



# Master Programme implementation plan

Deliverable 2.1.

Project Reference

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FoSaMed, or Enhancing Food Safety in the Mediterranean, is a project which includes Moroccan High Education Institutions (HEIs) and European higher education institutions with the aim to promote inclusive education through curriculum development and teacher education on food safety.

The main specific goal of the project is the implementation and development of a new Joint Master's Program, within the curricula of four Moroccan institutions including the Agronomic and Veterinary Institute Hassan II (IAV), the National School of Agriculture of Meknes, Morocco (ENA), the Faculty of Sciences Ibn Tofail, Morocco (IBN) and the University Mohammed Premier, Morocco (UMP) that will receive the support of three European institutions: the project coordinator the University of Évora (UEVORA), the University of Barcelona (UB) and the Mediterranean Universities Union (UNIMED).

The FoSaMed project aims to contribute to the qualification of the Moroccan academics on modern and innovative teaching methodologies, to support Moroccan HEIs in designing a new Master Program on Food safety, and to promote adherence to the traditional Mediterranean diet associated to short food supply chains. The contribution to inclusive higher education in Morocco, that integrates underprivileged groups, such as women, rural populations and refugees and gives them equal access to knowledge and the opportunities it brings is also targeted as another key objective of the project.

## Document Information

<b>Project Title</b>	FoSaMed – Food Safety in the Mediterranean
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<b>Abstract (for dissemination)</b>	<p>The Master Programme implementation plan defines a structure of the new curriculum, and all the necessary steps for its development and implementation.</p> <p>In addition, the implementation plan includes a sustainability plan that aims to ensure the maintenance of the Master Programme after the end of the project.</p>

## Contents

FoSaMed Master.....	5
Course identification and objectives .....	5
Training objectives (skills, know-how and knowledge).....	5
Conditions of access to the master and pre-requisites .....	8
Professional perspectives of the course.....	9
Structure and detailed description of the Master.....	10
Staff and teachers list.....	21
Teaching materials, equipment and spaces .....	27
Partnerships (determining the nature of the partnership and its methods) .....	35
Sustainability Plan.....	36

# FoSaMed Master

## Course identification and objectives

Title of the degree	School/Faculty/Department	HEI/University
Master	Sciences Alimentaires et Nutritionnelles	Institut Agronomique et Vétérinaire Hassan II
	Faculté des sciences à Kenitra (Département de Chimie)	Université Ibn Tofail
	Sciences de Bases	Ecole Nationale d'Agriculture de Meknès
	Faculté des sciences à Oujda (Département de Biologie)	Université Mohammed Premier

Sciences and Technologies	<b>Field of study</b>
Food Safety in the Mediterranean (EN) Sécurité Sanitaire des Aliments en Méditerranée (FR)	<b>Designation</b>
Academic year 2023/2024	<b>Start date</b>

The **request for the accreditation** of the master's degree is submitted at the same time by the four Morocco HEIs (IAV, IBN, ENA and UMP) in **May 2022**. And the approval response from ANEAQ (Agence Nationale d'Evaluation et d'Assurance Qualité de l'Enseignement Supérieur et de la Recherche Scientifique) is expected in October/November 2022.

HEI/University	Master Coordinator/Director
Institut Agronomique et Vétérinaire Hassan II	Saadia ZRIRA
Université Ibn Tofail	Abdelaziz CHAOUCH
Ecole Nationale d'Agriculture de Meknès	Ilham BELKOURA
Université Mohammed Premier	Abdeslam ASEHRAOU

## Training objectives (skills, know-how and knowledge)

This master's degree comes under the ERASMUS+ project (618518-EPP-T-2020-1-PT-EPPKA2-CBHE-JP), entitled (FoSaMed - Enhancing Food Safety in the Mediterranean).

In line with the ERASMUS+ and KA2 objectives, the overall objective of FoSaMed is to strengthen the capacity of higher education by promoting inclusive education through curriculum development and teacher education on food safety in Morocco.

The project brings together Moroccan HEIs, namely Agronomic and Veterinary Institute Hassan II (IAV), National School of Agriculture (ENA), Ibn Tofail University (IBN) and Mohamed I University

(UMP) which will receive the support of the project coordinator the University of Évora (UEVORA) together with the University of Barcelona (UB) and the Mediterranean Universities Union (UNIMED). The FoSaMed project aims to develop a Master's degree on food safety by:

- Updating the curricula of the Moroccan HEIs,
- Modernising the pedagogical processes,
- Updating the technical skills of the teachers,
- Modernisation of the laboratories, through the acquisition of equipment.

Moroccan academics are trained on modern and innovative teaching methodologies in order to design a Master programme which:

- 1) promotes the traditional Mediterranean diet
- 2) is associated to short food supply chains
- 3) promote an inclusive higher education by involving underprivileged groups, such as women, rural populations and refugees and giving them equal access to knowledge and opportunities.

The courses are oriented towards professional and research careers in Food Safety. The curriculum of the proposed teaching units has been chosen considering the national needs of Morocco in the field of food safety, in particular the training of qualified professionals able to strengthen the agri-food sector.

The main objective is to deepen and strengthen the knowledge and skills acquired by students during their training in Agricultural and Agri-food engineering or in basic bachelor's degrees in Biology, Life Sciences, Agronomy, and Veterinary Medicine, in order to: (1) prepare them to become responsible actors who will participate in the development of the agri-food sector in Morocco and internationally; (2) that they can contribute to meeting the challenges imposed by the current economic situation and national and international regulatory standards in terms of food safety assurance.

The students should have acquired, at the end of the course, the knowledge, and methodologies to apply for doctoral studies in a food safety related discipline or to be directly operational in food companies or public and private organisations in the field of food safety and quality control.

The proposed curriculum of teaching units has been established considering the national needs of Morocco in the field of food safety, including scientific research and the training of qualified professionals capable of strengthening the agri-food sector.

The general objectives of the Master are:

- To train senior managers who master the different scientific approaches to food safety;
- To design and make available to research laboratories and companies a sustainable and efficient training model to deal specifically with food safety issues;
- To involve students in food safety issues at local, national and international levels.

Specific objectives:

- To acquire the basic knowledge to analyse, diagnose and manage food safety problems;
- To acquire the basic knowledge to ensure a good valorisation of agri-food products;

- To acquire the expertise, skills and tools necessary to solve the above-mentioned problems.

The teaching of fundamental concepts is accompanied by the learning of methodological tools, laboratory training, the presentation of current research issues and applications in the chosen specialities.

The Master includes a first year with a common curricular plan in the 4 HEIs, which will cover the following subjects: Food Chemistry, Food Microbiology, Laboratory Biosafety, Food Analysis Methods, Applied Statistics, Technical English, Food Toxicology, Unit Operations in Food Processing, Food Safety and Quality Management, Food Safety and Hygiene, Food Legislation, Human Nutrition and Health.

The second year is a specialisation year, with each of the Moroccan HEIs having a distinct specialisation: Milk and dairy products - IAV; Fruits and Vegetables - IBN; Oleicultural Products - ENA; Local Agri-Food Products - UMP. The Master also includes a period of internship and the writing of an internship memoir or thesis (Projet de Fin d'Etudes).

