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Deliverable 2.2. Part I

Pedagogical Material

(online training plan)

January 2025

Expertise and Technology for São Tomé and Príncipe:
Bioresources for Food

101129248 —TecBioFood— ERASMUS-EDU-2023-CBHE



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Acronyms List

C1 – Course 1

C2 – Course 2

C3 – Course 3

D - Deliverable

IUCAI - Institute of Accounting, Administration, and Informatics

UC – Curricular Unit

UPorto – University of Porto

USTP – University of São Tomé and Príncipe

UVigo – University of Vigo

Introduction

TecBioFood Project Task 2.2 includes the development, by the European Universities, of a comprehensive training plan directed to the beneficiary Institutions - University of São Tomé and Príncipe (USTP) and Institute of Accounting, Administration, and Informatics (IUCAI) - developed by University of Porto (UPorto) and University of Vigo (UVigo).

The first part for the completion of this task comprehends the development of an online training plan integrated into the TecBioFood Academy, explained in detail in Deliverable (D) 2.3. Final Report Part I - Online Training Plan. In this context, diverse pedagogical materials were developed by the Project's scientific teams, that were used throughout the online training plan.

The pedagogical materials include all the presentations, information and bibliography used throughout the different curricular units during the month of the online training plan that was shared with the participants and between the scientific teams, as well as the online opinion survey that was made available, warnings and general messages.

The pedagogical materials, integrated into the TecBioFood Academy, were shared between the participants and scientific teams and managed using the Digital Learning Platform owned by UPorto (AcademiaUP®). Detailed information about this platform and regarding the development of the online training plan are presented in the D 2.3. For the participants to be able to access, individually, the pedagogical materials and documents published on the AcademiaUP® platform, a set of credentials were created for each one of them.

Pedagogical Material published in AcademiaUP®

In this report, screen images that represent access to the AcademiaUP® platform, as well as the content published were included to offer an overview of the courses' structure.

After entering the platform, an initial dashboard with the courses on which the participant is enrolled is presented. In this case, the three TecBioFood Academy courses are shown.

