Full title A project-based learning approach to promote innovation and academic entrepreneurship in a master's degree in food engineering

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ABSTRACT: Entrepreneurship brings several benefits, such as fostering innovation and productivity, competitiveness, and socioeconomic development. The search for professionals with different skills to overcome the current and foreseen challenges is relevant in the agri-food sector. Problem-based learning (PBL) is described as an instructional approach, which promotes interdisciplinarity and critical thinking, with the potential to meet current challenges. This article describes how PBL, aligned with an innovation program and contest, has been integrated into a master's degree in food engineering to promote academic entrepreneurship. The alignment of the PBL with the program and contest allowed the development of innovative products with a view to solving problems faced by the agri-food sector. The PBL strategy allowed students to mobilize knowledge from several curricular units of food studies for the development of different deliverables to participate in the innovation program and contest. This participation allowed students, supported by business mentors, to demonstrate their products to stakeholders. This way, it was possible to promote innovation in the agri-food sector, stimulating the entrepreneurial spirit among higher education students, and understand its potential for replication and mobilization of skills acquired in different food study courses.

Keywords: academic entrepreneurship, students, contest, new product development, innovation.

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1 Introduction

The agri-food system faces several challenges including climate change, food safety, and food insecurity (Lynde, 2020). Competitiveness at the business level is related to the ability of a company to satisfy its customers, creating goods/services that are more valued than those produced by the competitors. Currently, competitive advantages tend to be explained by a set of intangibles such as quality, image, technological knowledge, research and innovation (M. Oliveira et al., 2019).

Food Engineering focuses on aspects ranging from the design, production, processing, and distribution across the food sector. The role it has in society is clearly critical. Food products, in sufficient quantity and quality, are essential for the growth and well-being of the population balanced with the sustainability challenge - aspects closely linked to economic and social development (Boom & Janssen, 2014).

The students of Food Engineering programs at Master level (MDFE) are trained to:

- Describe the scientific bases of food processing and preservation operations;
- Identify and apply the methods used to assess and control food safety and quality;
- Identify the tools to assess impact of diet on health;
- Establish relationships for productivity in multidisciplinary teams;
- Communicate conclusions and knowledge in a concise and sustained manner to specialized and non-specialized audiences;
- Design and develop research projects in Food Engineering, in a personalized and autonomous way.

The MDFE is intended for students who have the 1st cycle of training in Engineering, or with other adequate academic training or the appropriate professional profile. Over two years and 120 credits based on European Credit Transfer System (ECTS), a specialization in food engineering is offered, with intense training and development of practical skills compatible with qualified professional performance (ESB-UCP, 2021). Table 1 shows the study plan and ECTS for the specific MDFE, the object under study. In the internship/thesis curricular unit, students have the possibility to carry out a semester of study abroad, namely under the ERASMUS program. Alternatively, the internship can take place in national companies or R&D organizations. In any case, this semester provides an enriching experience at both professional and personal levels (ESB-UCP, 2021).

Investing in research and innovation improves the daily lives of millions of people around the world, helping to solve some of the biggest challenges facing our society (European Union, 2014). Various strategies can be followed to develop the research and innovation ecosystem relevant to the agri-food sector.

Problem-based learning (PBL) can be understood as a differentiated learning and teaching approach through the use of projects based on a highly attractive and motivating question, task or problem (Margetson, 1994). This could be an approach that emphasize innovation in a learning setting at higher education institutions, building knowledge through long and continuous study work (Asbjornsen, 2015). From this point on, students begin a process of research, hypothesis setting and seeking resources to follow the needed activities. It also involves the practical application of the information obtained until a minimum viable product or a satisfactory solution to the initial question is reached (Helle, Tynjälä, & Olkinuora, 2006).

PBL has been explored in various contexts and distinct education levels, ranging from the early stages of education through primary (Kaldi, Filippatou, & Govaris, 2011) and secondary school (Aydın, Atalay, & Göksu, 2018) to higher education (Chen & Yang, 2019; Ribeiro, 2016), being some studies also found in food sciences (LeGrand, Yamashita, Trexler, Vu, & Young, 2017; Liceaga, Ballard, & Skura, 2011; Rivero-Pérez et al., 2015). In general, in these studies, the PBL methodology is employed in short courses or in individual curricular units at the undergraduate level. As follows, there seems to be less focus on concerted articulation between curricular units of the main course. Furthermore, none of these studies resulted in the development of food products or were associated with innovation competitions. Literature is still scarce but the potential for the application of PBL is high, so it is important to develop new studies on the implementation of PBL in the teaching and learning of food sciences in order to seek new solutions to overcome the challenges that the agri-food industry faces.