The objectives and structure of the Mater are designed so that students acquire the following skills:

Basic skills:

- Work in multidisciplinary teams;
- Research and select information and its appropriate source using specialised information and communication technologies to develop original research whose ideas are critically and creatively integrated;
- Communicate their findings and knowledge orally and in writing to specialist and non-specialist audiences in a clear and unambiguous manner;
- Analyse new and complex situations and devise a variety of alternative strategies to Analyse new and complex situations and devise various alternative strategies to solve them;
- Possess the learning skills that will enable them to conduct studies independently Have the learning skills to conduct studies independently;
- Integrate knowledge and understand the complexity of making judgements based on incomplete or limited incomplete or limited information, including reflections on social and ethical social and ethical responsibilities;
- Work independently, making the most of personal potential to improve professionally or as a Work autonomously, maximising personal potential for professional or research improvement.

General skills:

- Apply the concept of complexity to the analysis and interpretation of food safety management processes and systems;
- Analyse and interpret the response and management mechanisms of food safety processes and systems in general, and in the Mediterranean in particular;
- Apply sustainable planning tools and techniques to be able to respond to food safety issues;
- Apply new green economy strategies and innovations to promote food safety;

- Classify, based on the concept of scale, the factors that affect food safety from the local to the international level;
- Apply acquired knowledge and problem-solving skills in new or unfamiliar environments in broader (or multidisciplinary) contexts related to the field of food safety.

## Conditions of access to the master and pre-requisites

**Required diplomas:** degrees in the areas of Agronomy, Food Science, Biology, Life Sciences, Veterinary Medicine.

**Specific pedagogical prerequisites:** Academic background in Biology or Food Science and previous mastery of the knowledge areas of Microbiology, Biochemistry, Molecular Biology and Plant Biology.

**Language prerequisites:** Knowledge of the English language

**Number of students:** Maximum number of students expected in the first year (by HEI): 20 students (IAV); 20 students (IBN); 10 students (ENA) and 20 students (UMP).

Total number of students, in the four institutions: 70 students.

### **Selection procedures and applications**

- Application file/Dossier: registration form; 2 letters of recommendation; letter of motivation; detailed curriculum vitae with a passport photo; certified copies (diplomas, certificates of grades/assessment, certificates of additional training, certificates of internships, certificates of scientific or professional activity)
- Written exam on the scientific field of the Master (Microbiology, Biochemistry, Molecular Biology and Plant Biology)
- Oral Interview

English skills will be assessed indirectly in the exam and in the interview.

### **Selection of applicants**

- Analysis and evaluation of the application file
- Written evaluation
- Oral interview



## Professional perspectives of the course

The project pursues the general objective of capacity building in the higher education sector in Morocco, ensuring that high quality educational programmes meet the professional needs of employers in the socio-economic sector of the country.

The aim of this Master's degree is to enable graduates to enter working life after obtaining their diplomas, particularly in the following sectors:

- Scientific research in the field of food safety in university laboratories and public and private organisations;
- Food safety services in agri-food companies;
- Creation of their own companies (start-ups).

## Prospects for further higher education for the most distinguished students

The Erasmus+ Master's degree prepares students to pursue doctoral studies in Morocco and Europe, particularly in the partner countries of the Erasmus+ project - Portugal and Spain.

# Structure and detailed description of the Master

First Year (1st and 2nd semester)						
M	Teaching Unit	Teaching Unit Contents	Semester workload	Evaluation scheme (Final assessment (exam), Continuous assessment and practical work)	Teaching team	
			Total (Courses, TD, TP, Individual work, and Assessment of knowledge)			
S1	1	<b>Food Chemistry</b> <i>Chimie alimentaire</i>	-Chemical composition of foods. -Food flavours -Food spoilage kinetics	50h	Mixed assessment	Local Unit Coordinator: IAV   Saadia Zrira IBN   Abdelaziz Chaouch ENA   Bouchra Tazi UMP   Saalaoui Ennouamane
	2	<b>Food Microbiology</b> <i>Microbiologie Alimentaire</i>	- Microbial metabolism - Interactions between food and microorganisms - Microbial biotechnology	50h	Mixed assessment	Local Unit Coordinator: IAV   Khadija Lamrani IBN   Youness Taboz ENA   Amiri Said UMP   Asehraou Abdeslam
	3	<b>Laboratory Biosafety</b> <i>Biosécurité en laboratoire</i>	Good laboratory practice in scientific research laboratories and in agri-food companies (food quality control laboratories). - Notions of biosafety and biosecurity - Containment of human pathogens - Handling of pathogens - Methods of assessing infectious risk - Prevention and emergency measures - Control and monitoring of safety equipment - Laboratory waste management systems	50h	Mixed assessment	Local Unit Coordinator: IAV   Khadija Lamrani IBN   Mohamed Ebntouhami ENA   Bouchra Tazi UMP   Meziane Mustapha
	4	<b>Food Analysis Methods</b> <i>Méthodes d'analyse des aliments</i>	1- Reminder of some basic notions: Principle, retention parameters, and different types of chromatography. 2- HPLC and CPG: Areas of use, advantages and disadvantages, study of the different elements of the equipment (delivery system of the mobile phase, injectors, columns, detectors), optimisation of the separation. 3- Coupling HPLC and CPG with the mass detector (Equipment, acquisition modes, use) 4- Quantitative analysis methods (External, internal and additions).	50h	Mixed assessment	Local Unit Coordinator: IAV   Saadia Zrira IBN   Abdelaziz Chaouch ENA   Bouchra Tazi UMP   Saalaoui Ennouamane
	5	<b>Applied Statistics</b> <i>Statistiques appliquées</i>	Applied statistics: - Reminder of descriptive statistics. - Introduction to multivariate data analysis techniques. - Unsupervised methods. Computer Science: - Introduction to statistical software and the R programming language. - Data.	50h	Mixed assessment	Local Unit Coordinator: IAV   Mohamed Dehhaoui IBN   Amar Habsaoui ENA   Boualam Hssaine UMP   Kerkour Elmiad Aissa

S2	6	<b>Technical English</b> <i>Anglais Scientifique</i>	<ul style="list-style-type: none"> <li>- Functions.</li> <li>- Loops.</li> </ul> <p>English:            Deepening of basic English vocabulary and familiarisation of the student with thematic and specialised vocabulary in English (agri-food and food safety fields).            Oral comprehension            Oral expression            Written expression</p> <p>Communication techniques:            Introduction to communication            Introduction to bibliographic research methods            Written communication techniques            Oral communication techniques</p>	50h	Mixed assessment	Local Unit Coordinator: IAV   Fatima Zahra Kroum IBN   Youssef Aboussaleh ENA   Aoudry Saadia UMP   Mentak Said
	7	<b>Food Toxicology</b> <i>Toxicologie alimentaire</i>	<p>The main families of toxic substances in the environment:            - Sources of contamination and routes of entry of xeno biotics into humans            - The phases of the food poisoning process</p> <ul style="list-style-type: none"> <li>- The exposure phase</li> <li>- Toxic-dynamic phase</li> <li>- Mechanisms of toxic action</li> <li>- Protection systems</li> <li>- Main mechanisms of toxic action</li> <li>- Classification of hazards and risks</li> <li>- Study methods in food toxicology</li> <li>- Toxicological tests</li> <li>- Protocol followed</li> </ul>	50h	Mixed assessment	Local Unit Coordinator: IAV   Idrissi Drissia Janati IBN   Rachid Bengueddour ENA   Lahlali Rachid UMP   Gseyra Nadia
	8	<b>Unit Operations in Food Processing</b> <i>Opérations unitaires en technologie alimentaire</i>	<p>The module is presented in two parts:            1: Unit operations of separation            - Distillation            - Liquid-liquid extraction            - Solid-liquid extraction            - Crystallization            - Sedimentation            - Filtration            2: Unitary stabilisation operations            - Freezing            - Drying            - Evaporation            - Thermal destruction of micro-organisms</p>	50h	Mixed assessment	Local Unit Coordinator: IAV   Amar Kaanane IBN   Karima Selmaoui ENA   En Nahli Said UMP   Neffa Mounsef
	9	<b>Food Safety and Quality Management</b> <i>Sécurité des aliments et gestion de la qualité</i>	<p>The module is presented in two parts:            1. Food Safety System IS22000            - the food safety approach            - the process approach            - the company's context            - leadership</p>	50h	Mixed assessment	Local Unit Coordinator: IAV   Amar Kaanane IBN   Aouane El Mahjoub ENA   En Nahli Said UMP   Sbaa Mohamed

