BT403 Fresh File (Final term) Spring 2023
All questions were searched from groups and answered precisely still if you find any error kindly correct it….

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Collective short and long questions

Anthesis

Anthesis is the first opening of a flower during process of flowering. It is the period when a flower becomes sexually functional. It means anthesis facilitates the pollination by opening of flower.

Who created the first recombinent DNA

Paul Berg, a biochemist at Stanford who was among the first to produce a recombinant DNA molecule in 1972,

Mechanisms of resistance of plant

Plant immune systems rely on their ability to recognize enemy molecules, carry out signal transduction, and respond defensively through pathways involving many genes and their products. Pathogens actively attempt to evade and interfere with response pathways, selecting for a decentralized, multicomponent immune system.

Factors cause abiotic stress in plants

High temperature or low temperature, salinity, drought or flooding, nutrient deficiency or metal toxicity are a few of the major abiotic stress conditions a plant faces daily during its life cycle. There are several A-biotic factors that lead to a series of morphological, physiological, biochemical, and molecular changes that adversely affect plant growth and productivity.

Importance of protoplast

Protoplast culture is an important tool in the production of new plant varieties. By fusing protoplasts from different plant species, scientists can create hybrid plants with desirable characteristics, such as resistance to disease, increased yield, and improved quality.

Reduction of chlorophyll in case of plant disease

Conditions of embryo culture

Culture conditions consisting of 3. 5% oxygen have been shown to lead to higher rates of fertilization and cleavage (54). One major reason why a low oxygen tension is associated with improved embryo viability is possibly the effect it exerts on increasing expression of antioxidant enzymes and glucose transporters.

Wrong

How positive and negative transgene results of PCR assessed

PCR-based transgene detection is a simple and highly sensitive process. Subsequent PCR tests are assessed by agarose gel electrophoresis, and results are visualized by the presence or absence of the appropriately sized DNA fragment. If PCR shows a positive result, the transgene may be present. Transgene presence is confirmed by

incorporating it into the genome by DNA sequencing. In contrast, a negative PCR result implies that the transgeneisnotpresent

How many common Types of GMOs.

FOODS • Crops are modified to develop resistance to herbicides and increase their nutrient content, for example corn and soybeans . • Fruits are modified to make them ripen later. • This help them available fresh in marketplace during a longer time or for fruits that ripen after being picked, make it easier to transport them.

MEDICINES • These can be produced cheaper and easier some are: insulin, thyroid hormones and the Hepatitis B vaccine • GM Bacteria"s have been particularly important in producing large amounts of pure human proteins for use in medicine like clotting factors for hemophilia and human growth hormones to treat

Function of pr proteins

Pathogenesis-related (PR) proteins are proteins produced in plants in the event of a pathogen attack. They are induced as part of systemic acquired resistance. Infections activate genes that produce PR proteins. Some of these proteins are antimicrobial, attacking molecules in the cell wall of a bacterium or fungus.

• SA-mediated signal transduction cascades regulate the transcriptional activation of many PR genes

• Ethylene and SA have been shown to act synergistically, further enhancing the expression of PR genes

Adventages of herbicides

Pesticides help in an abundant harvest

It helps keep food affordable:

Pesticides help to prevent insects and waterborne transmission diseases:

Pesticides help farmers to grow more crops in the same or less land

Pesticides helped in making it easy to remove weeds or prevent pests without hardship:

It helped globally to increase the economical growth of a country:

Wrong

Application of embryo culture

Sterile seeds can be produced using embryo culturing techniques. The process of embryo culture is a savior when you need to produce viable embryos from interspecific and intergeneric crosses that generally result in the production of non-viable seeds

Wrong

Heat stress effects on plant

Dehydration. • Yellowing of plants and leaves; chlorophyll deteriorates. • Withered leaves • Sunburn; reddish-purple tint or freckles on leaves and pseudo bulbs, leaf tip

and root may turn brown. • Alteration of gene expression is the major cause of heat stress. • Leathery leaves; damage on cellular level. • In response to high temperature all organisms, including plants, synthesize a set of proteins called as heat shock proteins (HSPs) The induction of HSPs at permissive temperatures have been associated with the acquisition of thermotolerance to withstand the stress

Threatens of GMOs to crop diversity

• There is opposition to introducing GM genes on genetic diversity because these genes can spread to other organic farm crops and threaten crop diversity in agriculture. • And if crop diversity decreases, it will have a direct impact on our entire ecosystem and would affect the population dynamics of other organisms. • The chance that a single genetically modified crop strain could pollinate an already existing non-GM crop is unlikely and unpredictable, and there are many conditions that must be met for cross pollination to occur.

