

Call for 8 Initiation Research Scholarships (BII)

A call is open to award 8 Initiation Research Scholarships, funded by national funds of FCT (Foundation for Science and Technology) under the special support “Verão com Ciência - 2021”, under the following conditions:

1. Scientific fields:

Agriculture sciences, Food Sciences, Biotechnology, Agroforestry, Environmental, Animal Sciences, Engineering and related areas.

2. Admission Requirements:

In order to apply, students must be enrolled in a bachelor or master degree fulfilling the above-identified scientific fields.

3. Work Plan:

The 8 scholarships have the work plans according to the listed references:

Ref. 1. Evaluation of ecosystem services and enhancement of mountain sheep farming: Development of agroforestry research activities, in relation to ecosystem services associated with extensive grazing of sheep of native breeds in mountain areas of Northern Portugal: (1) Research on potential demand and current supply in ecosystem services. This task encompasses the collection of primary information, through interviews/questionnaires, on the perceptions/behavior of potential targets (including public and private bodies) of the commercial offer of ecosystem services, and the research of the currently existing commercial offer and the characterization of the same; (2) Assessment of the commercial and economic viability of ecosystem services associated with extensive sheep grazing in the Trás-os-Montes region.

Ref. 2. Assessment of the Environmental Benefits of Nature-Based Solutions with i-Tree software in the Cantarias, Bragança, and Argales Industrial Zones, Valladolid (Spain): Estimating the benefits, carbon capture, rainwater interception and removal of atmospheric pollution, based on the simulation with the i-Tree software: (1) Integration of the data acquired in the Intervention Areas of the INDNATUR Project in the i-Tree Software for the current context; (2) Data forecast for renaturalization scenarios, based on landscape intervention projects.; (3) Simulation of data with i-Tree, for base contexts and scenarios.

Ref. 3. Performance evaluation of sheep farmed in agro-silvo-pastoral system: In a Mediterranean climate, the growth of pratense plants under rainfed conditions is markedly seasonal. In the Northwest of Portugal (Bragança), dry matter (DM) production is concentrated (\approx 80% of annual DM production) in the period between the end of winter (March) and mid-spring (May). There is also a small growth during the autumn, from October to November. This irregularity in the availability of food, together with the

evolution of the food needs of the females throughout the production cycle, leads to the need to distribute fibrous and concentrated food to the manger to cover their food needs. The quality and quantity of feed to be distributed to the manger depends on the quality and quantity of pasture available, as well as the stage of the production cycle in which the females are. Thus, this work aims to monitor the performance of Churra Galega Bragançana sheep from the Escola Superior Agrária de Bragança.

Ref. 4. Molecular identification of Portuguese isolates of *Gnomoniopsis castânea*:

Chestnut brown rot, already declared devastating for the production of chestnuts in several European countries, was detected in Portugal in 2018, and its causal agent, the fungus *Gnomoniopsis castaneae* (GC), was already isolated from chestnuts from various areas of the region of Trás-os-Montes (ToM). The present work aims to identify and molecularly characterize 30 GC isolates from the ToM region. To this end, we intend to: (1) Molecularly identify GC isolates through DNA extraction, PCR and sequencing of appropriate gender markers (ITS and TEF-1); (2) compare the Portuguese isolates with those from other regions of the world available in the databases, using bioinformatics tools, and (3) prepare the isolates for deposit in the CIMO culture collection.

Ref. 5. Experimental characterization of PDMS composites with beeswax:

Among polymers, there is a growing interest in the study of polydimethylsiloxane (PDMS) for applications such as engineering and in the biomedical field. PDMS has been widely used in hydrophobic coatings, consisting of surfaces with low surface energy, and has been a way to improve anti-fog and water-repellent performance. Some of these properties can be improved by adding beeswax to PDMS. In this work we intend to characterize some properties of this composite according to the following activities: (1) Manufacture of specimens with different PDMS/Beeswax ratios; (2) Tests for mechanical characterization: tensile and hardness tests; (3) Tests for characterization of thermal degradation: DSC and TGA.

Ref. 6. Comparison and optimization of extraction methods for obtaining concrete from rock rose (*Cistus ladanifer* L.):

In this work we intend to compare three extraction methods, namely conventional extraction by Soxhlet, microwave and ultrasound, for the obtaining concrete from rockrose (*Cistus ladanifer* L.). Based on the extraction yields and volatile composition analyzed by gas chromatography coupled with mass spectrometry (GC-MS) the most promising methodology will be chosen. This will then be subjected to an optimization process, taking into account the variables related to the methodology in question, such as time, temperature and solvent composition. The optimization will be performed based on the response surface methodology (RSM).