		<ul style="list-style-type: none"> <li>- the risk approach</li> <li>- resources</li> <li>- communication</li> <li>- documentation</li> <li>- achieving safe products</li> <li>- performance evaluation</li> <li>- continuous improvement</li> </ul> <p>2. Management system:</p> <ul style="list-style-type: none"> <li>- Principles and structure of management systems</li> <li>- Process approach</li> <li>- Documentary engineering of the quality system</li> <li>- Understanding the ISO 9001/2015 quality standard</li> <li>- Implementation of the QMS</li> <li>- Management system audit</li> </ul>			
10	<b>Food Safety and Hygiene</b> <i>Hygiène et sécurité des aliments</i>	<p>Chapter 1: The importance of food hygiene</p> <p>Chapter 2: Integrating the concept of food risk when handling foodstuffs (food safety/quality assurance)</p> <p>Chapter 3: Implementing a guide to good hygiene practices</p>	50h	Mixed assessment	<p>Local Unit Coordinator:</p> <p>IAV   Khadija Lamrani  IBN   Aouane El Mahjoub  ENA   Tahiri Abdesslam  UMP   Mokhtari Khalida</p>
11	<b>Food Legislation</b> <i>Législation alimentaire</i>	<p>The module is presented in four parts:</p> <ul style="list-style-type: none"> <li>- Part 1: Introduction to legislation and standardisation,</li> <li>- Part 2: Overview of the national food control system,</li> <li>- Part 3: Food Legislation: Main food control laws,</li> <li>- Part 4: The main regulatory texts on product conformity,</li> <li>- Part 5: Traceability of food products.</li> </ul>	50h	Mixed assessment	<p>Local Unit Coordinator:</p> <p>IAV   Idrissi Drissia Janati  IBN   Youssef Aboussaleh  ENA   Tahiri Abdesslam  UMP   Saalaoui Ennouamane</p>
12	<b>Human Nutrition and Health</b> <i>Nutrition humaine et santé</i>	<p>Part 1: Physiological basis and nutritional requirements.</p> <p>Part 2: Link between nutrition and health.</p>	50h	Mixed assessment	<p>Local Unit Coordinator:</p> <p>IAV   Idrissi Drissia Janati  IBN   Rachid Bengueddour  ENA   Belkoura Ilham  UMP   Amrani Souliman</p>

**For a detailed description of content of the modules and workload, in each of the HEIs, please consult the accreditation dossiers here:**

[IAV Accreditation Dossier](#)

[IBN Accreditation Dossier](#)

[ENA Accreditation Dossier](#)

[UMP Accreditation Dossier](#)

**Second year (3rd semester)**

**IAV**

**Specialisation: Milk and dairy products**

M	Teaching Unit	Teaching Unit Contents	Semester workload	Evaluation scheme	Teaching team
			Total (Courses, TD, TP, Individual work, and Assessment of knowledge)	(Final assessment (exam), Continuous assessment and practical work)	
13	<b>Milk and dairy products technology</b>	I. Dairy sector in Morocco II. Composition and properties of milk III. Milk microbiology and analysis IV. Quality control of raw milk at reception V. Fluid milk technology: pasteurized and sterilized milk VI. Production of milk powder VII. Fermented milk technology VIII. Cheese technology IX. Butter and ice cream production X. Innovation and production of new products XI. Preservation and packaging	50h	Mixed assessment	Unit Coordinator: Zrira Saadia
14	<b>Environmental Management System EMS</b>	I. International standards in the field of environmental management II. The requirements of ISO 14001:2015 and other related standards III. Implementation of the environmental management system IV. Moroccan environmental policy and environmental management V. Moroccan legislative framework for environmental protection VII. Carrying out an environmental analysis, methodology and approach VII. Management of legal compliance and its use in the company VIII. Structure of the monitoring and evaluation of environmental performance IX. Knowledge of the certification process and EMS audit techniques	50h	Mixed assessment	Unit Coordinator: Kaanane Amar
15	<b>Packaging &amp; storage of milk and dairy products</b>	Packaging & wrapping Industrial refrigeration	50h	Mixed assessment	Unit Coordinator: Kaanane Amar
16	<b>Chemical and microbiological control of milk and dairy products</b>	Chemical control of milk Microbiological control of milk	50h	Mixed assessment	Unit Coordinator: Zrira Saadia
17	<b>Documentary analysis, research methods and writing of the master thesis</b>	Techniques for writing scientific documents: -Introduction -Techniques for researching bibliographic references - Techniques and standards for writing dissertations - Techniques and standards for writing theses - Techniques for writing scientific articles - Techniques for writing bibliographical references - Techniques for writing scientific reports and projects	50h	Mixed assessment	Unit Coordinator: Ouchbani Tarik
18	<b>Seminars and special topics</b>	Visits to industrial units Seminars	50h	Mixed assessment	Unit Coordinator: Ouchbani Tarik

**Second year (3rd semester)**

**IBN**

**Specialisation: Fruit and Vegetables**

M	Teaching Unit	Teaching Unit Contents	Semester workload	Evaluation scheme	Teaching team
			Total (Courses, TD, TP, Individual work, and Assessment of knowledge)	(Final assessment (exam), Continuous assessment and practical work)	
13	<b>Project management and entrepreneurship</b>	Part 1: Valorisation of research results Part 2: Project cycle Case studies Tutorials	50h	Mixed assessment	Unit Coordinator: Zidane Ismail
14	<b>Plant-based product technology</b>	Beverage Technology Fruit and vegetable technology Canning technology for vegetables and fruit Interaction: cause of agricultural losses, source of inoculum, birth of seed pathology Canning diseases of fruit and vegetables	50h	Mixed assessment	Unit Coordinator: Taboz Youness
15	<b>Environmental Management System EMS</b>	- Environmental Management - Definition -General requirements - Environmental policy - Planning - Implementation and operation - Control and corrective action - Management review - Application to agricultural companies in the food industry (Fruit and Vegetables) - Audit techniques	50h	Mixed assessment	Unit Coordinator: Aouane Elmahjoub
16	<b>Food control</b>	- Setting up of quality control systems - Quality control systems for the fruit and vegetable processing - Methods of chemical-microbiological analysis and physical tests	50h	Mixed assessment	Unit Coordinator: Chaouch Abdelaziz
17	<b>Methodology of documentary research and scientific writing</b>	1: Bibliographic research tools: - Categories of research tools - Bibliographic research methodology - Monitoring tools  2: Bibliographic management tools - Management of bibliographic references with zotero - Presentation of research results by students on other bibliographic management tools  Tutorial Practical Work	50h	Mixed assessment	Unit Coordinator: Chakiri Said