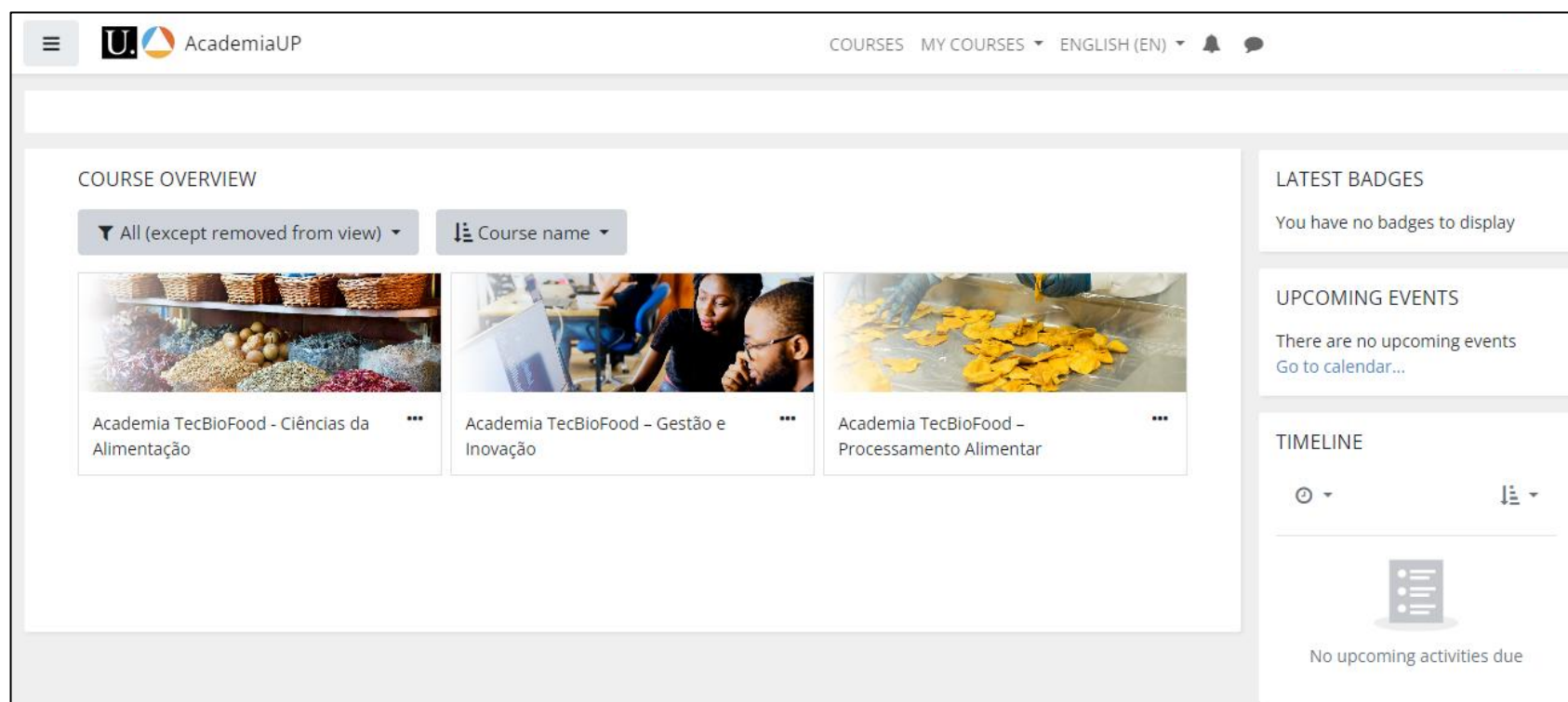


Figure 1. Dashboard of AcademiaUP® platform, with the three TecBioFood Academy Courses

C1. Food Science

Entering the first course the following welcoming page is presented:

The screenshot shows the welcome page of the Academia TecBioFood - Ciências da Alimentação course. The page features a large image of various food products in baskets and containers. Below the image, there is a 'Welcome' message and a 'Next' button. The page also includes a sidebar with 'LATEST ANNOUNCEMENTS', 'COMMUNICATION', and 'CALENDAR' sections.

AcademiaUP COURSES MY COURSES ENGLISH (EN) Turn editing on

Academia TecBioFood - Ciências da Alimentação

Dashboard / My courses / Academia TecBioFood - Ciências da Alimentação

Ciências da Alimentação

Welcome

Bem-vindo(a) ao Curso 1, da Academia TecBioFood!

Next

LATEST ANNOUNCEMENTS

Add a new topic...

20 Oct, 18:17
Lúcia Maria Galvão da Nova
Inquérito de Satisfação - Academia TecBioFood

5 Sep, 18:39
Patrícia Sofia Carneiro Antunes
Material Apoio Aulas
Older topics ...

COMMUNICATION

Forums

CALENDAR

December 2024

Mon	Tue	Wed	Thu	Fri	Sat	Sun
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

Hide site events
Hide category events
Hide course events
Hide group events

Figure 2. Welcoming page of the TecBioFood Academy Course 1. Food Science

From the previous page, it is possible to access all the contents shared within the course:

The image displays two side-by-side screenshots of the AcademiaUP web interface. Both screenshots show the course 'Academia TecBioFood - Ciências da Alimentação' under the 'My courses' section. The left screenshot shows the main course page with a list of items: 'Notícias', 'Inquérito de Satisfação - Academia TecBioFood', and a section titled '+ Microbiologia Alimentar' containing nine lessons (Aula 1 to Aula 9). The right screenshot shows a detailed view of the course content, organized into three main sections: '+ Ciências Gastronómicas' (3 lessons), '+ Segurança e Qualidade Alimentar' (7 lessons), and '+ Composição Nutricional dos Alimentos' (5 lessons). Each lesson is represented by a folder icon and a title with a date range.

