

DAAD-RISE WORLDWIDE 2023

Project name: **Characterization of bioactive compounds in effluents of coffee fruit anaerobic fermentation aiming at developing a functional beverage (Functional Coffee)**

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/investigacion/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. Coffee berry processing (beneficiado) can be conducted through several ways. The anaerobic fermentation allows the coffee seeds to acquire particular aroma and flavor that are not present when the fruit remainings are removed with machines. Effluents of the anaerobic fermentation are currently not being used. Therefore, the research group intends to characterize their composition, prepare a beverage and analyze their functional properties.

Main objective

The aim of the project is to study the composition of these by-products to prepare a beverage with functional properties.

Intern tasks and responsibilities

- Visit coffee plantation to collect the effluents for the analyses.
- Analyze the biochemical profile of the effluents and the beverage by means of HPLC/MS to assess their functional potential.

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).
- Work with 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 Korea International Cooperation Agency (KOICA) and the Vice-presidency of Research of the University of Costa Rica.