The aim of this article is to describe and assess among students, instructors, mentors and stakeholders, the implementation of the PBL methodology in a MDFE, aligned with an innovation program and contest to promote academic entrepreneurship in the agri-food sector.

2 Materials and Methods

This article reports the inclusion of the PBL methodology (Bell, 2010) in MDFE and its alignment with an innovation program and contest (Innovation Track - ITPC). To assess the results of this alignment, essentially, two techniques were employed: direct observation and focused interviews. Direct observation is a data collection technique that uses the senses to understand certain aspects of reality. It is not just about seeing and hearing, but also about examining facts or phenomena that are under study. It helps to identify and obtain evidence regarding situations about which individuals are unaware, but which guide their behavior (Herbert, 1970). This technique was used in monitoring teams during the development of their projects to understand the motivation, commitment, and team interaction. Focused interview is as free as the informal interview, however, it focuses on a very specific theme, when the interviewee is allowed to speak openly about the subject, but with the effort of the interviewer to return to the same focus when he begins deviating. It is widely employed in experimental situations, with the aim of thoroughly exploring some experience undergone precise conditions (Lewis-Beck, M. S., & Futing Liao, 2004). Focused interviews with students, instructors, business mentors, and stakeholders, were conducted to explore their perception about the participation in the contest, and the implementation of the PBL methodology in the MDFE, namely strengths, weaknesses, and recommendations for future editions.

The syllabus of the MDFE curricular units was analyzed to verify which contents could be of interest within the scope of the context and program for the development of new food products. After this identification, we met with the instructors of these curricular units and outlined a strategy to apply the PBL methodology for the development of new food products following the contest. Additional data (number of participants, awarded prizes, hours of mentoring, among others) was collected from project reports, project outcomes, and assessments from the juries of the innovation contest.

2.1. Innovation program and contest

The ITPC was organized by the Escola Superior de Biotecnologia da Universidade Católica Portuguesa (Faculty of Biotechnology of the Catholic University of Portugal — ESB-UCP), and took place in Porto between 2017 and 2020, over three editions.

The objective of the innovation program and contest was to promote academic entrepreneurship by selecting ideas for innovative products and services and supporting participants in presenting their innovative products to stakeholders in the economic fabric and in launching them on the market, by encouraging the presentation of their products at food fairs, technical and scientific meetings, as well as participation in other entrepreneurship competitions to attract investors. The teams intending to participate in the contest had to complete a survey with their project idea, what market needs their idea intended to solve, who was its target audience and what was its innovative dimension. The proposals for ideas to be developed were evaluated by a jury composed of experts in the agri-food sector. The teams that completed the survey in a sustained manner, demonstrating knowledge of the needs/opportunities of the sector and with innovative ideas able to be implemented, were admitted to the contest. ESB-UCP had a set of partners for the execution of the ITPC, such as clusters in the agri-food sector, associations of business mentors, alumni associations, companies, investors, among others.

The call for the program and contest Innovation Track was open to student's teams that apply with a product or service idea focused on the agri-food sector. The program and contest is intended for teams that involve graduated students, preferably with three or more members, with competencies at a higher education level in relevant areas to the development of products and services. Teams from any higher education institution could participate, however, the contest was disseminated with a greater emphasis on the northern region of Portugal. The Contest has 4 phases (Table 2): Admission, Development of Innovation Plans, Presentation of Products and Services in Media and Events, and Attribution of the BIOTEC INNOVATION Awards. Participation in the ITPC involved the submission of three deliverables: product specification, business plan and communication plan. These were evaluated based on different criteria with different weightings (Table 3). The following is a brief description of the elements required for each deliverable. The “product specifications” deliverable should contain technical data: product composition, manufacturing process (process, safety, materials, providers, and facilities and equipment), storage (shelf life and storage conditions), packaging (label, communication, materials, and design), distribution and logistics, innovative aspects, and eco-innovative aspects. In this way, students were encouraged to use previous knowledge about the development of new products, relating a set of subjects previously taught in their background and/ or being teaching at the master's level (e.g., food safety, food quality, packaging, sensory analysis, etc.), since the contest was aimed at students at master's level in the area related to food science and technology. The second deliverable "business plan" aimed to evaluate the product or service from the market point of view and included aspects such as: market analysis (analysis of consumption trends, competition analysis, targeting and positioning), business strategy (business model, validation by potential customers), “Go to market” plan (development plan, marketing plan), and financial forecast (profit and loss account, business indicators). For the development of this deliverable, the participants were accompanied by business mentors who guided them and provided them with a more realistic perspective of the business fabric. Finally, the third deliverable “prototype” corresponded to a finished version of the product or service. Each edition of the ITPC had two award calls (the first coincided with the end of the first academic semester and the second with the end of the second).

