

## Agri-Food biotechnology (IIIrd Year , VIth SEMESTER)

Credit value (ECTS) 5

### Course category

Domain (Optional)

### Course holder:

Associate Professor PhD. Dănuț Petru SIMIONIUC

### Discipline objectives (course and practical works)

The aim of the course is to help the students to acquire knowledges regarding the types and importance of biotechnological products, the technics of obtaining Genetically Modified Organisms and the methods for identification GMOs presence in food products.

Practical works seek to familiarize students with laboratory technical work, with the laboratory equipments, methods for identifying GMOs presence in food products, to understand the importance and contribution of biotechnologies in obtaining the food products, to know the laboratory methods for genetic analysis and to know the internal, European and international laws regarding GMOs.

### Contents (syllabus)

Course (chapters/subchapters)
<b>Classic and Modern biotechnologies:</b> Short history of modern biotechnologies ; Biotechnologies and health; Antibiotics production; Hormons production; Vitamins biosynthesis; Vaccins production
<b>Biotechnologies in the modern agriculture:</b> The limits of conventional agriculture in obtaining the food supply; Alternative solutions for increasing the yields; Green revolution; Trends in modern agriculture; Aspect related at introduction and using in the GMO cultivars in Romania and worldwide
<b>Molecular basis of genetic engineering:</b> DNA and RNA structure; The genetic code and his characteristics; Gene expresion; Gene structure at eucaryotes
<b>Genetic engineering and transgenic steps:</b> Authorities and national and international rules in Biotechnologies; Transgenic plants – advantages for agriculture; Steps for genetic engineering
<b>First Step for genetic engineering. Identification, izolation and cloning of interest gene;</b> Restriction enzymes, cloning vectors, recombinant vectors. Obtaining the transgenes
<b>Second Step for genetic engineering. The transfer of intrest genes to the plants: Indirect transfer methods;</b> The transformations mediated by bacteria; The transformations mediated by viruses; <b>Direct transfer methods;</b> Biolistics; Protoplast transformation; Electroforesys; Other methods
<b>Third Step for genetic engineering. Selection and testing of the GMP:</b> Selection with markers genes; Selection with reporters genes ; GMP uses; First generation of GM plants; Second generation of GM plants; Third generation of GM plants; Estimated risks in using GMP
<b>Practical use of GMP</b>
<b>Methods for identification GMOs presence in food products based on molecular markers</b>

Practical works
Biodiversity/ Genetic erosion
In vitro propagation
Genetic engineering
Protoplast fusion
Haploidy
Methods based on molecular markers - RAPD
Methods based on molecular markers - AFLP
Methods based on molecular markers - SSR
Methods based on molecular markers - Real Time PCR

## Bibliography

- Badea Elena Marcela, 2000 – *Plantele transgenice în cultură*, București.
- Badea Elena Marcela, 2003 – *Plantele transgenice în cultură*, București.
- Banu C. Și colab., 2000 – *Biotehnologii în industria alimentară*. Ed. Tehnică, București.
- Beceanu B., 1994 – *Tehnologia produselor horticole*, vol I. Centrul de multiplicare U:S.A.M.V. Iași.
- Bourgeois C.M., Larpent J.P., 1989 – *Microbiologie alimentaire*, vol. I-II. Edit. Lavoisier, Paris.
- Clement G. și colab., 1990 – *Aminoacid composition and nutritive value of the alga Spirulina maxima*, vol. 18. Journal of the Science of Food and Agriculture.
- Danson M. J., Hough D. W., 1998 – *Les enzymes de l` extreme*. Biofutur.
- Fellet P., 1998 – *Aliments et industries alimentaires*. Versailles, INRA Editions.
- Milică C.I., 1999 – *Biotehnologiile viitorului*. Edit. „Ion Ionescu de la Brad”, Iași.
- Niculiță P., Popa Mona, Belc Nastasia, 2006 – *Bioinginerie și biotehnologii alimentare*, vol. I. Ed. Academiei Române, București.
- Simioniuc D.P., 2009 – *Biotehnologii*. Ed. „Ion Ionescu de la Brad”, Iași.
- Vântu Smaranda, 2005 – *Culturi de celule și țesuturi vegetale în biotehnologie*. Ed. Universității Al. I. Cuza, Iași.

## Evaluation

Evaluation form	Evaluation Methods	Percentage of the final grade
Exam	Writing and oral examination	60%
Appreciation of the activity during the semester	Oral assessment during the semester, verification tests and final laboratory colloquium.	40%

## Contact

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