

# Mediterranean Agronomic Institute of Chania

MASTER OF SCIENCE IN

2023 / 2024

## FOOD QUALITY AND CHEMISTRY OF NATURAL PRODUCTS

Consumers' increasing awareness of issues related to food and bioactive ingredients has formed the basis for a Master of Science degree (120 ECTS) in Food Quality and Chemistry of Natural Products. Following an interdisciplinary approach, the FQC department aims to connect Food Science and Natural Products, investigating their bidirectional relationship. Furthermore, current challenges in sustainable food systems require the application of circular economy principles that focus on the reduction of waste and the efficient re-use of food by-products. In this context, recovery of biomolecules with non-toxic "Green" solvents and valorization of food industry wastes is included in the Department's research activities.

The programme is chemistry-oriented and in the first year, the students acquire theoretical knowledge in Food Science, Food Authenticity, Analytical/Laboratory Techniques and various aspects of the Chemistry of Natural Products. In the second year, students formulate a thesis project based on their interests with the aid of department researchers and professors from the first year. This project comprises a literature review, laboratory work, data analysis, and dissertation writing.

### RESEARCH ACTIVITIES

- ▶ Recovery of antioxidants from Agri-Food wastes.
- ▶ Extraction efficiency of "Green" solvents
- ▶ Natural product separation, properties and structural elucidation
- ▶ Chemical fingerprinting as a tool for authentication
- ▶ Delivery systems in food and cosmetic formulations

### INFORMATION

For more information, visit our website at: [www.iamc.ciheam.org](http://www.iamc.ciheam.org) or send inquiries to [grigorakis@maich.gr](mailto:grigorakis@maich.gr)



### HOW TO APPLY

Applications to study at CIHEAM MAICH must be made through the online application form that can be accessed by this link: <http://apply.maich.gr/>

The Master of MAICH (60ECTS) is awarded to those students who successfully complete the first-year requirements but do not satisfy the additional required conditions which allow them to be accepted into the second year of the M.Sc. programme (120 ECTS) as stated in the CIHEAM/MAICH specific academic regulations. The attainment of the M.Sc. degree qualifies them to successfully continue their doctorate studies and/or pursue an expert's career in both the public and private sector.



### REQUIREMENTS

Applicants must have the academic level that qualifies them to undertake postgraduate level studies in their home country or equivalent to a minimum of four years undergraduate studies.

The working language of MAICH is English. Selection is made on the basis of the files submitted by applicants, with priority being given to applicants from CIHEAM member countries, and takes account of their academic results, professional experience acquired in the chosen field of specialization, reference letters and their competence in English.

The documentation required by CIHEAM MAICH includes:

- ▶ Academic records and transcripts
- ▶ Graduation degree
- ▶ Proof of English language competence
- ▶ Two letters of recommendation.

### SCHOLARSHIPS

Qualified candidates may be eligible for scholarship covering fully or partly: tuition, teaching material, board, lodgings, health insurance and compensation.

## EDUCATIONAL SEQUENCE

### First-year Studies Programme

The first-year Studies Program of the Curriculum is organised in 5 Units (60 ECTS):

#### SEMESTER I (October 2023 – February 2024)

##### FQC510.11209.0 - FUNDAMENTAL OVERVIEWS (14 ECTS)

- ▶ Statistics
- ▶ Organic Chemistry
- ▶ Analytical Chemistry I
- ▶ Biochemistry of Secondary Metabolism

##### FQC520.11806.0 - ADVANCED FOOD CHEMISTRY (16 ECTS)

- ▶ Foods/ Lipids/ Antioxidants
- ▶ Water Relations in Food – Food Carbohydrates
- ▶ Analytical Chemistry II
- ▶ Functional foods and bioactive ingredients

#### SEMESTER II (February 2024 – June 2024)

##### FQC530.11209.0 - CHEMISTRY OF NATURAL PRODUCTS (12 ECTS)

- ▶ Chemistry of Terpenoids and Essential Oils
- ▶ Chemistry of Alkaloids, Flavonoids and other Phenolics
- ▶ Laboratory Techniques I
- ▶ Laboratory Techniques II

##### FQC540.11512.0 - TOPICS IN FOOD SCIENCE (15 ECTS)

- ▶ Food safety management
- ▶ Food Legislation
- ▶ Products of Appellation of Origin Quality Assurance
- ▶ Quality Assurance

##### FQC500.1312.0 - EXTENDED ESSAY (3 ECTS)

### Second year - The Master of Science Programme (Project - 9 months duration, 60 ECTS)

Second year students, having acquired a solid foundation on theoretical concepts in Food and Natural Products Chemistry, undergo training in practical and technical aspects of the aforementioned disciplines. During their laboratory work, they learn Good Laboratory Practices (GLP) and they

gain “hands-on” experience with advanced analytical instruments. Through literature reviewing, data analysis and dissertation writing, they develop their analytical skills, sharpen their inductive thinking, and improve their scientific writing.

## LABORATORY FACILITIES/EQUIPMENT

The Department’s Laboratory is fully equipped with advanced analytical and preparative instruments:

- ▶ GC-MS
- ▶ LC-DAD-MS
- ▶ LC-MS/MS
- ▶ LC-RI
- ▶ Lyophilizer
- ▶ Semi-preparative HPLC-UV
- ▶ Soxhlet extractors
- ▶ Rancimat apparatus
- ▶ Clevenger distilling apparatus
- ▶ Secondary instruments: pHmeters, conductivity meters, refractometers, drying oven, water baths, analytical balances, magnetic stirrers, centrifuges, homogenizers, rotary evaporators.

## SERVICES

The Laboratory of Analytical Chemistry at MAICH has been operating since 1992 as a testing laboratory for various foodstuff mainly of plant origin (fruit, vegetable, medicinal plants). Since 2003, it is accredited according to ISO 17025 for olive oil and honey analysis, and is active in the steady supply of analytical services to third parties.



The CIHEAM MAICH campus is situated in the heart of a pine forest and is conveniently located just 3km from Chania (Crete, Greece), a town well-known for its exquisite natural, cultural and academic environment.



### MEDITERRANEAN AGRONOMIC INSTITUTE OF CHANIA

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