AcademiaUP

Academia TecBioFood - Ciências da Alimentação

Dashboard / My courses / Academia TecBioFood - Ciências da Alimentação

- + Notícias
- + Inquérito de Satisfação - Academia TecBioFood

+ Microbiologia Alimentar

- + Aula 1 - 04.09
- + Aula 2 - 04.09
- + Aula 3 - 05.09
- + Aula 4 - 09.09
- + Aula 5 - 10.09
- + Aula 6 - 11.09
- + Aula 7 - 11.09
- + Aula 8 - 12.09
- + Aula 9 (12.09) & 10 (16.09)

+ Ciências Gastronómicas

- + Aula 1 - 02.09
- + Aula 2 - 02.09
- + Aula 3 - 05.09

+ Segurança e Qualidade Alimentar

- + Aula 03.09
- + Aula 12.09
- + Aula 16.09
- + Aula 17.09
- + Aula - 18.09
- + Aula - 19.09
- + Aula 23.09
- + Aula HACCP - 24.09 - 26.09

+ Composição Nutricional dos Alimentos

- + Aula 1 - 18.09
- + Aula 2 - 19.09
- + Aulas 3 a 5 - 23.09 - 26.09
- + Exercício TP Aula 5

Figure 3. Structure of the contents regarding the TecBioFood Academy Course 1. Food Science

AcademiaUP® Activity Report - C1. Food Science

Below, it is presented the number of users and total views of the documents made available throughout the course (images generated in January 2025)

C1.UC1. Food Microbiology

 Aula 1 - 04.09	97 views by 19 users	-
 Aula 2 - 04.09	80 views by 18 users	-
 Aula 3 - 05.09	48 views by 12 users	-
 Aula 4 - 09.09	47 views by 11 users	-
 Aula 5 - 10.09	46 views by 11 users	-
 Aula 6 - 11.09	49 views by 11 users	-
 Aula 7 - 11.09	41 views by 11 users	-
 Aula 8 - 12.09	40 views by 11 users	-
 Aula 9 (12.09) & 10 (16.09)	53 views by 12 users	-

C1.UC2. Culinary Sciences

 Aula 1 - 02.09	72 views by 16 users	-
 Aula 2 - 02.09	54 views by 13 users	-
 Aula 3 - 05.09	68 views by 12 users	-

C1.UC3. Food Quality and Safety

 Aula 03.09	6 views by 3 users	-
 Aula 12.09	9 views by 3 users	-
 Aula 16.09	8 views by 3 users	-
 Aula 17.09	8 views by 3 users	-
 Aula - 18.09	1 views by 1 users	-
 Aula - 19.09	1 views by 1 users	-
 Aula 23.09	8 views by 3 users	-
 Aula HACCP - 24.09 - 26.09	9 views by 3 users	-

C1.UC4. Nutritional Composition of Foods

 Aula 1 - 18.09	16 views by 5 users	-
 Aula 2 - 19.09	12 views by 5 users	-
 Aulas 3 a 5 - 23.09 - 26.09	16 views by 6 users	-
 Exercício TP Aula 5	11 views by 5 users	-

Finally, a total of 217 file downloads were registered.

C2. Food Processing

Entering the second course, the following welcoming page is presented:

The screenshot shows the user interface of the Academia TecBioFood – Processamento Alimentar course. At the top, there's a navigation bar with the AcademiaUP logo and links for COURSES, MY COURSES, and a language selector set to ENGLISH (EN). Below this, the course title 'Academia TecBioFood – Processamento Alimentar' is displayed, along with a breadcrumb trail: Dashboard / My courses / Academia TecBioFood – Processamento Alimentar. A 'Turn editing on' button is visible in the top right corner.

The main content area features a large image of hands in blue gloves processing yellow food pieces on a metal tray. Below the image, there are logos for the European Union, U.PORTO, Universidade de Vigo, and STP, followed by the text 'Processamento Alimentar'. A 'Welcome' message reads: 'Bem vindos ao Curso 2. da Academia TecBioFood!'. A 'Next' button is located at the bottom right of the main content area.

