UNIWERSYTET GDAŃSKI

Course title
Węglowodany - podstawowy składnik żywienia/ Carbohydrates - a basic component of nutrition

ECTS code
13.3.1036

Name of unit administrating study
Faculty of Chemistry

Studies

Field of study	Type	Form	
Chemistry	Bachelor	Full-time studies	

Teaching staff
Dr hab. Beata Liberek, prof. nadzw.

Forms of classes, the realization and number of hours

A. Forms of classes, in accordance with the UG Rector's regulations
lecture

B. The realization of activities
in-class learning

C. Number of hours
30 h lecture

ECTS credits 2

classes - 30 h
tutorial classes – 5 h
student's own work – 15 h

Total: 50 h - 2 ECTS

The academic cycle
2020/21 summer semester

Type of course
obligatory

Language of instruction
Polish

Teaching methods

Multimedia presentation combined with discussion of the problems; individual or group consultations, depending on the needs.

Form and method of assessment and basic criteria for evaluation or examination requirements

A. Final evaluation, in accordance with the UG study regulations
course completion (with a grade)

B. Assessment methods
Test

C. The basic criteria for evaluation or exam requirements
Achievement of at least 51% of the total number of points from the test. The percentage result of the test is correlated with the mark in the way indicated in "Study Regulations of University of Gdansk".

Required courses and introductory requirements
Knowledge of the basic organic groups of compounds, their structure and properties.

Aims of education
Studies on the structure, properties, functions and metabolism of carbohydrates and their derivatives, which are the nutrition components.

Course contents
Carbohydrates classification and functions. Structural diversity of aldoses and ketoses. Ring forms of sugars. Optical activity of sugars. Mutarotation. Reducing and non-reducing sugars. Other equilibriums of sugars in aqueous solution. Conformations of monosaccharide ring. Glucose: characteristic, sources, metabolic conversions. Glucose fermentations. Fructose, glucose-fructose syrup, honey. Other hexoses and pentoses as the nutritional ingredients. Monosaccharides with other functional groups: deoxysugars, aminosugars, uronic acids and their role in nutrition. Derivatives of monosaccharides: glyconic acids, aldaric acids, alditols, esters and their role in nutrition. Glycosides: structure, classification, occurrence in food. Disaccharides and oligosacchides in food. Prebiotics. Cyclic oligosaccharides. Polysaccharides: classification and occurence. Starch: structure, sources, metabolism, hydrolysates, chemical modifications. Cellulose: structure, modifications. Other plant polysaccharides: hemicelluloses, beta-glucans, pectins, gums. Maillard browning: reactants, stages and key reactions, final products. Acrylamide: forming and toxicity. Proteins glycosylation. Caramelization.

Bibliography of literature

A. Literature required to pass the course

S. W. Cui, Food Carbohydrates: Chemistry, Physical Properties and Applications
R. E. Wrolstad, Food Carbohydrate Chemistry
I. Żak, Chemia medyczna
H. M. I. Osborn, Carbohydrates

B. Extracurricular reading

L. Stryer, Biochemia

Knowledge

Students are familiar with basic carbohydrates, their divisions and derivatives. Students explain behavior of carbohydrates in aqueous solution. Students explain the special role of glucose and fructose in nutrition. Students know the basic reactions of sugars, Maillard browning and caramelization. Students know monosaccharides and their derivatives found in food and are familiar with their functions. Students are acquainted with oligosaccharides found in food and their functions. Students know starch and other plant polysaccharides and define their functions. Students are familiar with metabolic processes of sugars.

Skills

Students recognize configurationally different monosaccharides, selected oligosaccharides and polysaccharides. Students draw possible forms of monosaccharides. Students describe metabolic processes of glucose and other carbohydrates. Students list derivatives of monosaccharides, found in food, and recognize their functions. Students list oligosaccharides crucial in nutrition and recognize their functions. Students recognize functions of starch and its modifications. Students recognize other plant polysaccharides and their functions. Students differentiate stages and products of Maillard browning and caramelization.

Social competence

Students understand the need of a comprehensive view of a problem, discuss different aspects of a problem, keep criticism, appreciate the particular components of the newly gained knowledge.