

## DAAD-RISE WORLDWIDE 2023

Project name: **Characterization of bioactive compounds in coffee fruit peel to increase its valorization**

Internship Provider: **Centro para Investigaciones en Granos y Semillas (CIGRAS) (Seed and Grain Research Center). University of Costa Rica.**

Webpage: <https://cigras.ucr.ac.cr/en/investigation/biotechnology-projects>

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### Project outline

Coffee is the most important food commodity worldwide. The coffee seeds, used to prepare the coffee infusion, constitute 50% of the coffee fruit, meaning that the other 50% is currently discarded. However, several bioactive compounds have been identified in this by-product and further work is needed to promote its utilization. The project aims at analyzing the coffee peels of three coffee varieties growing in the same location, thus minimizing the effect of environmental factors. Through these studies, it is intended to make a detailed description of the deposition of the different bioactive compounds and their role in determining the external fruit color.

### Main objective

To characterize the profile and cellular deposition of various pigments in coffee fruit peels to understand the process of color development and valorize this by-product.

### Intern tasks and responsibilities

- Visit coffee plantation to collect the fruit samples for the analyses.
- Processing of coffee peel samples to extract the bioactive compounds (pigments) for further analysis.
- Possibility to analyze the individual compounds by means of HPLC/MS to characterize their profile and quantities.

### Desirable knowledge and skills of the intern

- Basic experience working on chemistry or biology lab.
- Practical experience on the use of HPLC (not indispensable).

### Knowledge and skills that will be acquired by the intern

- Overview of the coffee production system (one of the most important trade products worldwide).
- Possibility of conducting analysis with a High-Performance Liquid Chromatograph coupled to a Mass Spectrometer detector (triple quadrupole) and to a diode array detector.
- Depending on the interest of the intern, there is the possibility of acquiring experience with other techniques commonly used in a plant science lab (tissue culture, molecular biology, etc.).

### **Information about the city and region**

Coffee plantation where the samples will be collected is located in the town of San Pablo de León Cortez, ca. 1.5 hours away from San José. The experiments will be conducted at the Plant Biotechnology Laboratory of CIGRAS at the University of Costa Rica's main campus, located in San Pedro, a suburb of the capital city of Costa Rica. This is a very green, pedestrian- and cyclist-friendly campus that includes protected areas. The University of Costa Rica, founded in 1940, is placed in the range 531-540 of the QS Global World Rankings for 2022, #20 among Latin American universities and first in Central America. San José downtown, where most of the country's museums and theaters are located, can be easily reached by bus (10-15 minutes at the most). The Pacific Ocean and the Caribbean Sea are only few hours away and different national parks and biological reserves (and beaches) can be visited during the free time.

### **We provide:**

- Excellent laboratory environment with an almost complete bilingual working atmosphere (Spanish/English) and even the possibility to interact in German with some lab members.
- Logistic support concerning administrative matters at the beginning of the internship (e.g., visa, accommodation, residence permit).
- Necessary training, workplace, internet access, etc.
- Transportation and assistance during coffee sample collecting.
- All consumables, facilities, and equipment to perform the laboratory experiments.
- More than 20 years of experience with international students and academicians (many from Germany).

### **Funding**

This research is part of a project funded by the Vice-presidency of Research of the University of Costa Rica.