The right sidebar contains three sections: 'LATEST ANNOUNCEMENTS' with a link to 'Add a new topic...' and a recent announcement from Lúcia Maria Galvão da Nova; 'COMMUNICATION' with a link to 'Forums'; and 'CALENDAR' showing a calendar for December 2024 with various event links like 'Hide site events', 'Hide category events', etc.

Figure 4. Welcoming page of the TecBioFood Academy Course 2. Food Processing

From the previous page, it is possible to access all the contents shared within the course:

The figure displays three screenshots of the AcademiaUP interface, showing the course structure for 'Academia TecBioFood – Processamento Alimentar'.

Screenshot 1 (Left): The main course page. It shows the course title and a list of modules:

- Notícias
- Inquérito de Satisfação - Academia TecBioFood
- C2.UC1. Tecnología de Alimentos**
 - 1.-Tecnología de Alimentos - 02.09
 - Tema 2. Alteraciones químicas, físicas y biológicas de los alimentos - 03.09
 - Tema 3. Envasado y empaquetado de los alimentos - 04.09
 - Tema 4. Conservación de los alimentos por acción del calor - 04.09
 - Bibliografía
- C2.UC2: Conservas e semiconservas**
 - Conservas e semiconservas vegetais (I) - 05.09
 - Conservas e semiconservas (II) - 09.09
 - Planta Piloto

Screenshot 2 (Middle): A detailed view of the course structure, showing modules C2.UC3 through C2.UC6:

- C2. UC3: Desidratação e secagem de produtos vegetais**
 - Desidratação e secagem de produtos vegetais (I) - 05.09
 - Desidratação e secagem de produtos vegetais (II) - 05.09
 - Conservação por redução da atividade da água - 10.09
 - Outros sistemas de conservação - 10.09
- C2.UC4. Doces, Geleias, Citrinadas e Compotas**
 - Doces, geleias, citrinadas e compotas - 17.09
 - norma Codex confituras y mermeladas - 17.09
- C2.UC5. Bebidas**
 - Bebidas de frutos - 17.09
 - Norma Codex zumos y néctares - 17.09
- C2.UC6. Produtos pré-cozinhados**
 - Produtos pré-cozinhados - 18.09
 - Produtos pré-cozinhados exercícios - 18.09~

Screenshot 3 (Right): A detailed view of the course structure, showing modules C2.UC4 through C2.UC7:

- C2.UC4. Doces, Geleias, Citrinadas e Compotas**
 - Doces, geleias, citrinadas e compotas - 17.09
 - norma Codex confituras y mermeladas - 17.09
- C2.UC5. Bebidas**
 - Bebidas de frutos - 17.09
 - Norma Codex zumos y néctares - 17.09
- C2.UC6. Produtos pré-cozinhados**
 - Produtos pré-cozinhados - 18.09
 - Produtos pré-cozinhados exercícios - 18.09~
- C2.UC7. Análise de Dados**
 - Dados
 - Rcmdr
 - Ficheiro de instalação do Rcmdr
 - Slides - 19.09 - 26.09

Figure 5. Structure of the contents regarding the TecBioFood Academy Course 2. Food Processing

AcademiaUP® Activity Report - C2. Food Processing

Below, it is presented the number of users and total views of the documents made available throughout the course (images generated in January 2025).

C2.UC1. Food Technology

 1.-Tecnología de Alimentos - 02.09	29 views by 11 users	-
 Tema 2. Alteraciones químicas, físicas y biológicas de los alimentos - 03.09	27 views by 11 users	-
 Tema 3. Envasado y empaquetado de los alimentos - 04.09	22 views by 9 users	-
 Tema 4. Conservación de los alimentos por acción del calor - 04.09	21 views by 9 users	-
 Bibliografía	35 views by 9 users	-

C2.UC2. Canned and Semi-preserved Food

 Conservas e semiconservas vegetais (I) - 05.09	38 views by 16 users	-
 Conservas e semiconservas (II) - 09.09	39 views by 16 users	-
 Planta Piloto	34 views by 12 users	-