What is BT cotton

Bt cotton is a genetically modified pest resistant plant cotton variety that produces an insecticide to combat bollworm.. Strains of the bacterium *Bacillus thuringiensis* produce over 200 different Bt toxins, each harmful to different insects. Most notably, Bt toxins are insecticidal to the larvae of moths and butterflies, beetles, cotton bollworms and flies but are harmless to other forms of life.

What is post mitotic anthers (Below answer is for anther culture, there is no proper answer for give Question)

AIM: To isolate and inoculate anthers for haploid production. Principle: Haploids refer to those plants which possess a gametophytic number of chromosomes in their sporophytes. Haploids may be grouped into two broad categories: Ø (a) monoploids which possess half the number of chromosomes from a diploid species. Ø (b) Polyhaploids which possess half the number of chromosomes from a polyploidy species. Haploid production through anther culture has been referred to as androgenesis while gynogenesis is the production of haploid plants from ovary or ovule culture where the female gameteorgametophyteistriggeredtosporophytic

What are botanical pesticides

These are naturally occurring plant material that may be crude preparation of the plant parts ground to produce a dust or powder that can be used in full strength or dilute form in a carrier such as clay, talc or diatomaceous earth. •“Azadirachtin” effects the reproductive and digestive procees of pest. Several plant based insecticides as nicotinoids, natural pyrethrins, rotenoids, neem products etc are used.

Why pesticides affect childs more than adults

Infants and children are more sensitive to the toxic effects of pesticides than adults. An infant's brain, nervous system, and organs are still developing after birth. When exposed, a baby's immature liver and kidneys cannot remove pesticides from the body as well as an adult's liver and kidneys.

What are phenolic compounds

Phenolic compounds are secondary metabolites, which are produced in the shikimic acid of plants and pentose phosphate through phenylpropanoid metabolization [1]. They contain benzene rings, with one or more hydroxyl substituents, and range from simple phenolic molecules to highly polymerized compounds

What is role of auxin in plants

Auxins are a powerful growth hormone produced naturally by plants. They are found in shoot and root tips and promote cell division, stem and root growth. They can also drastically affect plant orientation by promoting cell division to one side of the plant in response to sunlight and gravity

How genetic engineering practice affect the environment?

Possible risks of GEOs could include: (1) creating new or more vigorous pests and pathogens; (2) exacerbating the effects of existing pests through hybridization with related transgenic organisms; (3) harm to nontarget species, such as soil organisms, non-pest insects, birds, and other animals; (4) disruption of biotic components.

What are advantages of herbicide

- Herbicides can be applied before the weeds grow. ...
- Herbicides can be effectively used in different crop arrangements. ...
- Herbicides can get rid of deep-rooted weeds. ...
- Herbicides prevent weeds from growing for a long time.

1.Mode of action of herbicides

The “mode of action” is the biological process or enzyme that the herbicide interrupts, affecting normal plant growth and development. For example 2, 4-D is a growth regulator mode of action herbicide that affects auxin growth.

2.Step wise tissue culturing

The stages of plant tissue culture are: selection/preparation (stage 0), initiation/establishment (stage 1), multiplication (stage 2), rooting (stage 3), and acclimatization/hardening (stage 4). A formulation for growth medium is selected based on which stage the plant is in or will be entering.

3.name some glass wares used in tissue culture

Wide-neck Erlenmeyer flasks (50-, 125-, 250-ml capacity) are commonly used as culture vessels; large volume Erlenmeyer flasks are required for media preparation.

Test tubes, petri dishes, mason jars, baby food jars, and other glassware can also be adapted to tissue culture.

How to treat herbicide burnt skin area

1. Drench skin with water for at least 15 minutes. If the skin appears burned, do not apply ointments, greases, powders, or other drugs. ...
2. Remove contaminated clothing.
3. Wash skin and hair thoroughly with soap and water.
4. Later, discard contaminated clothing or thoroughly wash it separately from other laundry.

