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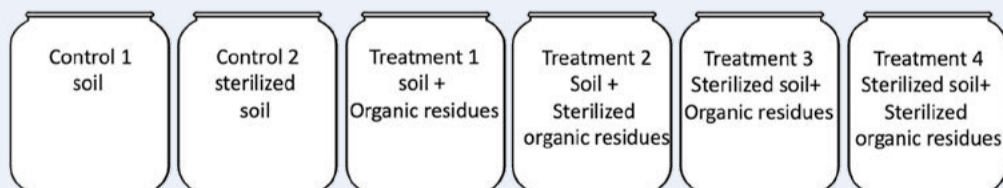
## Motivation

It is generally accepted that organic residues like compost and digestate have great potential to improve physical, chemical and biological status of soil. Different treatments for instance composting and digestion of organic waste will result in organic residues with different chemical and microbial compositions. Here, chemical composition means chemical structure of humic-like substances in organic residues; microbial composition means microbial activity, abundance and diversity.

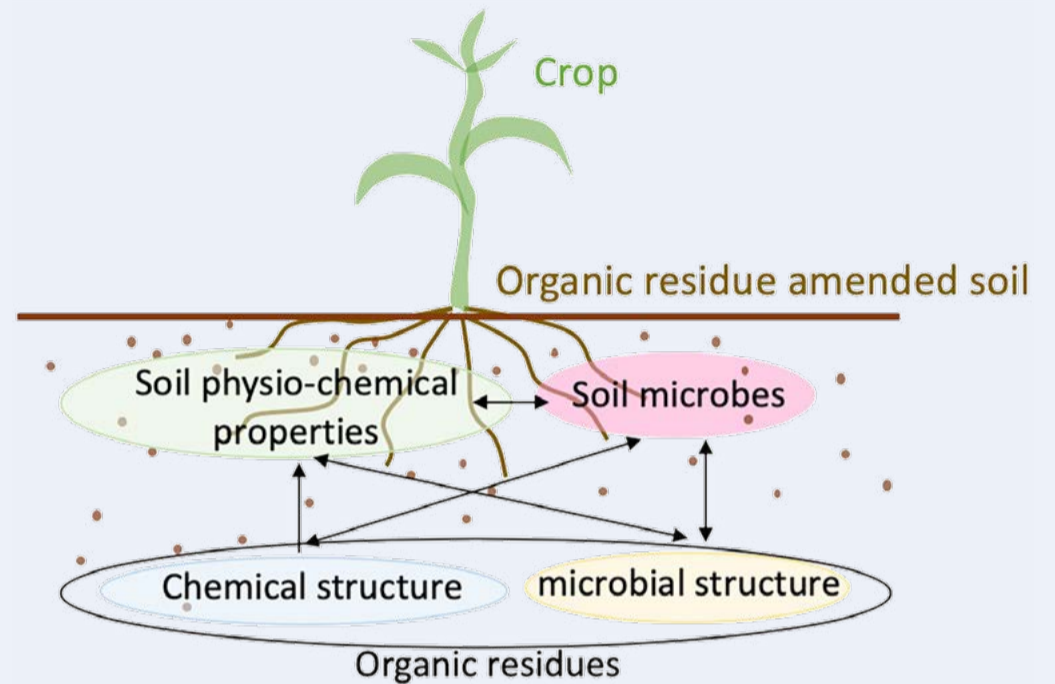
The effect of organic residues with different chemical <sup>[1,2]</sup> and microbial compositions <sup>[3]</sup> on soil matrix is very complex and surrounded by riddles, especially the relationship with soil microbial characteristics and crop growth. In this project, environmental technology specialists and soil ecologists are going to cooperate and shed light on this complex context.

## Technological challenges

- Processes involved in the soil matrix are complex and always inter-related;
- Relate intrinsic properties of organic residues to their effects on soil microbial characteristics;
- Identify/isolate/enrich specific groups of crop beneficial or detrimental soil microorganisms;
- Relate the changes in soil characteristic to crop growth, and study the mechanisms



Soil incubation experiments with addition of different organic residues in glass jars.  
Pot experiments will also be conducted afterwards



Above- and below-ground interactions in organic residue amended soil

## Research goals

Our hypothesis is that the influence on soils and crop growth depends on chemical and microbial composition of organic residues rather than their C, N, and P concentrations alone.

Our investigation intends to answer the following questions:

1. What is the relationship between the molecular C composition of added organic residues and soil microbial community composition?
2. How do organic residue associated microbial communities influence soil microbial community composition?
3. How do organic residue induced changes in soil microbial communities affect crop growth? And through what mechanisms?
4. Can we select organic residues to promote or reduce specific groups of crop beneficial or detrimental soil microorganisms?

### Reference:

- [1] Martinez-Balmori, D. *et al. J. Agric. Food Chem.* **62**, 11412–11419 (2014)  
 [2] Monda, H. *et al. Sci. Total Environ.* **590–591**, 40–49 (2017)  
 [3] Saison, C. *et al. Environ. Microbiol.* **8**, 247–257 (2006).