TFM offers 2026-2027

Project title: Bioprocess development for the production of cosmetic ingredients in Plant Stem Cells (VEG4COS).

Summary: Platform development for the biotechnological production of ingredients for cosmetic applications based on ***in vitro*** **culture of plant stem cells** as an alternative to extracting ingredients from plants' biomass, to produce anti-aging, anti-oxidants, and other ingredients with cosmetic activity.

The interest of companies focused on the production of cosmetic ingredients is moving fast from the classical ingredient extraction from plants to biotechnological-based bioprocesses that allow the no stationary production, improve reproducibility and product quality. The student will join a team of the project VEG4COS composed by 2 PhD candidates. The project has granted by Acció (Nuclis, Genralitat de Catalunya) in collaboration a well stablished company of the cosmetic ingredients sector.

The objective of this Project is to explore the use of plant stem cells as a sustainable source of bioactive compounds for cosmetic applications. Starting from differentiated cell lines derived from explants, the project involves a process of selection and screening to identify the most resilient, fast-growing, and productive cell cultures. These selected lines will then be transferred to suspension cultures, where different elicitation methods will be tested to enhance the production of flavonoids and polyphenols. In the most promising cases, biochemical assays will be carried out to evaluate the antioxidant activity of the produced molecules, which will also be tested in an *in vitro* platform using human cell models (hNDF). The overall aim is to contribute to the development of innovative and environmentally responsible cosmetic ingredients through plant cell biotechnology.

Additionally the project pursues to stablish the bases of the bioprocess based on Plant Stem Cells at bench scale bioreactors (from shake flasks up to 5-liter Bioreactor). This work will include the study of the main culturing and bioprocessing conditions, the development of bioprocess monitoring tools, bioprocess intensification to increase productivities, and if possible, production of different batches of the ingredient of interest and its characterization.

Supervisor: Dr. Martí Lecina, Associate professor
Laboratory: Department of Bioengineering
act email: marti.lecina@iqs.url.edu; https://merit.url.edu/es/persons/mart%C3%AD-l
na/projects/