Home tasks on discipline “**Biotechnology of Agricultural plants”**

*Biotechnology daily, Master students*

**SIWT 1**. Consultation and admission of Student Independent work with Teacher. Student Independent work (SIW) 3. Home tasks titles.

Applications of plant tissue culture for improving the yield. Show the examples for the different agricultural plants.

Applications of plant tissue culture for improving the yield. Show the examples for the different agricultural plants.

Applications of plant tissue culture for improving quality characteristics. Show the examples for the different agricultural plants.

Applications of plant tissue culture for increasing tolerance to abiotic stresses. Show the examples for the different agricultural plants.

Applications of plant tissue culture for increasing resistance o biotic stresses (fungi, pathogen microorganisms, viruses). Show the examples for the different agricultural plants.

How to produce the clones of plants.

Practical applications of callus culture. Show the examples for the different plant species

Practical applications of organ culture. Show the advantages and limitations, the examples of plants.

Practical application of the somatic embryogenesis

Describe the functions of each components of culture medium in vivo. How to regulate its composition.

### Describe Organogenesis

### **SIWT 2**. Consultation and admission of Student Independent work with Teacher. Student Independent work (SIW) 3. (Report)

### *Title for home tasks*

### Regeneration Methods of Plants in Culture Organogenesis

### Somatic Embryoge

### Insect cell culture

Cells derived from Drosophila melanogaster (most prominently, Schneider 2 cells) can be used for experiments which may be hard to do on live flies or larvae, such as biochemical studies or studies using siRNA. Cell lines derived from the army worm *Spodoptera frugiperda*, and from the cabbage looper, are commonly used for expression of recombinant proteins using baculovirus.

# Factors Affecting Organogenesis in Plant Tissue Culture

SIWT 4. Consultation and admission of Student Independent work with Teacher. Student Independent work (SIW) 4. (Report)

### *Title for home tasks*

Problems that can Occur in Tissue Culture

Culture Contamination

Hyperhydricity

Browning of Explants

Types of Organogenesis

Analysis of Transgenic Plants

Organogenesis is the process of forming a specific organ from non-specific mass of meristem or parenchyma cell known as callus. In this experiment, auxin and cytokinin are used to determine the effect of PGR, auxin and cytokinin on the organogenesis in carrots and petunia leaves, in which auxin hormones responsible for growth of roots, phototropism and gravitropism, while, cytokinin helps in inducing the growth of shoots and regulates auxin action. Theoretically, the presence of high cytokinin and low auxin in the media, the shoots will form, meanwhile, in low level of cytokinin and high level of auxin in the media, roots will form. Meanwhile, in the presence of high concentration of both cytokinin and auxin, callus formation will be induced. However, in this experiment, production of the shoots and roots are not compatible with the theory due to improper ratio of auxin and cytokinin and the high toxicity of synthetic cytokinin, kinetin.

SIW 2. Consultation and admission of Student Independent work with Teacher. Student Independent work (SIW) 4. Home tasks titles.

Show examples of sexual reproduction: natural

Give practical examples of selective breeding

Describe the process of hybridization

Describe the gene splicing

Show practical applications recombinant DNA technology

Show examples of genetically modified microorganisms

How to use the restriction enzymes to make recombinant DNA

Describe the protocol of preparation of vector DNA

Describe *the main principles of choice of host organism*

For what purpose the vector is used?

What is a human artificial chromosome

Give practical examples of a bacterial artificial chromosome

Describe using bacteriophage

What is a cosmid

Give practical examples of yeast artificial chromosomes (YACs)

Give practical examples of use of plasmids

How to choice the host cells for replication of recombinant DNA

**IWS 4.** Topic, type of task. Topic 1. Organic Agriculture.

Topic 2 Organic farming practices.

Topic 3 Process of organic farming practices.

Topic 4. Organic farming techniques.

Topic 5. Effects of regulation of organic plant production.

Topic 6. Organic pesticides.

Topic 7. Microbiological hazards.

Topic 8. Animal feeds and veterinary drugs.

Topic 9. Advantages and disadvantages of organic agriculture and products.

**SIWT 5.** Consultation and admission of Student Independent work with Teacher. Student Independent work (SIW) 5. Topics:

Research on genome editing agricultural plants.

Methods of development of GM crops.

Advantages of use of genome editing plants for agricultural production.

The examples of GM crops with improved nutritional value of end products.

**SIWT 6.** Consultation and admission of Student Independent work with Teacher. Student Independent work (SIW) 6.

Topics: Zn-Enriched Crops,

Biofortification Through Targeting

Cytokinin Metabolism plants absorb a range of mineral elements,

Quality Improved Crops,

Vitamin A Enriched Crops,

Production of antibodies in plants biotechnology. Production of hormonal drugs in plants biotechnology. Transgenic plantss - as models of human diseases. Monitoring the use of biotechnological methods. Ethical policy gene therapy germ and somatic cells . Ethical policy on human cloning.