How heat stress effects the photosynthesis

Effect on Photosynthesis • Disruption of PS II (Photo System II) • stomatal closure • decrease in electron transport Reduce Photosynthesis

Stratgies of pathogens attack

Pathogen attack strategies • Necrotrophy, in which the plant cells are killed • Biotrophy, in which the plant cells remain alive • Hemibiotrophy, in which the pathogen initially keeps cells alive but kills them at later stages of infection

Nutritional value of genetic engineering

The GMO method can put in added nutritional value to crops that lack necessary vitamins and minerals. • Considering that there are places in the world relying on rice or corn as their daily staple, plant genes may be added to these crops to increase their nutritional value. • This would help malnourished populations receive more nutrients from their diet.

Role of bio fertilizer

• Biofertilizers are known to play a number of vital roles in soil fertility, crop productivity and production in agriculture as they are eco friendly and can not at any cost replace chemical fertilizers that are indispensable for getting maximum crop yields. • Some of the important functions or roles of Biofertilizers in agriculture are:

• They supplement chemical fertilizers for meeting the integrated nutrient demand of the crops. • They can add 20-200 kg N/ha year (eg. Rhizobium sp 50-100 kg N/ha year ; Azospirillum , Azotobacter : 20-40 kg N/ha /yr; Azolla : 40-80 kg N/ha; BGA :20-30 kg N/ha) under optimum soil conditions and thereby increases 15-25 percent of total crop yield.

• They can at best minimize the use of chemical fertilizers not exceeding 40-50 kg N/ha under ideal agronomic and pest-free conditions.

• Application of Biofertilizers results in increased mineral and water uptake, root development, vegetative growth and nitrogen fixation.
• Some Biofertilizers (eg, Rhizobium BGA, Azotobacter sp) stimulate production of growth promoting substance like vitamin-B complex, Indole acetic acid (IAA) and Gibberellic acids etc.

Steps of initation and maintenance in callus medium

Explants from both mature and immature organs can be induced to form callus. However, explants with mitotically active cells (young, juvenile cells) are generally good for callus initiation. Callus is produced on explants in vitro from peripheral layers as a result of wounding and in response to growth regulators, either endogenous or exogenously supplied in the medium. The season of the year, donor conditions of the plant, the age and physiologicalstateoftheparentplant Growth regulator concentration in the culture medium is critical for morphogenesis.

Sever 6 symptoms of pesticides poisoning

- feeling and being sick.
- diarrhoea.
- stomach pain.
- drowsiness, dizziness or weakness.
- high temperature.
- chills (shivering)
- loss of appetite.
- headache.
- stinging eyes, rashes, blisters, blindness,

Drawbacks of pesticides on environment

Pesticides are toxic chemicals designed to be deliberately released into the environment. Although each pesticide is meant to kill a certain pest, a very large percentage of pesticides reach a destination other than their target. Pesticides easily contaminate the air, ground and water when they run off from fields, escape storage tanks, are not discarded properly, and especially when they are sprayed aerially.

Advantage of GM Crops

- More nutritious food.
- Tastier food.
- Disease- and drought-resistant plants that require fewer environmental resources (such as water and fertilizer)
- Less use of pesticides.

- Increased supply of food with reduced cost and longer shelf life. Faster growing plants and animals.

Method of regeneration?

Plant regeneration is the major outcome of plant tissue culture, which is based on the principle of totipotency. Plant regeneration can be achieved by organogenesis and somatic embryogenesis (Fig. 6.1). Organogenesis means formation of organs from the cultured explants.

Enlist the pathogenesis related Pr proteins

Pathogenesis-related proteins, often called PR proteins, are a structurally diverse group of plant proteins that are toxic to invading fungal pathogens. They are widely distributed in plants in trace amounts, but are produced in much greater concentration following pathogen attack or stress.

Difference between infrastructural constraints and financial constraints.

Infrastructural constraints

• Non-availability of suitable facilities for production • Lack of essential equipments, power supply, etc. • Space availability for laboratory, production, storage, etc. • Lack of facility for cold storage of inoculant packets.

Financial Constraints:

Financial constraints • Non-availability of sufficient funds and problems in getting bank loans • Less return by sale of products in smaller production units.