18	<b>Food safety management</b>	<p>Introduction: The standards landscape  Steps to iso 22000 certification  The high level structure:</p> <ol style="list-style-type: none"> <li>1. Scope of application</li> <li>2. Normative references</li> <li>3. Terms and definitions</li> <li>4. Organisational context</li> <li>5. Leadership</li> <li>6. Planning</li> <li>7. Support</li> <li>8. Operation</li> <li>9. Performance performance</li> <li>10. Improvement</li> </ol> <p>Application on the Food Industry (Fruit and Vegetables)</p>	50h	Mixed assessment	Unit Coordinator: Habsaoui Amar
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**Second year (3rd semester)**

**ENA**

**Specialisation: Oleicultural Products**

<b>M</b>	<b>Teaching Unit</b>	<b>Teaching Unit Contents</b>	<b>Semester workload</b>	<b>Evaluation scheme</b>	<b>Teaching team</b>
			Total (Courses, TD, TP, Individual work, and Assessment of knowledge)	(Final assessment (exam), Continuous assessment and practical work)	
13	<b>Valuation of olive by-products</b>	Chapter 1: By-products of the olive oil industry: Environmental issues and regulations Chapter 2: Treatment methods for the by-products of the olive industry Chapter 3: Ways of valorisation of olive industry by-products in a circular economy context: the olive biorefinery Activities and practical work	50h	Mixed assessment	Unit Coordinator: EN Nahli Said
14	<b>Seminars and special topics</b>	- Writing techniques. - Definition of intellectual property. -Definition of plagiarism. - Presentation of the objectives and function of the bibliographical review -Acquire the methodology of bibliographic research. -Knowing how to prepare and present bibliographical references. - Presentation of the objectives and function of bibliographic references - Techniques for inserting citations. -Knowing how to write a bibliographic synthesis	50h	Mixed assessment	Unit Coordinator: BELKOURA Ilham
15	<b>Olive growing and olive technology</b>	Olive growing Chapter 1: Ecological and socio-economic interests of the olive tree Chapter 2: Biology and physiology of the olive tree Chapter 3: Production techniques in olive growing and good olive growing practices  Oil technology Chapter 1: Physiological and biochemical bases of olive development and maturation of the olive Chapter 2: Olive harvesting and transport Chapter 3: Extraction processes of olive oil Chapter 3: Extraction processes of virgin olive oil Chapter 4: Good hygiene practices for the elaboration of virgin olive oil  Activities and practical work Visits	50h	Mixed assessment	Unit Coordinator: BAJOUB Adil
16	<b>Documentary analysis, research methods and writing of the master thesis</b>	I- General considerations II- Issues III- Analysis and Synthesis IV. Results and Recommendations IV- Writing V- Methodological and practical guide to the oral presentation	50h	Mixed assessment	Unit Coordinator: Aoudry Saadia



17	<b>Quality and safety of olive products</b>	<p>Legislation and regulations  Chapter 1: Quality criteria and purity and safety of olive oil.  Chapter 2: Quality criteria, purity and safety of table olives.  Chapter 3: Regulatory standards for the quality and safety of olive oil and table olives.</p> <p>Methods of analysis and control  Chapter 1: Deterioration of the quality of olive products and risks of their contamination by phytosanitary residues.  Chapter 2: Official methods of analysis of the quality and safety of olive products.  Chapter 3: Recent progress in the detection and quantification of pesticide residues in olive olive products.</p> <p>Activities and practical work  Visits</p>	50h	Mixed assessment	Unit Coordinator: TAZI Bouchra
18	<b>Processing of table olives</b>	<p>Part 1: Socio-economic interests, challenges, and prospects of the table olive production sector in the world and in Morocco  Part 2: Introduction to table olive production processes  Part 3: Processing and packaging of table olives  Part 4: Good hygiene practices for the elaboration of table olives  Activities and practical work  Visits</p>	50h	Mixed assessment	Unit Coordinator: Amiri Said

**Second year (3rd semester)**

**UMP**

**Specialisation: Local Agri-Food Products**

M	Teaching Unit	Teaching Unit Contents	Semester workload	Evaluation scheme	Teaching team
			Total (Courses, TD, TP, Individual work, and Assessment of knowledge)	(Final assessment (exam), Continuous assessment and practical work)	
13	<b>Project Management and Entrepreneurship</b>	1: Valorisation of research results 2: Project cycle Case studies Tutorials	50h	Mixed assessment	Unit Coordinator: Asehraou Abdeslam
14	<b>Quality and safety of milk and milk products</b>	I: Milk production: composition, collection, storage, quality control of milk II: Milk processing III: Quality assurance in the milk processing industry V: Waste management in the dairy industry Tutorials Practical Work	50h	Mixed assessment	Unit Coordinator: Amrani Souliman
15	<b>Quality and Safety of Olive Oil</b>	I: Olive oil crushing processes: varieties, crushing techniques, olive oil storage, packaging and packaging II: Quality assurance in the olive oil processing industry III: Waste/by-product management in the olive oil processing industry. Tutorial Practical Work	50h	Mixed assessment	Unit Coordinator: Gseyra Nadia
16	<b>Quality and safety of table olives</b>	I: Table olive processing: varieties, processing techniques, packing and packaging II: Quality assurance in the table olive processing industry III: Waste/by-product management in the table olive processing industry Tutorial Practical Work	50h	Mixed assessment	Unit Coordinator: Asehraou Abdeslam
17	<b>Quality and safety of citrus fruit and juice</b>	I: The citrus industry in Morocco II: Chemical composition of citrus fruits III: Storage and packaging of citrus fruit IV: Extraction of citrus juice V: Quality assurance in the citrus juice industry VI: Valorisation of by-products Tutorial Practical Work Visits	50h	Mixed assessment	Unit Coordinator: Kharmach Ez-Zahra
18	<b>Methodology of documentary research and scientific writing</b>	1: Bibliographic research tools: - Categories of research tools - Bibliographic research methodology - Monitoring tools  2: Bibliographic management tools	50h	Mixed assessment	Unit Coordinator: Meziane Mustapha

		<ul style="list-style-type: none"><li>- Management of bibliographic references with zotero</li><li>- Presentation of research results by students on other bibliographic management tools</li></ul> <p>Tutorial Practical Work</p>			
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Second year (4th semester)			
	Semester workload	Evaluation scheme	Unit Coordinator:
<p><b>Internship and Report/Thesis</b></p> <p>The internship will be carried out in a university research laboratory or in a company, and the student's work will be monitored by a professional supervisor and an academic supervisor who is a teacher-researcher. The supervisors oversee the progress of the student's work until its completion (thesis defence).</p> <p>The student will contact the host laboratory or company at the end of the second semester to draw up a work plan and carry out bibliographical research in the field of activity of the host institution.</p> <p>The student is required to present to the person in charge of the placement (tutor) the whole of their work or activities in a document which he/she written in the form of a dissertation.</p> <p>The aim of the internship module is to put the student's acquired knowledge into practice, to introduce him/her to the worlds of scientific research and work, and to enable him/her to acquire long-term professional experience.</p> <p>This internship also allows the student to confront his or her knowledge with the constraints of the given professional sector relevant to the fields of their training.</p>	Six months – 300 hours	Report/Thesis Oral presentation	Ouchbani Tarik (IAV) Habsaoui Amar (IBN) Amiri Said (ENA) Asehraou Abdeslam (UMP)

**For a detailed description of content of the modules and workload, in each of the HEIs, please consult the accreditation dossiers here:**

[IAV Accreditation Dossier](#)

[IBN Accreditation Dossier](#)

[ENA Accreditation Dossier](#)

[UMP Accreditation Dossier](#)

