

Tárgytematika / Course Description

Plant biotechnology

N_DMA05

Tárgyfelelős neve /

Teacher's name: Dr. Barnabás Beáta

Félév / Semester: 2023/24/1

Beszámolási forma /

Assesment: Vizsga

Tárgy heti óraszám /

Teaching hours(week): 0/0/0

Tárgy féléves óraszám /

Teaching hours(sem.): 30/0/0

OKTATÁS CÉLJA / AIM OF THE COURSE

The aim of the course is to review the biotechnology of plant biology, beginning with the history, methods and results of plant cell and tissue culture. After describing the somatic cells and tissue production *in vitro*, the biotechnological alternatives related to the growth of plants are described in detail. The exploration of spontaneous and induced genetic changes, the alternatives of using the cells, tissues, regenerated plants with modified genetic background are also discussed. The theoretical and methodological basis of plant gene technology are described. The possibilities of producing genetically modified (GM) plant varieties are explained. The characteristics of the transgenic (GM) species and cultivars grown in public cultivation and the risks of their cultivation and consumption are discussed. Briefly, the introduction of legal regulations related to plant gene technology are explained.

TANTÁRGY TARTALMA / DESCRIPTION

1. Metabolism of plant cells and tissue cultures, nutrient media.
2. Plant somatic cell cultures. Plant regeneration, somatic embryogenesis.
3. Biotechnology of sexual reproduction (embryo cultures, haploid and triploid cultures, *in vitro* fertilization, biotechnology of apomixis).
4. Biotechnology of asexual reproduction (*in vitro* cultures of vegetative organs, meristem cultures, *in vitro* gene bank).
5. The theory and practice of *in vitro* vegetative micro propagation.

6. Plant protoplasts. Somaclonal and gametoclonal variability.
7. Theoretical and methodological basis of gene technology.
8. Genetically modified (GM) plants (biotic stress resistant transgenic plants, transgenic modified plants in metabolism).
9. Genetically modified (GM) plants (abiotic stress-resistant transgenic plants, developmentally modified transgenic plants).
10. Cultivation of transgenic (GM) varieties.
11. Risks of cultivation and consumption of transgenic (GM) varieties.
12. Legislative regulation of plant gene technology.

SZÁMONKÉRÉSI ÉS ÉRTÉKELÉSI RENDSZERE / ASSESMENT'S METHOD

Meeting the conditions set by the supervisor.

KÖTELEZŐ IRODALOM / OBLIGATORY MATERIAL

Christou P., Klee H. (Eds.) (2004): Handbook of Plant Biotechnology – Wiley-Blackwell, Oxford-Hoboken, UK and USA.

Davey, R.M., Anthony P. (Eds.) (2010): Plant Cell Cultures. Essential Methods – Wiley-Blackwell, Oxford-Hoboken, UK and USA.

George, E.F., Hall, M.A., De Klerk, G.-J. (2008): Plant Propagation by Tissue Culture

3rd Edition – Springer-Verlag Berlin Heidelberg.

Neumann, K.H., Kumar, A., Imani, J. (2009): Plant Cell and Tissue Culture - A Tool in Biotechnology –

Springer-Verlag Berlin Heidelberg.

Stewart, C.N., Jr. (Ed.) (2016): Plant Biotechnology and Genetics: Principles, Techniques, and Applications, 2nd Edition – Wiley-Blackwell, Oxford-Hoboken, UK and USA.