2.2. Setting the problem at the MDFE

Through meetings of the Master's Council, a strategy was devised so that students could, in groups, at the beginning of the cycle of studies, set a problem (related to the circular economy, food sustainability, food security, nutrition, productivity, etc...) and proposed a solution by developing a new innovative product or service. In parallel the ITPC was launched, used as a motivating factor for in-depth work, articulating the work in different units, fostering interdisciplinary experience to tackle real world challenges. In this way, the PBL was implemented with the ITPC in which the deliverables for assessment submission were also considered as assignments for different curricular units of the MDFE. Additionally, the students who participated in the contest enjoyed the benefits associated with it (for example, support from business mentors, support for participation in events with stakeholders, etc.). The performance on the work was mandatory and weighted at least 20% in the final evaluation of each Curricular Unit integrating the PBL approach, however, participation in the ITPC was encouraged, but not mandatory, with no penalty in the curricular unit's evaluation for students who did not compete.

3 Results and Discussion

The PBL was implemented in such a way that the development of products by students integrated and mobilized knowledge acquired in different curricular units according to the needs of each challenge associated with food innovation. Some curricular units were identified as core units for the PBL approach such were: sensory analysis; advanced food technologies; microorganisms and food safety; development of new products and processes; packaging; food engineering and innovation project; management, innovation, and marketing.

The role of units were clear, one of the stages of the development of a new product was the prototyping of the respective packaging solution, thus in the curricular unit "food packaging", students studied and designed the best suited solution considering different aspects, from product-packaging interaction, to the assessment of the sustainability; in the curricular unit "sensorial analysis", a consumer study was carried out to have insights about the new product acceptance. The implementation of the PBL was considered by instructors as very satisfactory, following the fundamental criteria for achievement in the different course units. The results obtained from the evaluation of the characteristics of the methodology used and its pedagogical intention were described in Table 4.

In academic year 2017/2018, of a total of 54 students (17 of the first year and 37 of the second year in the MDFE program), 37 (12 teams) decided to participate in the ITPC. In the following academic year, of a total of 45 students (9 of the first year and 36 of the second year in the MDFE program), 22 (5 teams) decided to participate in the ITPC. And in the academic year 2019/2020, of a total of 35 students (11 of the first year and 24 of the second year in the MDFE program), 17 (5 teams) decided to participate in the ITPC. Of a total of 14 prizes awarded under the ITPC, 6 were won by teams with MDFE students: 5 in the 1st edition, and 1 in the 2nd edition.

The 1st edition was the one with the most MDFE adherence, with the most considerable number of students and teams competing. This may have been attributed to the fact that the contest was something new, and it was better understood by the MDFE program with its PBL initiative fostering direct links. Following this line of thought, this may also explain the fact that only five MDFE teams contested for the 2nd edition of the ITPC. That is, the teams of students who would have the possibility to have their products more developed, had competed in the previous edition (some students from the 2nd year of MDFE, competed even when they were in the 1st year in the previous academic year, 1st edition of the ITPC). It should be noted that the 3rd edition of the ITPC only ran until the end of the first academic semester (September 2019 to February 2020), which may explain the smaller number of teams in competition. In addition, as students did not have enough time to develop their products consistently and perhaps because of this, they submitted deliveries of a lower quality than previous editions of the contest, it can explain why no award was granted to MDFE teams.

From the ideation phase until the preparation of the deliverables, the participants were able, through the PBL methodology, to mobilize and structured knowledge from several areas, from product design to process engineering and business planning. Teams that apply to ITPC were supported by business mentors, considered by students as special relevant in issues concerned with production, commercialization and finantials. The engagement of Almuni mentors have been seen by instructors as a major potential source of commitment and availability . These teams also have access to ESB-UCP laboratories such as KitchenLab or TechLab to prototype and scale-up work, and also analytical, sensorial and packaging laboratories, where they can have access to adequate infrastructure and technical support for the development of their products. ITPC also supported the demonstration of products at national and international events looking to exposure to the market and to industry stakeholders, so that they could attract investors to turn viable further developments.

