

EC 08-VII Applied Biochemistry and Biotechnology of Plants

Code	EC 08-VII
ECTS credits	4
Attendance time	8 Semester
Language of instruction	Ukrainian
Duration	1
Cycle	Each Summer Semester
Coordinator	Associate professor, PhD Olha Avksentieva
Instructor(s)	-
Allocation of study programmes	Biology
Recommended prerequisites	Biochemistry; Biotechnology; Structural Botany: Anatomy of Plants, Plants Physiology and Biochemistry and knowledge of the disciplines of natural science
Learning objectives	<p>- Know the main classes of primary (carbohydrates, nitrogen-containing compounds, proteins, lipids) and secondary (phenolic compounds, isoprenoids, alkaloids, glycosides, minor compounds) plant metabolism;</p> <p>- their general characteristics, classification, main representatives, features of metabolism,</p> <p>- their functional role in the plant and practical use in modern biotechnologies.</p> <p>To be able to apply theoretical knowledge of the basics of plant biochemistry and biotechnology when conducting scientific research and under the conditions of production activity.</p>
Syllabus	<p>Topic 1. General characteristics and features of vegetable carbohydrates.</p> <p>Characteristics of monosaccharides</p> <p>Oligosaccharides: general properties and individual representatives</p> <p>Reserve and structural polysaccharides</p> <p>Carbohydrate metabolism</p> <p>Topic 2. Nitrogen-containing compounds and lipids.</p> <p>· Amino acids, peptides, plant proteins</p>

	<ul style="list-style-type: none"> · Metabolism of nitrogenous substances in the plant · General characteristics of lipids, their classification. Lipid metabolism <p>Topic 3. Substances of secondary (specialized) plant metabolism. General characteristics of substances of secondary metabolism. Phenolic compounds. Isoprenoids. Alkaloids Glycosides. Minor compounds of secondary metabolism</p> <p>Topic 4. Applied aspects of modern biochemistry and biotechnology of plants</p> <ul style="list-style-type: none"> · Plant metabolomics · GM plants with altered biochemical composition. · Sweetness of sugars and sugar substitutes. · Stevia is a natural sugar substitute. · Deficiency of food protein and ways to solve it. · Palm oil - benefit and harm. · Biotechnology of medicinal plants: metabolites, tissue culture. · GM plants - biofactories and "edible vaccines". · Essential oils - composition, synthesis, functions, methods of production. · Aromatherapy. · Biotechnological ways of obtaining alkaloid raw materials.
Literature	<p>Wheeler C., Sterr M.W., Tobin A.K. Plant Biochemistry. – Garland Science, 2008. – 446 p.</p> <p>Shanahan B.B., Gruissem W., Jones R.L. Biochemistry and Molecular Biology of Plants. 2nd Edition. – Wiley, 2015. – 1283 p.</p> <p>Mason F., Chollet R. Plant biochemistry. – Jones & Bartlett Publishers, 2011. – 248 p.</p> <p>Ward H.-W, Piechulla B. Plant biochemistry. Academic Press, 2011. - 668 p.</p> <p>Krasilnikova L.O., Avksentieva O.O., Zhmurko V.V. Biochemistry of plants. - Kind. "Osnova" group, 2007. - 191 p.</p>
Teaching and learning methods	Lecture (2 WH), Laboratory (1 WH)
Workload	Classroom hours: 48 h Individual study time: 72 h Total: 120 h

Assessment	The assessment consists of a written examination and a preliminary assessment of educational achievements
Grading procedure	The module grade is the sum of preliminary study achievements and the examination grade
Basis for	Elective courses and Course project