personal hygiene.
- Essential oils not only masked offensive odours, but also may have acted as antiseptics.
- Perfumes are added to baths and used for anointing the body.
- Perfumes are manufactured from essential oil which are **volatile** and **aromatic**.

R.UTHAYAKUMAR
P.G. Asst. in Botany
Sri Venkateshwara Vidhyalayaa Higher Secondary School,
Thasampalayam, Gobi – 638 476.
7810917500