C2.UC3. Dried foods

 Desidratação e secagem de produtos vegetais (I) - 05.09	26 views by 11 users	-
 Desidratação e secagem de produtos vegetais (II) - 05.09	21 views by 9 users	-
 Conservação por redução da atividade da água - 10.09	32 views by 12 users	-
 Outros sistemas de conservação - 10.09	33 views by 12 users	-

C2.UC4. Jams and jelly

 Doces, geleias, citrinadas e compotas - 17.09	3 views by 2 users	-
 norma Codex confituras y mermeladas - 17.09	3 views by 2 users	-

C2.UC5. Beverages

 Bebidas de frutos - 17.09	3 views by 2 users	-
 Norma Codex zumos y néctares - 17.09	3 views by 2 users	-

C2.UC6. Pre-cooked products

 Produtos pré-cozinhados - 18.09	21 views by 10 users	-
 Produtos pré-cozinhados exercícios - 18.09~	19 views by 9 users	-

C2.UC7. Data analysis

 Dados	52 views by 9 users	-
 Rcmdr	36 views by 9 users	-
 Ficheiro de instalação do Rcmdr	26 views by 9 users	-
 Slides - 19.09 - 26.09	38 views by 9 users	-

Finally, a total of 40 file downloads were registered.

C3. Management and Innovation

Entering the third course, the following welcoming page is presented:

The screenshot shows the AcademiaUP interface for the TecBioFood Academy Course 3. The main header includes the AcademiaUP logo and navigation links for COURSES, MY COURSES, and ENGLISH (EN). The course title "Academia TecBioFood – Gestão e Inovação" is prominently displayed, along with a "Turn editing on" button. The central content area features a large image of two people working on a laptop, with logos of partner institutions (FEUP, Universidade de Vigo, STP) and the text "Gestão e Inovação". Below this, a "Welcome" message is displayed, along with a "Next" button. The right sidebar contains sections for "LATEST ANNOUNCEMENTS", "COMMUNICATION", and a "CALENDAR" for December 2024.

LATEST ANNOUNCEMENTS

Add a new topic...

20 Oct, 18:19

Lúcia Maria Galvão da Nova

Inquérito de Satisfação - Academia TecBioFood

Older topics ...

COMMUNICATION

Forums

CALENDAR

December 2024

Mon	Tue	Wed	Thu	Fri	Sat	Sun
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

Hide site events

Hide category events

Hide course events

Hide group events

Hide user events

Hide other events

Figure 6. Welcoming page of the TecBioFood Academy Course 3. Management and Innovation

From the previous page, it is possible to access all the contents shared within the course:

