UMR iAte Agropolymer engineering & emerging technologies	***Implanteus* Graduate School** Academic Year 2020 - 2021 **Proposal of** **Master 2 Internship**	 

Title: *Olive solid waste as a functional component for bio-based composite materials*

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Context

The olive oil industry produces two major wastes, a liquid by-product called “margine” and a solid by-product, the olive pomace, both with detrimental impacts on the environment. New valorizations for these two major wastes are challenging research fields and new uses would have a huge positive socio-economic impact. Contrarily to solvent extraction, the olive oil extraction process based on pressing or centrifugation yields an olive pomace still containing an oily fraction. However, industrial technologies have been developed to separate them. Bio-based binding agents (alternatives to toxic petrochemicals), including functionalized fatty acids and alcohols that may be present in the residual oily fraction of olive pomace, are currently sought for bio-based materials, and lignocellulosic fillers in composite materials, such as olive stones, are developed with both natural and synthetic polymer matrices. The internship will focus on the development of bio-based materials from olive pomace.

Objectives

The first part of the work will address the separation of the lignocellulosic material from the oily fraction of olive pomace by hydrothermal or thermal processes. Parameters including granulometry of the raw materials, temperature and time of processing will be optimized by monitoring the amount and composition of the solid and oily fractions.
The second part will focus on the formulation and characterization of a composite material based on an epoxy resin matrix and the olive solid filler. The use of the oily fraction as a natural plasticizer in the composite formulation will be investigated as well. Other matrices, including biodegradable ones such as PHA (PolyHydroxyAlkanoates) will be tested to determine the best applications for olive pomace.

Prerequisite skills: Sound foundation in chemistry (organic, physical, analytical) and process engineering.

Main competences: range of analytical methods, including GC-MS, UHPLC-MS for complex mixtures analyses, TGA, DSC and DMTA for material mechanical and thermal properties.