Role of Cytokinesis on plants

ytokinins promote cell division and increase cell expansion during the proliferation and expansion stages of leaf cell development, respectively. During leaf senescence, cytokinins reduce sugar accumulation, increase chlorophyll synthesis, and prolong the leaf photosynthetic period.

What are the growth characteristics of cell suspension.

A cell suspension culture consists of cell aggregates dispersed and growing in a moving liquid media. It is normally initiated by transferring pieces of undifferentiated and friable callus to a liquid medium, which is continuously agitated by a suitable device. Suspension cultures can also be started from sterile seedlings or imbibed embryos or leaves by the mechanical method. Leaves or the other tissues (e.g. hypocotyl, cotyledon, etc.) can be gently grinded or soft tissues can be broken up in a hand-operated glass homogenizer. This homogenate, containing intact living cells, dead cells and cell debris is cleared by filtration and centrifugation and then transferred to moving

For general purpose, the objective with cell suspension cultures is to achieve rapid growth rates, along with uniform cells, all the cells being viable

What are the precautions to use Murashige and Skoog medium

Precautions Ensure appropriate pH of the medium before addition of gelling agent as acidic pH will lead to decreased gelation resulting in semi solid flowing gel while alkaline pH will lead to formation of hardened gel. Use of Distilled water / Tissue culture grade water is recommended for media preparation as tap water or lower grade water may lead to salt precipitation and improper gelation. Avoid preparation of concentrated solutions, as it will lead to precipitation of salts.

Method by which plants become stress tolerant

Plants tolerant to both the biotic and the abiotic stresses can be acquired by applying the selecting agents such as NaCl (for salt tolerance), PEG or mannitol (for drought tolerance) and pathogen culture filtrate, phytotoxin or pathogen itself (for disease resistance) in the culture media.

GM crops

Corn Soybean Potato Alfalfa Papaya Wheat Cotton Rice Tomato

Benefits of bio pesticides

- In addition to controlling pests and diseases, they produce little toxic residue, and are of minimal risk to human health.
- Many biopesticides have a zero or low re-entry and handling interval.
- Some microbial biopesticides can reproduce on or near to the target pest / disease, giving some self-perpetuating control.
- As alternatives to conventional chemical pesticides, they can help reduce the selection pressure for the evolution of pesticide resistance in pest populations.
- The risk of pests and disease developing resistance to biopesticides is often considered to be low.
- They often have good compatibility both with biological pest control agents (natural enemies) and conventional chemical pesticides, so can be readily incorporated into IPM programmes.

Why synthetic seed are beneficial over natural seeds

They act as a channel to develop a whole new line of plants through biotechnological advances. They maintain the clonal nature of the resulting plants. They are easy to transport. There is the ease of handling while in storage. Short- and long-term storage capacity. Genetic uniformity. Low cost quality plant materials. Allows for transportation and exchange of germplasm between national and international laboratories.

Strategies for managing and avoiding pesticde weed

The North Central Weed Science Society (NCWSS) Herbicide Resistance Committee has developed the following list of strategies for avoiding and managing problems with herbicide resistant weed biotypes. • Keep in mind that reliance upon any one strategy is not likely to be effective. • The crop producer must use the following strategies in carefully selected combinations if herbicide resistant weed problems are to be avoided or properly managed.

Mutagenesis

Mutations (muta) are genetic changes that can switch, add, or delete nucleotides (those A,T,G and C bases), these genetic changes can sometimes lead to new/enhanced traits which is why plant breeders sometimes induce (genesis) these genetic changes using radiation or chemicals. • Hermann Muller, Charlotte Auerbach and J. M. Robson founded this technique in the first half of the 20th century. • For example, radiation was used to produce a deeper color in the red grapefruit.

Composition of culture medium

The salt composition of Murashige and Skoog (1962) nutrient medium, referred to as MS medium, is very widely used in different culture systems as it gives satisfactory results. But it must be remembered that it is not always the best medium. Generally, in all the media, the nutritional milieu consists of inorganic nutrients, carbon and energy sources, vitamins, growth regulators, and complex organic supplements. It is desirable to choose a composition according to the knowledge of the physiology of species. Inorganic nutrients Mineral elements are very important in the life of a plant. Besides, C,H,N, and O, 12 other elements are known to be essential for plant growth. According to the recommendations of the International Association for Plant Physiology, the elements required by plants in concentration greater than 0.5 mmol/l are referred to as macroelemetns or major elements and those required in concentration less than the prescribed amount are microelements of minor elements. A variety of salts supply the needed macro and micronutrients that are the same as those requiredbythenormalplant

Major salts The salts of potassium (K), nitrogen (N), calcium (Ca), magnesium (Mg), phosphorus (P) and sulphur (S) are required in macro or millimole quantities. Nitrogen is generally used as nitrate or ammonium salts, sulphur as sulphates and phosphorus as phosphates.