## Staff and teachers list: skills involved in the master

Staff and teachers list				INTERVENTION	
Surname & Name	Institution School/Faculty and HEI/University/Institution/Company	Area of expertise	Grade	Module(s) of intervention	Nature Courses, tutorials, practical work, project supervision, etc.
<b>Teachers from the 4 Moroccan HEIs</b>					
JANATI IDRISSE Drissia	Food and Nutritional Sciences - IAV	Agricultural and food industries	PES	M1, M4, M7, M11, M12, M16, M18	Courses, tutorials, practical work, supervision
KAANAE Amar	Food and Nutritional Sciences - IAV	Agricultural and food industries	PES	M8, M9, M14, M15	Courses, tutorials, practical work, supervision
LAMRANI Khadija	Food and Nutritional Sciences - IAV	Microbiology	PES	M2, M3, M8, M10, M18	Courses, tutorials, practical work, supervision
OUCHBANI Tarik	Food and Nutritional Sciences - IAV	Agricultural and food industries	PH	M1, M4, M8, M16, M17, M18	Courses, tutorials, practical work, supervision
ZRIRA Saadia	Food and Nutritional Sciences - IAV	Agricultural and food industries	PES	M1, M4, M16, M18	Courses, tutorials, practical work, supervision
DEHAOUI Mohamed	Applied Informatics and Statistics - IAV	Applied statistics	PES	M5	Courses, tutorials, practical work, supervision
Kroum Fatima Zahra	Department of Languages- IAV	Languages and Communication Techniques	PH	M6	Courses, tutorials, practical work, supervision

HABSAOUI AMAR	Department of Chemistry - IBN	Chemistry	PES	M5, M18	Courses, tutorials, practical work, supervision
CHAOUCH ABDELAZIZ	Department of Chemistry - IBN	Chemistry	PES	M1, M4, M16	Courses, tutorials, practical work, supervision
TABOZ Youness	Department of Biology - IBN	Biology	PH	M2, M14	Courses, tutorials, practical work, supervision
EBNTOUHAMI MOHAMED	Department of Chemistry - IBN	Chemistry	PES	M3	Courses, tutorials, practical work, supervision
ABOUSSALEH YOUSSEF	Department of Biology - IBN	Biology	PES	M6, M11	Courses, tutorials, practical work, supervision
BENGUEDDOUR RACHID	Department of Biology - IBN	Biology	PES	M7, M12	Courses, tutorials, practical work, supervision
SELMAOUI KARIMA	Department of Biology - IBN	Biology	PH	M8	Courses, tutorials, practical work, supervision
AOUANE ELMAHJOUR	Department of Biology - IBN	Food biotechnology	PH	M9, M10, M15, M18	Courses, tutorials, practical work, supervision
INEKACH Sultana	Department of Biology - IBN	Food biotechnology	Engineer	M10	Courses, tutorials, practical work, supervision
ZIDANE ISMAIL	Department of Chemistry - IBN	Chemistry	PES	M13, M17	Courses, tutorials, practical work, supervision
BOUKHRIS SAID	Department of Chemistry - IBN	Chemistry	PES	M13	Courses, tutorials, practical work, supervision
CHAKIRI SAID	Department of Geology - IBN	Geology	PES	M17	Courses, tutorials, practical work, supervision
SEGHIRI RAJAA	Department of Chemistry - IBN	Process engineering	PA	M13	Courses, tutorials.
BAJOUB Adil	Basic Sciences - ENA	Food technology	PA	M1, M4, M13, M14, M15, M17	Courses, tutorials, practical work, supervision
TAZI Bouchra	Basic Sciences - ENA	Chemistry	PES	M1, M3, M4, M14, M17	Courses, tutorials, practical work, supervision
Taoufk Brahim	Basic Sciences - ENA	Biology	PA	M2, M10, M14, M16, M18	Courses, tutorials, practical work, supervision

Amiri Said	Plant and Environmental Protection - ENA	Phytopathology/Nematology	PES	M2, M14, M18	Courses, tutorials, practical work, supervision
BOUALAM HSSAINE	Basic Sciences - ENA	Mathematics	PA	M5, M14	Courses, tutorials, practical work, supervision
Aoudry Saadia	Basic Sciences - ENA	Languages and Communication	PES	M5, M16	Courses, tutorials, practical work, supervision
EN Nahli Said	Fruit growing, Oil and wine growing - ENA	Post-harvest and Conservation	PES	M5, M8, M9, M13, M14, M16, M17	Courses, tutorials, practical work, supervision
Lahlali Rachid	Plant and Environmental Protection - ENA	Phytopathology	PH	M7, M13, M14	Courses, tutorials, practical work, supervision
BELKOURA Ilham	Basic Sciences - ENA	Biology	PES	M12, M14, M15, M17	Courses, tutorials, practical work, supervision
Tahiri Abdessalem	Plant and Environmental Protection - ENA	Phytopathology/virology	PES	M10, M11, M14	Courses, tutorials, practical work, supervision
BELBCHIR Mohammed	Basic Sciences - ENA	Physics	PES	M14	Courses, tutorials, practical work, supervision
BENABBES Redouane	Department of Biology - UMP	Biochemistry	PA	M1, M4, M14, M15	Courses, tutorials, practical work, supervision
SAALAOUI Ennouamane	Department of Biology - UMP	Biochemistry	PES	M1, M4, M11	Courses, tutorials, practical work, supervision
ASEHRAOU ABDESLAM	Department of Biology - UMP	Microbiology	PES	M2, M3, M9, M10, M11, M13, M14, M15, M16, M17	Courses, tutorials, practical work, supervision
MOKHTARI KHALIDA	Department of Biology - UMP	Microbiology	PA	M2, M10	Courses, tutorials, practical work, supervision
MEZIANE MUSTAPHA	Department of Biology - UMP	Microbiology	PES	M2, M3, M14, M18	Courses, tutorials, practical work, supervision
EL GUERROUJ Bouchra	Department of Biology - UMP	Microbiology	PA	M2, M3, M10, M14, M18	Courses, tutorials, practical work, supervision
BELLAOUCHI Reda	Department of Biology - UMP	Microbiology	Other	M2, M3, M10, M14, M15, M16, M17	Courses, tutorials, practical work, supervision

AMRANI SOULIMAN	Department of Biology - UMP	Biochemistry	PES	M4, M7, M8, M12, M14	Courses, tutorials, practical work, supervision
JABRI Mohamed	Department of Mathematics	Biostatistics	Other	M5	Courses, tutorials, practical work, supervision
Kerkour Elmiad Aissa	Computer Science Department	Biostatistics	PH	M5	Courses, tutorials, practical work, supervision
BERRAAOUAN ALI	Department of Biology - UMP	Nutrition	PA	M12	Courses, tutorials, practical work, supervision
GSEYRA NADIA	Department of Biology - UMP	Toxicology	PES	M7, M15	Courses, tutorials, practical work, supervision
AOUINTI Fatima Zahra	Department of Chemistry - UMP	Chemistry	Other	M7	Courses, tutorials, practical work, supervision
NEFFA MOUNSEF	Department of Biology - UMP	Biochemistry	PA	M8	Courses, tutorials, practical work, supervision
CHAKROUNE Khadija	Department of Biology - UMP	Biochemistry	PA	M8, M15	Courses, tutorials, practical work, supervision
SBAA MOHAMED	Department of Biology - UMP	Environment	PES	M9, M17	Courses, tutorials, practical work, supervision
BENABDELLAH Nihad	Department of Physics - UMP	Physics/ Computer Science	Other	M10	Courses, tutorials, practical work, supervision
KHARMACH EZZAHRA	Department of Biology - UMP	Phytopathology	PES	M17	Courses, tutorials, practical work, supervision
SAID MOURAD	Faculty Polydisciplinaire of Nador - UMP	Biochemistry	PES	M1	Courses, tutorials, practical work, supervision
MENTAK SAID	English department – UMP	English	PES	M6	Courses, tutorials, practical work, supervision
SOUHIR Mohammed	Management - UMP	Management	Engineer	M13	Courses, tutorials, practical work, supervision