From the content analysis of the focused interviews, it was possible to identify key information about the learning experience in this alignment between the PBL implemented in the master’s course with the innovation program and contest.

The ITPC initiative and the PBL methodology were supported by the University both in term of strategy as well as in financial and operational conditions. The institutional leadership was recognized but additional formal communication could raise a better awareness across the ESB-UCP. A more substantial involvement of key teaching staff was identified, by faculty members, as needed for a significant change to take place in the present teaching culture and to achieve more sustainable outcomes in the educational programs.

The alignment between the ITCP and the PBL project additionally allowed the institution to optimize resources since it was already known in advance the integrated assignment the students would develop throughout the academic year. In this way, it allowed a more effective management of material resources, namely less variety of materials used, avoiding waste.

From the instructor's point of view, PBL presents some limitations: the difficult adaptation and the acceptance of change in the way students conduct themselves; the difficulty in identifying how and when the student will require additional instructions, and how to provide them with freedom from their opinion without interfering with the student's autonomy; difficulty in evaluating the student individually; and the requirement of a greater administrative burden.

From the student's point of view, the following limitations stand out: the difficulty in changing posture, from a passive to an active one, assuming an personal autonomy in the construction of knowledge; insufficient time to solve problems and develop their projects and deliver on time; difficulties of individualistic, competitive and introverted students to adapt to the participatory and collaborative nature; different levels of involvement and work within the team; the need of a more wide communication and public exposure. This type of limitations, appointed by instructors and students, can also be found in the literature that reports the implementation of PBL in higher education programs (M. Oliveira, 2013; Ribeiro, 2016; Sesoko & Mattasoglio Neto, 2014).

On the other hand, the alignment of PBL with innovation program and contest, allowed highlight some advantages pointed by instructors and students: a holistic orientation for professional practice; consolidation of knowledge by the multidisciplinary approach; development of skills to solve problems, facing “real” problems; the increased interaction between students and instructors; the work autonomy in the search for knowledge; and finally, it allows the student to assume more responsibilities and face external players. Some of these aspects are considered in other studies (M. Oliveira, 2013; Sesoko & Mattasoglio Neto, 2014), including in food science studies (Duffrin, 2003; Ng, Yap, & Hoh, 2011).

Also, instructors and students considered that this alignment was an opportunity to improve the learning experience. A PBL approach also was recognized by key senior teaching staff as an opportunity to improve the learning experience offered to students in the field, integrating the contributions of the different specific courses (Shih & Huang, 2017). In fact, other master and post-graduation programs in the area of food studies includes courses that are oriented towards the development a product or a service, as well as courses that contribute to the development of skills in economics and management and more recently in innovation and entrepreneurship (Fonseca et al., 2015).

The alignment of the MDFE's PBL methodology with the ITPC and its articulation with other external initiatives, national and international, represent an essential mechanism of engagement, especially the Ecotrophelia Portugal competition or NEWFOOD program and contest (Oliveira & Cardoso, 2020). Some students also saw this alignment as a way to gain professional market exposure, and the attribution of a monetary prize was seen as a motivating factor (Willard & Duffrin, 2003). In the first Innovation Track edition one of the teams that also compete on the Ecotrophelia did own the first prize and represented Portugal at Ecotrophelia Europe, that took place al SIAL, Paris. This was a flagship outcome, and in all the ITCP editions different teams compete in the Ecotrophelia Program and in other national and European programs.