Ref. 7: Evaluation of the quality of bee bread from different regions of Portugal:

Bee bread, or fermented bee pollen, is one of the bee products less explored by beekeepers, however this product has great potential as a nutraceutical, due to its richness in essential amino acids, proteins, sugars and phenolic compounds. The scientific information available in the literature is still scarce, so this work plan aims to study the quality of this product collected in different regions of Portugal. Several samples of bee bread will be evaluated for their nutritional parameters, which include moisture, ash, lipids, protein, and sugar content, applying standardized methods. In addition, the bioactive content of the samples will be evaluated in relation to total phenolics by the Folin-Ciocalteu methods, together with the antioxidant activity by the free radical inhibition test.

Ref. 8: Development of a QSAR model to assess the antioxidant activity of phenolic compounds: QSAR (Quantitative Structure–Activity Relationship) modeling is useful to understand and explain the mechanism of action of compounds at the molecular level, allowing the development of new compounds with desirable biological properties. A quantitative QSAR model is represented by a mathematical equation, which relates the calculated properties of the studied compounds (molecular descriptors) with their biological activities. QSAR models can be used to predict the bioactivities of different natural compounds. The QSAR model to be developed will analyze the antioxidant activity of a minimum of 50 phenolic compounds and will be implemented using PyQSAR, a package present in the PYTHON programming language, and OCHEM, a tool for calculating molecular descriptors.

4. Objectives:

Promotion of scientific and technological culture and dissemination of scientific and technical knowledge among higher education students in accordance with the objectives of the “Verão com Ciência – 2021” program.

5. Applicable legislation and regulations:

Statute of the Scientific Research Grant Holder, approved by Law No. 40/2004 of 18 August, in its current wording; Regulation of Research Grants from FCT, I. P., in force <https://www.fct.pt/apoios/bolsas/docs/RegulamentoBolsasFCT2019.pdf>; Regulation No. 522/2020, published in Diário da República, 2nd Series, No. 113, June 12 - Regulation of Research Grants from the Polytechnic Institute of Bragança.

6. Workplace and scientific orientation:

The work will be developed in Centro de Investigação de Montanha (CIMO) (Bragança, Portugal) under the scientific supervision of: **Ref.1.** Paula Sofia Alves do Cabo; **Ref.2.** Artur Gonçalves; **Ref.3.** Vasco Augusto Pilão Cadavez; **Ref.4.** Paula Rodrigues; **Ref.5.** João Eduardo Pinto Castro Ribeiro; **Ref.6.** Joana Amaral; **Ref.7.** Soraia Falcão; and **Ref.8.** Rui Abreu.

7. Duration of the grant:

The fellowship is expected to start 1st September 2021, with a duration of 1 month.

8. Amount of the monthly maintenance allowance:

The amount of the grant corresponds to 446,12, according to the table of values of grants awarded by FCT, I.P. in the country. The Fellows will be covered by personal accident insurance and, if they are not covered by any social protection scheme, they may ensure the exercise of their right to social security by joining the voluntary social insurance scheme, under the terms set forth in the Code of Contributory Regimes of the Social Security Welfare System. The scholarship amount will be paid monthly by bank transfer.

9. Selection methods and respective evaluation:

- a) Curricular evaluation and adequacy to the work plan (80%);
- b) Motivation letter (20%).

10. Composition of the Selection Board:

Prof. José Alberto Pereira (President of the Jury), Prof. Filomena Barreiro (member), Dr. Lillian Barros (member).

11. Form of publication/notification of results:

Communications and the final results of the evaluation will be communicated via email notification to the candidates.

12. Application deadline:

The call is open between **05/08/2021 and 11/08/2021**. Given the exceptional nature of the support to be granted and the short duration of the grants, FCT authorizes the deadline for receiving applications to be shortened to five working days.

13. Form of presentation of applications:

Applications can be formalized by email to jpereira@ipb.pt, referring the reference to which the applicant is applying, and accompanied by the following documents: a) Curriculum Vitae; b) Certificate of enrollment in a bachelor or master degree; c) Motivation letter.

The documents proving the title of academic degrees or diplomas, or enrolment in an academic degree or diploma, may be dispensed with during the application stage. They can be replaced by a declaration of honor from the candidate, being mandatory to verify this condition during the scholarship contracting stage.

Academic degrees obtained in foreign countries require recognition by a Portuguese institution in accordance with Decree Law no. 66/2018, of August 16 and Administrative Rule no. 33/2019, of January 25. The presentation of the recognition is mandatory for the signing of the contract.

14. Time limits and complaint and appeal procedures:

If the decision to be made is unfavorable to the grant requested, the candidates have a period of 10 working days, after the date of the announcement of the results of the evaluation, to comment, if they so wish, in a prior hearing, under the terms set forth in the Administrative Procedure Code. The final decision may be appealed to the President of the IPB within 15 working days of notification.