Professors/Researchers from other HEIs					
AJAL El Amine	Pharmaceutical Sciences, Faculty of Medicine and Pharmacy, Mohamed 5 University, Rabat, Morocco	Pharmacology		M6	Courses and tutorials
ROKNI Yahya	National School of Applied Sciences, Sultan Moulay Slimane University, Beni Mellal, Morocco	Microbiology	PA	M16, M18	Courses, tutorials, practical work, supervision
ABOULOIFA Houssam	Hassan II University of Casablanca, Morocco	Microbiology	PA	M17	Courses, tutorials, practical work, supervision
GHABBOUR Nabil	Faculté Polydisciplinaire, Taza, Morocco	Microbiology	Professor and Researcher	M16	Courses, tutorials, practical work, supervision
LARANJO Marta	Mediterranean Institute for Agriculture, Environment and Development (MED), UÉvora, Portugal	Microbiology	Senior Researcher	M2, M11	Online courses and tutorials in Food Microbiology
LAMY Elsa	Mediterranean Institute for Agriculture, Environment and Development (MED), UÉvora, Portugal	Food Science	Senior Researcher	M12	Online courses and tutorials in nutrition and health, consumer behaviour, Mediterranean diet.
ELIAS Miguel	Phytotechnology - UÉvora, Portugal	Food engineering	Associate Professor	M8, M9	Online courses and tutorials in food science and technology, food quality and safety.
SANTOS Ana Cristina	Phytotechnology - UÉvora, Portugal	Agronomy and Horticulture	Assistant Professor	M4	Online courses and tutorials in post-harvest technology, food rheology, sensory analysis and physical properties of food.
POTES Maria Eduarda	Veterinary Medicine - UÉvora, Portugal	Animal health and hygiene	Associate Professor	M10, M11	Online courses and tutorials in Food Hygiene and Safety, Food Legislation

DUARTE Elsa Leclerc	Veterinary Medicine - UÉvora, Portugal	Pathology and clinical aspects of infectious diseases	Assistant Professor	M7, M10	Online courses and tutorials in Microbiology (veterinary bacteriology and mycology) and infectious diseases
QUEIROGA Cristina	Veterinary Medicine - UÉvora, Portugal	Medical microbiology	Assistant Professor	M7, M10	Online courses and tutorials in Microbiology and Health
GUIX Susana	Génétique, Microbiologie et Statistique, Faculté Biologie - UBarcelona	Virology	PH	M10	Online courses
SAURINA PURROY Javier Vicente	Ingénierie Chimique et Chimie Analytique-UBarcelona	Food analysis	PES	M3, M4	Online courses
ZERON RUGERIO Maria Fernanda	Nutrition, sciences alimentaires et gastronomie-UBarcelona	Nutrition	PhD/Researcher	M12	Online courses
TRESSERRA RIMBAU Anna	Nutrition, Sciences Alimentaires et Gastronomie-UBarcelona	Nutrition	PA	M1	Online courses
RODRIGUEZ LAGUNAS MJosé	Département de Biochimie et Physiologie-UBarcelona	Immuno-nutrition	PA	M12	Online courses
PEREZ CANO Francisco José	Département de Biochimie et Physiologie-UBarcelona	Immuno-nutrition	PH	M12	Online courses
<b>Professors/Researchers from other institutions</b>					
EDDABBEH Fatima-Ezzahra	Office National de Conseil Agricole (ONCA), Oujda	Agronomy	Professor and Researcher	M9	Courses, tutorials, practical work, supervision
ERRAJI Hassan	Institut de Formation aux Métiers des Energies Renouvelables et de l'Efficacité Énergétique Oujda	Microbiology		M9, M14, M15, M17	Courses, tutorials, practical work, supervision
Belbachir CHAOUKI	ONSSA	Microbiology	Researcher	M9	Courses, tutorials, practical work, supervision

BECHCHARI Abdelmajid	Centre Régional de la Recherche Agronomique d'Oujda	Animal feed	Professor and Researcher	M14	Courses, tutorials, practical work, supervision
ZOUHEIR Chafik	Institut Spécialisé en Industrie Agroalimentaire	Agri-food		M17	Courses, tutorials, practical work, supervision
MCHIOUER Kaoutar	Commercial laboratory	Microbiology	Diagnosis	M18	Courses, tutorials, practical work

## Teaching materials, equipment and spaces

### Resources available

Facilities, IT equipment and Lab equipment	
IAV	
Type	Context of use
Amphitheatres and classrooms	It will be used for classes and conferences, organised in the framework of the master
Laboratories for practical classes: - Laboratory – Department of Food and Nutritional Sciences, equipped with: Autoclave (01), Laboratory oven (02), Refrigerators (03), Analytical balance (03), Centrifuge (01), Kjeldahl system (01), Bench pH meter (02), Bench conductivity meter (01), Real time PCR system, HPLC, Glassware and laboratory consumables. - Microbiology laboratory equipped with all the scientific material necessary for the realisation of practical work and end-of-study projects: Real-time PCR thermocyclers (01), Spectrophotometer (01), Incubators (03), Autoclaves (02), Fridge-freezers (02), Centrifuges (01) - Glassware and lab consumables	Essential for practical classes
Free internet connection inside the HEI	Essential for the good implementation of the Master and the application of e-learning
Car fleet for field trips	Essential for compliance with the practical part of the master and enhancement of the relationship with companies and stakeholders in the sector, through visits

IBN	
Amphitheatres and classrooms	It will be used for classes and conferences, organised in the framework of the master
Lab equipment: Ultra-pure water purifier with UV lamp and ultra-filter - Vertical autoclave, VAPOUR-Line 80, EU plug - Drying and sterilization oven +50...300°C - Bacteriological incubator +5...100 °C - CO2 incubator +5... 50°C - Water baths +5...99 °C with cover - Microbiological safety station, class II, int 879x480x650 mm - Magnetic stirrer - Vortex shaker - Orbital shaker platform 610x457 mm, max load 22,7 kg 96-well thermal cyclor - Refrigerated centrifuge -9... +40, max 6x50 ml, 18000 rpm, 31 150 xg - Double vertical gel tank with cooling kuroGEL 1816K - Gel documentation system - Inverted microscope with camera, image capture and processing software, computer, printer - Upright microscope with camera, image capture and processing software, computer, printer - Freezer -20° for the conservation of reagents - Standard refrigerator for reagent storage - Ice machine - Micro plate reader - Analytical balance - Double beam UV/visible spectrophotometer - Colony counter - 3 Standard Pack with 3 variable volume pipettes (2 – 20 / 20 – 200 ) 100 - 1000 µl) -Ball mill - Dispenser for 3-30 ml variables volumes vials, autoclave	Essential for practical classes
ENA	
Amphitheatres and classrooms	It will be used for classes and conferences, organised in the framework of the master
Lab equipment:	Essential for practical classes

- **Central laboratory of the ENA of Meknes**, equipped with : UV/Visible spectrophotometer (02), Autoclave (02), Laboratory oven (02) Refrigerators (03), Laboratory refrigerator-freezer (-30°C) (02), Analytical balance (04), Precision balance (03), Horizontal laminar flow hood (03), Refrigerated centrifuge (03), Micro-centrifuge (01), Fume cupboards (02), Rotary evaporator (02), Ice cube maker, Kjeldahl system (03), Digital ultrasonic cleaner (02), Oil and grease analyser (NIR) (01), Vacuum pump (02), Water distiller (04), Digital burettes (05), Incubator  
 Incubator with stirrer (01), Benchtop pH meter (04), Benchtop conductivity meter (01), Freezer at -80°C (01), DNA sequencer, DNA, RNA Purifier, Real-time PCR system, HPLC with quadrupole MS and UV and DAD detectors, FTIR Spectrometer  
 FTIR spectrometer, Demineralised and ultrapure water production station. Glassware and laboratory consumables.

