

IDENTIFICATION

Course code : E3AG5RD6
ECTS : 3

DURATION

Lectures : 12
Tutorial classes : 36
Labs : 8
Total : 56

Project :
Personnal work :

ASSESSMENT

Continuous assessments, oral presentations, project report, 1 lab report

TEACHING MATERIALS

Course materials, tutorials, and lab work documents provided

LANGUAGE

English

CONTACT

Joël COUPRIE Cyrielle GARCIA cy-rielle.garcia@univ-reunion.fr
Axelle SEP-TEMBRE MALATERRE axelle.malaterre-septembre@univ-reunion.fr
joel.couprie@univ-reunion.fr

Modifié le : 14 juillet 2026

UE : UE5-R

COURSE : Functional properties of food

SCOPE OF THE COURSE

OBJECTIVES

Course objectives Master the functional properties of the 3 major classes of food constituents (proteins, carbohydrates, lipids) as well as food additives. Understand the determinants of the water component in foods.

Intended learning outcomes Understand the 'how' of constituent structure and environment that affect physicochemical properties such as solubility, density, optical rotation, melting point and range, crystalline form, oxidative stability, chemical/biochemical reactivity of carbohydrates, lipids, and proteins. Master knowledge of physicochemical properties for developing techno-functional applications of the main constituents of foods. Know how to extrapolate on formulation, transformation, and preservation strategies.

COMPETENCE AND SKILLS

Formulate and transform a product Understand scientific and technical resources in English

PROGRAM

I Properties of classes of food constituents and functional properties
1) Relationship between carbohydrate structures in foods and physicochemical/techno-functional properties
a- Functions of mono- and oligosaccharides in foods. b- Functions of polysaccharides and interactions in food matrices. c- Role of food carbohydrates in food aids or PAI. Hydrocolloids : starches, cellulose, hemicelluloses, xanthan, carrageenans, pectic compounds, alginates. i) Production, structure, properties. ii) Physical and chemical transformation reactions. iii) Enzymatic transformation reactions.
2) Food proteins Recall of protein structures and functions. a- Physicochemical and functional properties of proteins. b- Main sources of proteins and applications in AA. c- Nutritional aspects : essential AAs, protein value, digestibility of food proteins, allergies. d- Modification of food proteins and technological treatments.
3) Food lipids Recall of lipid structures a- Edible fats and oils b- Physicochemical and functional properties c- Role in food technology

II Importance of water in foods
a - Physicochemical properties and structure of water. Interactions water/polar/apolar constituents – hydration properties
b - Water thermodynamics, Aw, vapor pressure – sorption isotherms. Molecular mobility of water and food stability. Water migration in heterogeneous food matrices

III Food additives Classification and regulatory framework
a - Preservatives b – Sensory agents c – Texture agents d – Conditions of use

Lab work : Effect of the composition in macronutrients and additives on the functional properties of finished products. Models of creams/foams or intermediate bakery/viennoiserie/pastry products (e.g., doughs) will be studied.

BIBLIOGRAPHY

REQUIREMENTS

Organic chemistry (main functional groups and reactivity), structure of biomolecules, microbiology, general enzymology