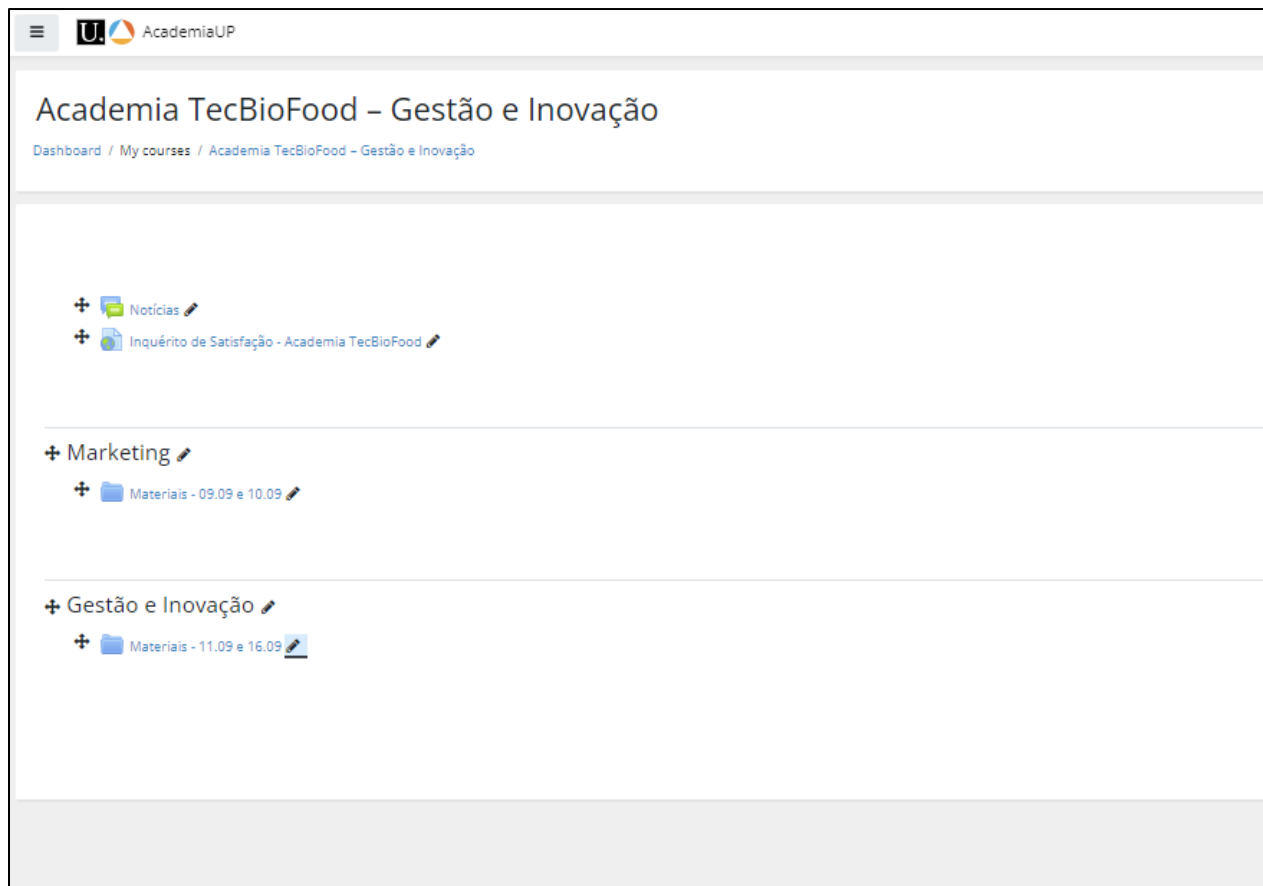


Figure 7. Structure of the contents regarding the TecBioFood Academy Course 3. Management and Innovation

AcademiaUP® Activity Report - C3. Management and Innovation

Below, it is presented the number of users and total views of the documents made available throughout the course (images generated in January 2025).

C3.UC1. Marketing

 Materials - 09.09 e 10.09	38 views by 14 users	-
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C3.UC2. Innovation and Entrepreneurship

 Materials - 11.09 e 16.09	45 views by 13 users	-
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Finally, a total of 32 file downloads were registered.

Final Considerations

The TecBioFood Academy has successfully developed and implemented a comprehensive online training plan, through innovative online tools, such as the AcademiaUP® platform.

AcademiaUP® has proved to be a useful tool for sharing academic content and teacher-student communication, providing easy access to content, allowing its use by a diverse number of groups.

Throughout the online training, a diverse range of materials were made available to the participants, including document presentations, case-studies, relevant references and bibliography, exercise materials, and others. Additionally, the incorporation of tools like Wooclap® for interactive learning further enriched the educational experience, promoting and active participation.

It is important to emphasize that, if any trouble is felt accessing AcademiaUP® Platform, it is possible to contact the UPorto services of e-learning support through the e-mail: apoio.elearning@uporto.pt, sending the identification of the project and mentioning the problem.