- **Microbiology laboratory** equipped with all the scientific material necessary for the realisation of practical work and end-of-study projects: DNA sequencers (01), Real-time PCR thermocyclers (01), UV (01), Fragment analyser (01), Spectrophotometer (01), Fluorimeter (01), ELISA plate reader (02), Light flow hood (03), Incubators (03), Preparative autoclaves (02), Refrigerator-freezers (04), Centrifuges (03), Culture rooms (03), Micro (03), Light microscope (05), Electron microscope (01). Laboratory glassware and consumables.

- **Biotechnology laboratory** equipped with all the scientific material necessary for the realisation of practical work and final projects: ICP apparatus (01), Autoclave (02), Laboratory oven (01) Refrigerators (02), Laboratory fridge-freezer (-30°C) (01), Analytical balance (02), Precision balance (01),  
 Horizontal laminar flow hood (02), Refrigerated centrifuge (01), Microcentrifuge (01), Hot plates (05), Water distiller (04), Automatic burettes (02), Thermostatic incubator with stirrer (02), Benchtop pH meter (01), Benchtop conductivity meter (01), Optical microscope (10), Electron microscope (01), Culture rooms (02). Glassware and laboratory consumables.

- **Laboratory for the analysis of products and by-products of the agro-food industry**: equipped with the necessary material for the analysis and the realisation of the practical works foreseen in the framework of the master: UV/Visible spectrophotometer (02), Autoclave (01), Laboratory oven (03)

<p>Refrigerators (01), Laboratory refrigerator-freezer (-30°C) (02), Laboratory freezer (-45°C) (01), Analytical balance (03), Precision balance (02), Horizontal laminar flow hood (01), Refrigerated centrifuge (03), Micro-centrifuge (01), Hot plates (08), Fume cupboards (01), Rotary evaporator (03), Ice cube machine (01), Kjeldahl system (03), Ultrasonic cleaner (02), Thin layer chromatography plant (01), Chemical hood (01), Soxhlet oil content analyser (03), Orbital shaker (01), Benchtop pH meter (03), Benchtop conductivity meter (01), Digital refractometer (02), Rancimat for lipid oxidation analysis (01), Biochemical oxygen demand (BOD) self-monitoring system, Chemical oxygen demand (COD) analyser (01), Microwave Extraction System (01), Abencor Unit for olive oil extraction and industrial yield determination (01). Glassware and laboratory consumables.</p>	
<p>Other facilities and equipment:</p> <ul style="list-style-type: none"> <li>- Greenhouses for propagation and acclimatisation.</li> <li>- Application farm and olive orchards: traditional orchard, demonstration orchard variety and density demonstration orchard, collection of international varieties.</li> <li>- Olive crushing unit: two-phase extraction with a capacity of 20 tons/day, and equipped with a room for the conservation and packaging of olive oil.</li> <li>- Sensory analysis room.</li> <li>- Platform for the valorisation of olive by-products.</li> <li>- Agricultural equipment adapted to olive growing and the valorisation of the by-products of the olive tree.</li> <li>- Libraries of the ENA of Meknes</li> <li>- Multimedia room: equipped with 10 computers.</li> </ul>	<p>Essential for a better teaching within the theoretical and practical lessons of the Master and research work.</p>
<p>Internet access throughout the ENA campus.</p>	<p>Essential for the good implementation of the Master and the application of e-learning</p>
<p>Car fleet to ensure travel on the field field</p>	<p>Essential for compliance with the practical part of the master and enhancement of the relationship with companies and stakeholders in the sector, through visits</p>
<b>UMP</b>	
<p>Amphitheatres and classrooms</p>	<p>It will be used for classes and conferences, organised in the framework of the master</p>
<p>Lab equipment: Microbiology, biochemistry and toxicology rooms in the Biology Department: - Incubators (04)</p>	<p>Essential for practical classes</p>

<ul style="list-style-type: none"> <li>- Autoclave (02)</li> <li>- Shaking incubator</li> <li>- PCR equipment: thermocycler, electrophoresis apparatus</li> <li>- Speedvac concentrator</li> <li>- Du Nouy tensiometer</li> <li>- UV/Visible spectrophotometer</li> <li>- Spectrophotometer Visible</li> <li>- Fermenters 2 litres (02)</li> <li>- Aw-meter</li> <li>- ATP-meter</li> <li>- pH-meter</li> <li>- Sonicator</li> <li>- Spectrofluorometer</li> <li>- Electronic balances</li> <li>- Heating plates</li> <li>- Ovens</li> <li>- Grinder</li> <li>- Binocular loupes</li> <li>- Optical microscopes</li>   <li>- Analytical platform of the Faculty of Sciences of Oujda: GC-MS, HPLC, NMR, IR, XRD, Microscope Scanning electron microscope SEM.</li> </ul>	
University libraries	Essential for a better teaching within the theoretical lessons of the Master and research work.
Multimedia room University Centre for E-learning for distance learning	Essential for the good implementation of the Master and the application of e-learning
Means of transport University's means of transport: Cars, Lands Rover.	Essential for compliance with the practical part of the master and enhancement of the relationship with companies and stakeholders in the sector, through visits

## Expected means and list of equipment to be purchased under the project

IT equipment and Lab equipment		
Type of equipment	Context of use	HEI
IT equipment: computers (05)	The computers will be used by the teachers and the Master's students, in order to guarantee the success of all the Master's activities, from classes to research and investigation work. A loan system will be set up to guarantee access to the equipment to the most economically disadvantaged students.	IAV
Lab equipment: - Purchase of scientific equipment: Gas chromatography FID with double columns (01), accessories (01), Ultrasound Processor (01). - Purchase of liquid chromatography and gas chromatography accessories: columns (LC), columns (GC), syringes, filters, vials, degasser - Purchase of rotary evaporation system (rotavapor) (01) - Laminar flow hood (01) - Autoclave (01)	The laboratory equipment will be used during the Master FoSaMed lessons	IAV
IT equipment: Macbook   2 Laptop computer - HP   2	The computers will be used by the teachers and the Master's students	IBN
Lab equipment: Stainless steel 4l/h water distiller with tank   1 Autoclave for sterilisation   1 Bain marie with cover   1 Soxhlet extractor 250 ml   1 Clevenger 250 ml complete   1 Bacteriological incubator   1 Magnetic stirrer   1 Vortex shaker   1 Centrifuge   1 Microscope with camera   1 Refrigerator   1	The laboratory equipment will be used during the Master FoSaMed lessons	IBN



