	Implanteus Graduate School Academic year 2021-22 **Proposal of M1 Internship**	

Title: **Discrimination of natural yellow dyes produced by Mediterranean plants using untargeted LC-MS-based metabolomics**

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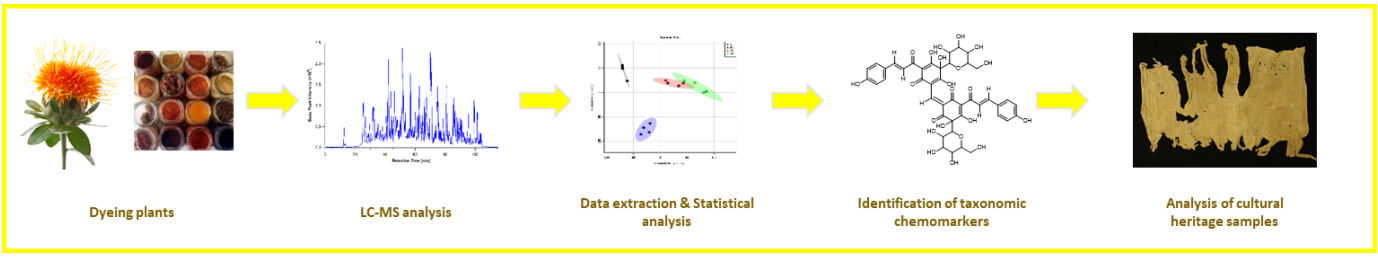
Context:
Natural dyes have been used since the ancient times by humans for several purposes. More particularly, yellow dyes have been isolated from a wide range of plants growing in Mediterranean regions such as weld (*Reseda luteola*), safflower (*Carthamus tinctorius*), Persian berries (*Rhamnus* spp.) or several other plant species. Due to the botanical diversity of dyes, as well as the multiplicity of chemical compounds occurring in such natural matrices, their identification in an historical context requires the development of novel powerful analytical approaches such as metabolomics.

Objectives:
This M1 internship will be organized in the following way:

1) Selection of Mediterranean plants known to produce yellow dyes,
2) Implementation of an untargeted LC-MS-based metabolomics workflow including the following steps:
   - Selection of adapted extraction protocols,
   - Optimization of chromatographic and MS acquisition parameters,
   - Optimization of data extraction and data treatment,
   - Determination via statistical methods and structural characterization of taxonomic chemomarkers,
3) Search for taxonomic chemomarkers in a selection of cultural heritage samples.



Skills:

Required: Analytical (bio)chemistry (Chromatography, mass spectrometry), natural products chemistry/structural biochemistry.

Additional: Biostatistics, plant physiology, botany or archaeometry.

Other: Ability to work in team, rigor and enthusiasm, strong verbal and written communication skills.