The participation in ITPC provided opportunities for students to develop a prototype, a product specification, and a business project, combining different components of food science, management, and communication/ marketing, taught through the PBL. The instruction went from the didactic lecture to the application in the real world of the principles of management in the simulated entrepreneurial activity. Those were changes appreciated by mentors and stakeholders that took different roles across the innovation program. In other studies (Brush & Saye, 2008; Castro, Peuker, & Mott, 2021; Choi, Lee, & Kim, 2019; Larmer & Mergendoller, 2010), the project's work resulted in high levels of student engagement, improved critical thinking and problem-solving skills, and improved collaborative skills. It should also be noted that, just like studies (Belland, Ertmer, & Simons, 2006; ChanLin, 2008; Shahiwala, 2017), the ITPC participants showed enthusiasm in the development of their products since it gave them the opportunity to interact with their colleagues, as well as to make new contacts between stakeholders. Thus, it was noticed that the students started to assume an active posture, exercising a critical and constructive attitude that will make them a better-prepared professional (Berdel, 2011). It is considered that this may be due to the fact that the students who decided to participate in the ITPC had the support of business mentors who provided them with a closer view of the work context (LeGrand et al., 2017). The most effective mentoring was the one that was professionally delivered through contracts either for marketing assessment, product development or, business planning. Communication through collaboration is completed with communication one by one, with personalization, through the mentor's dialogue with each team and their project, with the guidance and monitoring of their pace. Through mentoring it was possible to offer more personalized didactic sequences, monitoring them, evaluating them in real-time with the support of adaptive platforms, which was not possible in more massive or conventional teaching (Morán, 2015). Thus, mentors guide the teams in a more direct way, as they need and in the most convenient way. As Morán (2015) describes, it was possible to perceive, in the course of this project, a balance between individual and collective learning, plus an advantage of the use of innovative methodologies.

In general, this alignment allowed: the development of communicative, social, and interpersonal skills; stimulates the partnership between instructor and student; develop the ability to learn to meet deadlines and plans; promote autonomy in studies, and interdisciplinary; encourage critical thinking and teamwork.

For future editions of MDFE, it would be important to establish partnerships with business mentors or enterprises who could accompany students in the development of their projects throughout the academic year, providing them with a closer look at professional reality.

This article has some limitations, namely the fact that a formal data collection instrument has not been developed, namely questionnaires with instructors, students, mentors, and stakeholders. On the other hand, this article gathers data from three academic years, which allows evaluating the consistency of the results. As follows, the article presents some evidence that allows the application of a PBL methodology to be implemented in a concerted manner in courses related to food engineering.

4 Conclusion

The alignment of the PBL of course units of the MDFE with the innovation program and contest, allowed the development of new products, as well as motivating students to participate in the ITPC. With the challenge proposed under the ITPC, it was possible to observe a meaningful and contextualized learning, while students were creating and executing their innovation projects for the agri-food sector. Exposure to the sector’s stakeholders represents a particular new dimension for the learning path, where the student’s participation at Ecotrophelia Portugal remains a very good reference. Moreover, students could develop skills and competencies that will be extremely important for the development of their profession, with the expectation of having a positive impact on the agri-food economic tissue.

The PBL approach demonstrated the value for the learning path and the potential for differentiation of the MDFE program in the national higher education landscape that, with room for different improvements did set the pedagogical agenda for a near-future across a core of key faculty and institutional leaders at the level of the ESB-UCP.

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Author Contributions

Both authors contributed to the design, implementation, and data analysis for the project. L. Oliveira was responsible for drafted the manuscript. E. L. Cardoso collaborated on the manuscript revision.

Conflicts of Interest

Authors declare no conflicts of interest.

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Tables

Table 1 - Study plan and European Credit Transfer System (ECTS) of the master's in food engineering.

Curricular Units	Scientific area	Credits	Working time (hours)		Objectives and competencies
			Total	Contact	
Semester I					
Advanced Transfer Phenomena	Engineering	5	130	13T+22TP+4LP	Deepen the knowledge previously acquired in the areas of heat transfer and mass transfer, with emphasis on processes that take place in a transient state.
Instrumental Analysis and Laboratory Automation	Chemistry	5	130	24T+15LP	Provide the fundamentals of some instrumental methods of advanced analysis and automation, complementary to those usually addressed in the 1st cycle.
Sensory analysis	Food	5	130	19T+20TP	Sensitize students to the importance of sensory analysis in quality control and in the development of new food products. Study of Sensory Analysis tools and methods.
Advanced Food Technologies	Food	5	130	25T+18TP+9LP	Design food processing processes and conditions. Ability to develop a processing project with the aim of transforming and obtaining a final product.
Microorganisms and Food Safety	Biology	5	130	18T+8LP	Recognize that foodborne infections are a serious public health problem not only in developing countries but also in industrialized countries
Option I / Homogenization (*)	Optional	5	130		
Semester II					
Dynamics and Process Control	Engineering	5	130	13T+19TP+7 TG	A familiarization with mathematical modeling / simulation of (bio) processes is intended, including the learning of different methods of systems analysis with feedback controllers.
Development of New Products and Processes	Food	5	130	13T+13TP+13 TG	Know the sources of generation of new processes and / or products, outline a market research and conduct it in a preliminary way.
Packaging	Food	5	130	16T+11TP+12LP	Students should get to know the main packaging systems, in terms of materials, their characteristics and properties, their relationship with the useful life of the products and with the performance in the storage and transport circuit.