<p>Precision balance   1  Visible spectrophotometer   1  Pack of 3 variable micropipettes   1  Biological microscope   5  PH bench top meter   2  PH field meter   1  Flame Photometer   1  Complete Kjeldahl Nitrogen Analyzer System   1  250ML flask heater   1  500ML Flask Heater   1  100ML flask heater   1  Water distiller  Water bath  Soxhlet extractor  Oven  CO2 incubator  Microplate reader  Ball mill  Magnetic stirrer  Bottle dispenser  Platform orbital shaker  Refrigerated centrifuge  Upright microscope  Freezer -20°C  Electrophoresis tanks  Ultra-pure hydrogen generator  Micropipettes  Ice machine  Inverted microscope</p>		
<p>Other equipment:  Video projector   1  Video conference camera   1  2-channel wireless system microphone   1</p>	<p>This equipment will be to equip a room that will be essential for e-learning Master classes, given by teachers from other HEIs in the consortium or by teachers and researchers from European Universities or other institutions.</p>	
<p>IT equipment: computers (05)</p>	<p>The computers will be used by the teachers and the Master's students</p>	<p>ENA</p>
<p>Lab equipment:  1 Gas Chromatograph Platform</p>	<p>The laboratory equipment will be used during the Master FoSaMed lessons</p>	<p>ENA</p>

<p>1 Solid phase extraction system  2 Columns  10 x 2ml Vials for HPLC autosampler (pack of 100)  10 x 9mm PTFE/silicone septa plugs (pack of 100)  1 Glass filtration unit  Benchtop Colorimeter (01)  Ultrasonic Processor (01)</p>		
<p>Other equipment:  Video conferencing system - Logitech Rally Plus (1 camera, 2 speakers, table and display HUB)</p>	<p>This equipment will be to equip a room that will be essential for e-learning Master classes, given by teachers from other HEIs in the consortium or by teachers and researchers from European Universities or other institutions.</p>	<p>ENA</p>
<p>IT equipment: 8 computers</p>	<p>The computers will be used by the teachers and the Master's students</p>	<p>UMP</p>
<p>Lab equipment:  - Microbiological safety station  - Goniometer (contact angle)  - Hunter Colorimeter  - Dip Coater  - Spin Coater  - UV Ozone Cleaner</p>	<p>The laboratory equipment will be used during the Master FoSaMed lessons</p>	<p>UMP</p>
<p>Other equipment:  Video projector and camera</p>	<p>This equipment will be essential for e-learning Master classes, given by teachers from other HEIs in the consortium or by teachers and researchers from European Universities or other institutions.</p>	<p>UMP</p>

## Partnerships (determining the nature of the partnership and its methods)

### Academic partnership

Nature of the partnership and its mode	Types of activities	Institutions
Participation in training Signing of a cooperation agreement between the 4 Moroccan HEIs Signing of a cooperation agreement between all partners	Teaching, supervision and research	National and international HEIs (UEVORA, UB, IAV, IBN, ENA and UMP)

### Partnership with the professional and economic environment

Nature of the partnership and its mode	Types of activities	Institutions
Signing of a cooperation agreement between the Moroccan partners and FENAGRI	Expertise and guidance Support for the implementation of internships	FENAGRI - Fédération Nationale de l'Agroalimentaire IAV, IBN, ENA and UMP

### Other partnerships

Nature of the partnership and its mode	Types of activities	Institutions
Partnerships for supervision and research	Training and supervision of internships	Other HEIs, Agri-food companies, local institutions and research centres

#### List of institutions with which the 4 FoSaMed partner HEIs have cooperation

##### Universities and public institutes:

Institut National de la Recherche Agronomique (INRA)  
Ecole Nationale Forestière de Salé (ENFI)  
Laboratoire Officiel des Analyses et de recherche chimiques (LOARC)  
Faculté des lettres et des sciences humaines - Aïn-Chock  
La Haute Ecole des Sciences Agronomiques, Forestières et Alimentaires (HALF), Suisse.  
Université Szeged (Hongrie).  
Faculté des sciences et techniques à Fès  
Faculté de Gouvernance, des Sciences Economiques et Sociales  
Université de Bologne (Italie)  
University of Georgia, USA  
Présidence de l'Université Moulay Ismaïl Meknès  
La Société Civile Agricole - Providence Verte

##### Companies:

Les Domaines Agricoles  
La Compagnie Sucrière Marocaine et de Raffinage (COSUMAR)  
Eléphant Vert SA, Maroc

Guercif Lait (GIE)  
 TRIFFA Conserve, Oujda (sarl)  
 TASE OLIVE (sarl), Oujda

## Sustainability Plan

Sustainable Outcomes	Strategy to ensure their sustainability	Resources necessary to achieve this	Where will these resources be obtained?
<b>Master on Food Safety</b>	<p>Ensure the continuity of the master, with new editions in the following years, through an agreement signed between all Moroccan and European partners and the associated Partner</p> <p>To reinforce the partnership of the Master's consortium with other national and international scientific and professional institutions.</p>	<p>Funding for website maintenance and production of other dissemination materials</p> <p>Motivated team of teachers, researchers and technical staff</p> <p>Effective communication plan for attracting and funding new students</p> <p>Funding for internal and international mobility of students, teachers, and researchers</p> <p>Financial commitment of the Moroccan HEIs</p>	<p>Own funds from Moroccan HEIs</p> <p>Provision of human resources by European Universities (teachers and researchers) in future editions of the Master</p> <p>Applications for national funding for science and technology, and applications for international (European) funding</p> <p>Engagement of public and private institutions and companies for financing scholarships</p>
<b>Equipped Food Safety laboratories</b>	<p>Continuous training of laboratory technicians and teachers/researchers</p> <p>Development of a plan to offer laboratory services to external entities</p> <p>Promotion of a policy of technical maintenance and constant modernization of laboratories in Moroccan universities</p>	<p>Contribution of European institutions to provide continuing training for Moroccan professionals</p> <p>Availability of teams of researchers and laboratory technicians to perform services to external entities</p> <p>Commitment of university teams to formalize funding applications</p> <p>Financial commitment of the Moroccan HEIs</p> <p>Financing to produce service offer brochures</p>	<p>Own revenue from services rendered to companies in the agri-food industry and other public institutions</p> <p>Own funds from Moroccan HEIS</p> <p>Competitive funds resulting from applications for national science and technology, and applications for international (European) funding.</p>

<p><b>Partners Agreement</b></p>	<p>Ensure continuity of the Master and pre-established partnerships through the signed agreement between all partners</p>	<p>Funding for website maintenance and production of other dissemination materials</p> <p>Motivated team of teachers and researchers</p> <p>Commitment of HEIs and associated partner</p> <p>Commitment of HEIs teams to formalize funding applications, especially for international mobility</p>	<p>Own funds from Moroccan HEIs</p> <p>Provision of human resources by European Universities (teachers and researchers) in future editions of the Master</p> <p>Applications for national funding for science and technology, and applications for international (European) funding</p>
<p><b>Cooperation Agreements &amp; International Collaborative Network on Food Safety</b></p>	<p>Ensure continuity of the collaborative network, established by cooperation agreements</p> <p>Promote a proactive strategy for inclusion of new partners in the network</p>	<p>Funding for website maintenance and production of other dissemination materials</p> <p>Motivated team of teachers and researchers</p> <p>Commitment of HEIs and associated partner</p> <p>Constant work to raise new partners and collaborators for the network</p>	<p>Own funds from Moroccan HEIs</p> <p>Competitive funding and obtaining funds in national and international support frameworks, involving network partners</p> <p>Involvement of professional, academic, and business institutions in the organisation of events and projects</p>



Food Safety in the Mediterranean

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