What is genome editing

This process has the ability to cut, replace or insert genes within the seed cells using “molecular scissors” called nucleases—enzymes which have the ability to loosen, remove and add nucleotides. These nucleases are artificially engineered to accurately

place in desired genes, or traits, into the genome of the crop. • Herbicide tolerant canola was created using this technique to help famers control weeds.

Morphogenesis and enlist it's two types

morphogenesis, the shaping of an organism by embryological processes of differentiation of cells, tissues, and organs and the development of organ systems according to the genetic “blueprint” of the potential organism and environmental conditions.

Plant morphogenesis is brought about chiefly through differential growth. Permanent embryonic tissue results in a morphogenetic potential that varies greatly with the environment and continues to produce new organs throughout the life of the plant. Animal morphogenesis is accomplished by growth and by cell movement.

Why nitrogen fixation is necessary for plants?

The role of nitrogen-fixing bacteria is to provide plants with nutrients that they cannot acquire from the air. Nitrogen-fixing bacteria perform what crops cannot: they obtain assimilative N. Bacteria absorb it as a gas from the air and release it to the soil, typically as ammonia.

What is the use ca MV in gene transfer

The cauliflower mosaic virus promoter (CaMV 35S) is used in most transgenic crops to activate foreign genes which have been artificially inserted into the host plant. It is inserted into transgenic plants in a form which is different from that found when it is present in its natural Brassica plant hosts.

Haploid:

Haploid refers to the presence of a single set of chromosomes in an organism's cells. Sexually reproducing organisms are diploid (having two sets of chromosomes, one from each parent). In humans, only the egg and sperm cells are haploid.

HOW sod work in defense mechanism

Superoxide Dismutase (SOD) • SOD belongs to the family of metalloenzymes present in all aerobic organisms. • Under environmental stresses, SOD forms the first line of defense against ROS-induced damages. • The SOD catalyzes the removal of O•−2 by dismutating it into O2 and H2O2. This removes the possibility of OH• formation by the HaberWeiss reaction

Some solved and unsloved mcqs

MCQs

 Apoenzyme are.....

 ozone causes.....

 symptom of pesticides which are not for short time.....

 vessels used for culture.....

 herbicide are.....

 Tumer causing bacteria.....

 optimum temperature for culture media.....

which possess half the number of chromosomes from a
diploid species.___monoploids

 for tissue growth in the medium. Sucrose,
at a concentration of ___2%

It has been estimated that __ is fixed by different legume crops by the microbial activities
of Rhizobium.__40-
250 kg N / ha / year

Worldwide, there is percent global primary crop production from genetically modified crops,___9%

Canola is genetically engineered form was approved in___ 1996,

injecting a gene for a rat
growth hormone into a mouse embryo in___ 1982.

GMO stand for _ genetically modified organisms

Transformed cells with a single copy of the transgene usually show higher and more stable expression than multicopy lines, in which expression may suffer from posttranscriptional _ gene silencing.

Rate of transportation __ in plant with pathogenic attack _ increase

Hormone induce callus formation _ cytokinin

The genetic markers should be____and___: palymorphic;. heterazygous:

Almost perecent of corn grown in the U.S. is genetically modified.__85%

The creation of the first recombinant DNA molecules by Paul Berg in_____ 1972

___ can usefully be defined as the branch of philosophy concerned witecide what is morally wrong and what is morally right. __Ethics

Glycine is__ acid __ amino acid
plasmid genome is
4.incorporation of genes from one to other
5.herbicides used where
6.types of generation
7.which is firstly used for genetic texhnique
8.light stress is

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9.Agriculture practices for years
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11.Powdery mildew is.
12.viruses spread by
13.in which condition cell are killed
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Amount of CTAB bufer used for extraction of DnA
Most abundant hormone in plants

Incubation of callus culture

Plastid genome is?