Safety in the Food Chain	Food	5	130	13T+13TP+26 TG	To know the production techniques in the different primary production activities (agriculture, livestock and fisheries) and to identify, from a perspective of hazard assessment and control, the places where food security problems emerge most frequently.
Sustainable Environmental Practices	Food	5	130	12LP+12 TG+6FW+6S	Make known more sustainable approaches to primary production in order to reduce its environmental impact.
Option II (*)	Optional	5	130		
Semester III					
Food Engineering and Innovation Project	Food	15	390	7T+13 TG+6S	Acquisition of the ability to elaborate a synthesis work, in a group, which requires an adequate mastery of the various thematic areas necessary for a professional activity in Food Engineering.
Management, Innovation and Marketing	Humanities	5	130	10T+10 TG	Develop the skills and competences of Students to articulate knowledge acquired during their training in Engineering with the needs of Society through business development and the creation of new companies based on knowledge and innovation.
Operational Research and Innovation	Engineering	5	130	20T+19TP	Develop the capacity for critical analysis of the environment to the decision-making processes, through the selection of relevant information, its coordination, and adaptation of the parameters of the models to reality, efficiently adjusting their applicability conditions and rationalizing the expected results.
Option III	Optional	5	130		
Semester IV					
Food Engineering Internship / Thesis		30	780	13 TG	Ability to analyze and propose solutions in the context of topics related to food engineering, through the completion of the internship or research project. Development and application of technical and scientific skills.

Legends: FW – Fieldwork; LP - Laboratory Practices; T - Theoretical; TP - Theoretical-practical; TG - Tutorial guidance; S - Seminars.

(*) Optional curricular unit to be chosen in any scientific area offered by the Faculty of Biotechnology.

Table 2 - Phases of the Innovation Track Program and Contest.

Phases	Description
I. Admission	All potential competitors filled out the Application Form with information about the team and the idea of the product to be developed.
II. Development of Innovation Plans/ Projects	Development of Innovation Plans (intended for admitted Project Teams). ESB-UCP had mobilized resources to support each Group / Team in the development of their innovation plans, which may include: a) product specifications. b) a business project; c) prototype.
III. Presentation of Products and Services in Media and Public Events	The developed Projects are submitted to an Evaluation by the Jury that will select the Products and Services that will be proposed for the Presentation phase in Media, Showcases and other Public Events.
IV. Awarding of BIOTEC INNOVATION Awards	The Innovation Track Competition Jury annually awarded BIOTEC INNOVATION Awards to Teams that present innovative Products or Services that are considered to be of higher quality, considering, in particular, the contribution of the following Deliverables that make up the final proposals.

Table 3 - Innovation Track Program and Contest evaluation criteria, deliverables, and weighting in of the criteria on evaluation.

Criteria	Deliverable	Weighting evaluation
A. Innovation	Product specifications	15%
B. Eco-innovative aspects	Product specifications	10%
C. Properties and characteristics	Product specifications	15%
D. Industrial viability	Product specifications	10%
E. Market credibility	Business project	10%
F. Potential market size	Business project	10%
G. Economic prospects	Business project	10%
H. Communication and marketing plans	Business project	5%
I. Team	Business project	5%
J. General presentation	Prototype	10%

Table 4 - Outcomes matching the characteristics of the methodology used.

Characteristics of the Project Based Learning Methodology	Outcomes observed
Generating situation	The launch of the Innovation Track Program & Contest that aimed to develop new products and services for the agri-food sector, started with market forecasts and ideation sessions.
Projects defined by the teams in the competition mediated by scientific and business mentors	The competing teams identified the needs of the agri-food sector market. They developed a project to try to fill it, particularly within the scope of the valorization of food by-products, circular economy, sustainability, nutrition, health, or the optimization of production processes.
Duration	The teams in the competition had about 9 months to develop their projects (in each edition).
Final deliverables	The teams in competition developed for their project: product specifications, business project and product prototype.
Interdisciplinarity	The developed project made it possible to mobilize the knowledge of the following core curricular units: sensory analysis; advanced food technologies; microorganisms and food safety; development of new products and processes; packaging; food engineering and innovation project; management, innovation, and marketing.