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Deliverable 2.2. Part II

Pedagogical Material

(face-to-face mobility plan)

February 2025

Expertise and Technology for São Tomé and Príncipe:
Bioresources for Food

101129248 —TecBioFood— ERASMUS-EDU-2023-CBHE



Coordinator:**Olívia Pinho**

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Acronyms and Abbreviations List

a_w – Water activity

D - Deliverable

INSA – National Institute of Health Dr. Ricardo Jorge

IUCAI - Institute of Accounting, Administration, and Informatics

PPE – Personal Protective Equipment

STP -São Tomé and Príncipe

SOP – Standard Operational Procedures

UPorto – University of Porto

USTP – University of São Tomé and Príncipe

UVigo – University of Vigo

Introduction

The TecBioFood Project Task 2.2 includes the development, by the European Universities, of a comprehensive formation plan directed to the beneficiary Institutions - University of São Tomé and Príncipe (USTP) and Institute of Accounting, Administration, and Informatics (IUCAI) - developed by University of Porto (UPorto) and University of Vigo (UVigo).

After the completion of the first part of this task (online training plan), a mobility (face-to-face) training plan was developed, explained in detail in Deliverable (D) 2.3. Final Report Part II. This mobility plan aimed to reinforce theoretical knowledge obtained with the online training plan, in a hands-on context. It had a total duration of 4 weeks of face-to-face activities (2 weeks organized by the UPorto and 2 weeks organized by UVigo).

As such, diverse pedagogical materials were developed by the USTP and IUCAI students and teachers, based on the study visits done to food industry companies, *start-ups*, laboratories, and food transformations workshops.

The pedagogical materials include relevant bibliography, creation of protocols, reports, flowcharts, standard operational procedures (SOP), workplans that can be used for the transformation of native São Tomé and Príncipe (STP) fruits and vegetables into new food products in the TecBioFood Lab.

The pedagogical materials developed were supervised by the UPorto and UVigo scientific teams and will be presented in this document. Moreover, these materials are also integrated into the Digital Learning Platform AcademiaUP® and available to all the TecBioFood Academy participants.

It is important to note that, since the pedagogical materials were developed by the USTP and IUCAI trainees, the versions presented are only in Portuguese (SEE PORTUGUESE VERSION).

Pedagogical Material developed under the scope of the activities planned by UPorto

The pedagogical materials that were planned by the UPorto scientific team, for the participants to do, correspond to the themes addressed in the visits and *workshops*. The details of the mobility training plan with the description and schedule of activities, goals and pedagogical materials are presented in **Deliverable 2.3. – Final Report Part II.**

Pedagogical Materials related to the two FCNAUP workshops

1. Food Transformation and physico-chemical workshop

Location: FCNAUP Gastrotechnics + Food Technology Lab

In this workshop, equipment to determine physicochemical parameters such as pH, water activity (a_w) and °Brix in native fruits of STP were used. Additionally, some transformation techniques (drying, pulp/puree, juice, frying, baking, jams) were performed. The pedagogical materials developed comprehend the protocols for the measure of the physicochemical parameters (Appendix I to III).

2. Determination of Macronutrients (from the food samples used in the first workshop) and development of technical sheets workshop

Location: FCNAUP Bromatology Lab

In this workshop, equipment was used to determine the total fats and content moisture of native fruits and transformed products - bananas (fried and dried). Moreover, technical sheets using measured results and food composition tables were developed for native fruits. The pedagogical materials developed comprehend the protocols for the determination of total fats and moisture, as well as the technical sheets (Appendix IV – VI).

Pedagogical Materials related to seven out of nine study visits to industries and companies

1. National Health Institute Dr. Ricardo Jorge (INSA) – Porto

The pedagogical materials developed in the scope of this visit comprehend: Protocols for the collection of samples from foods, surfaces and water; Water sampling plan (Appendix VII – X).

2. FRUBIS - Nuvi Fruits, S.A. (Torres Vedras)

The pedagogical material developed in the scope of this visit comprehends: Flowchart process to produce dehydrated apples (Appendix XI).

3. COMTEMP - Companhia dos Temperos (Entroncamento)

The pedagogical material developed in the scope of this visit comprehends: Layout and circuits of a fermented products production unit (vinegar) (Appendix XII).

4. Pingo Doce Central Kitchen (Aveiro)

The pedagogical materials developed in the scope of this visit comprehend: (1) Flowchart process for the production of soups; (2) Rules for the use of personal protective equipment (PPE) (Appendix XIII and XIV).

