

## Long-term effect of organic amendments on soil enzymatic activities

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### Introduction

Organic amendments are a valuable source of organic matter intended to increase agricultural soil quality. The use of long-term field experiments is very important to investigate the environmental impacts of recycling organic residues on soil biochemical properties, as well as the possible resilience of the agrosystems. Since 1998, the site of Qualiagro-Feucherolles allows to study the effects of various organic amendments.

### Material and Methods

Since 2009, we followed soil enzymatic activities related to the C ( $\beta$ -Glucosidase), N (Urease), P (Phosphatase) and S (Arylsulfatase) cycles, as well as laccase, during a 2-year period following organic amendments. In the Qualiagro-Feucherolles site, the organic amendments have been applied every two years in September on wheat stubble, and soil physico-chemical parameters are monitored since 1998. Enzymatic assays were performed in microplate assays with protocols derived from [1, 2, 3, 4].

### Results

Our results show that organic waste products (OWPs) modify soil organic matter status and microbial biomass during the months following OWP inputs. In general, whatever the biogeochemical cycle observed, soil enzymatic activities are more or less increased because of organic carbon, total N and increase of microbial biomass, water retention and structural stability. The initial level of this increase depends on the nature of the amendment, more specially the statute of organic matter amended, its availability and degradability. Moreover, these organic amendments promote immobilization of enzymes linked to humic colloids, which could strongly affect soil quality. Laccase activity increase significantly, according to the incorporation of immature organic matter in soil, mostly with biowastes and municipal household waste compost.

### Conclusion

Our results demonstrate that organic amendments had a noticeable long-term-effect on enzymatic activities. They suggest that soil microbial processes are sensitive indicators for monitoring soil properties due to amendments by organic wastes. In addition, organic amendments can be used to reduce mineral fertilization.

### References

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