5. Territórios Criativos (FCNAUP)

The pedagogical material developed in the scope of this visit comprehends: Activity report regarding the session (Appendix XV).

6. Parque de Ciência e Tecnologia da Universidade do Porto - UPTEC (Porto)

The pedagogical material developed in the scope of this visit comprehends: SWOT analysis of the CORIAL FOODS company (Appendix XVI).

7. Saladíssimas (Guimarães)

The pedagogical materials developed in the scope of this visit comprehend: (1) Unit waste management - from the reception to product exit; (2) Steps and strategies for decontamination and microbial control in vegetables and fruit in the Unit (Appendix XVII and XVIII).

Pedagogical Material developed under the scope of the activities planned by UVigo

The pedagogical materials that were planned by the UVigo scientific team, for the participants to do, correspond to the themes addressed in the workshops. The details of the mobility training plan with the description and schedule of activities, goals and pedagogical materials are presented in Deliverable 2.3. – Final Report Part II.

Contact with Food Transformation Equipment

From January 21 to 23, the USTP Students and Teachers were at the agrifood industry pilot laboratory to learn about the equipment and materials that are essential in food processing.

Fruit Transformation Workshops

1. Orange marmalade

Days: 21/01/2025

Fruit: orange

Two recipes were made during the preparation of the raw material: one with artificial and natural pectin, and the other with natural pectin only. The aim of this practice was to check the difference in the consistency of the final product, as well as in preservation. Calculations were made for the different ingredients, and the process was monitored by reading the ° Brix (Appendix XIX).

2. Preparing fruit for dehydration

Day: 21/01/2025

Fruit: mango and banana

The dehydrated mango was subjected to three pre-treatments: one with water and sugar (60°Brix), another with water and lemon juice (2:1), and another with water, lemon juice and sugar (40°Brix). For dehydrated bananas, a 10% lemon juice preparation was used to make the raw material. The aim of both practices was to check the difference in the color of the final product, as well as its preservation (Appendix XX).

3. Dehydration process

Day: 22/01/2025

Both the bananas and the mangoes were placed in dehydration ovens, after determination of the a_w .

Fruit: banana

For dehydrated bananas, another pre-treatment was carried out with 50% lemon juice. The aim of this practice was to check the difference in color and firmness of the final product, as well as its preservation (Appendix XX).

4. Fruit in syrup

Day: 22/01/2025

The aim of this practice was to improve conservation and increase the product's shelf life. The process was monitored by reading the ° Brix (Appendix XXI).

5. Apple Jelly

Day: 22/01/2025

The aim of this practice was to improve conservation and increase the product's shelf life. The process was monitored by reading the ° Brix (Appendix XXII).

6. Preparation of banana flour and checking the dehydrated product

Day: 23/01/2025

The dehydrated bananas were ground into flour and then vacuum-packed. The control of the a_w of the dehydrated product was performed.

Vegetable processing workshop

7. Preparation of preserves

Day: 23/01/2025

Fruit: curly kale and turnip greens

Two recipes were prepared during the preparation of the raw material: one with artificial additives and the other with natural juice only. The covering liquids were prepared, and the corresponding pre-treatments were carried out. The purpose of this practice was to check the difference in the color of the final product, as well as its preservation (Appendix XXIII)

Final Considerations

TecBioFood mobility training plan was a key step in strengthening knowledge transfer in Food Science, Food Technology, and Management and Innovation. Through workshops, study visits, and hands-on laboratory activities, participants from USTP and IUCAI gained practical experience in food transformation techniques, sustainability, and entrepreneurship.

This training reinforced the connection between theory and practice, allowing students and teachers from STP to develop essential technical skills applicable to the TecBioFood Lab. The pedagogical materials created during the program will serve as valuable educational resources, supporting future research and product innovation in STP.

The program was successful, and the participants reported increased technical knowledge, problem-solving abilities, and adaptability to new food technologies. This initiative highlighted the importance of international collaborations in capacity-building and sustainable food development.