

N₂-fixing trees (*Acacia mangium*) introduce in eucalypt plantations modify rapidly the pools of organic P and low-molecular-weight organic acids (LMWOAs) in tropical soils contrasted for their C/P stoichiometry

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Introduction of a N₂-fixing tree (*Acacia mangium*) in eucalypt plantations has the potential to increase eucalypt wood production through increased N input due to biological N₂ fixation. However, the effect of acacia intercrop on phosphorus cycle is poorly understood.

The main objective of this study was to investigate the modification of organic P (Po) and organic acids (LMWOAs) forms in soils under the influence of acacia.

We hypothesized that Po and LMWOAs may change in the mixed stands due to the introduction of acacia, affecting P availability, and that this response might be different depending on the status of nutrients in soils.

Soil sampling in 2 sites

- Itatinga, Brazil (6-year-old, Oxisols, sandy soil)

C, N, P

- Kissoko, Congo (7-year-old, Arenosols, sandy soil)

C, N, P

Eucalyptus grandis and Acacia mangium plantations

3 Treatments, sampled in 3 blocks:

- 100E
- 100A
- 50E : 50A (near eucalyptus and acacia trees)

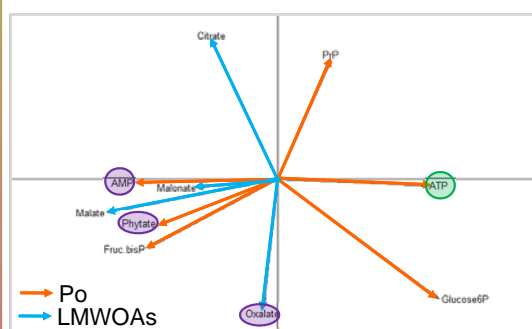
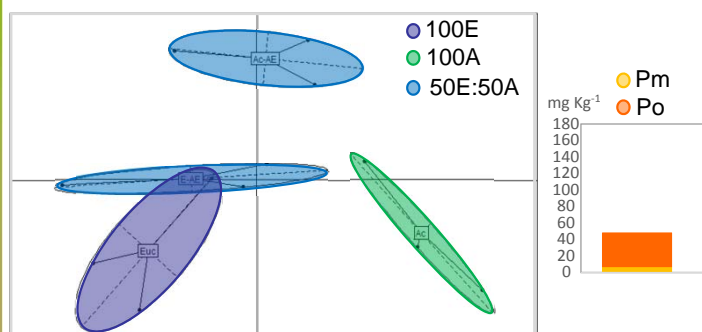


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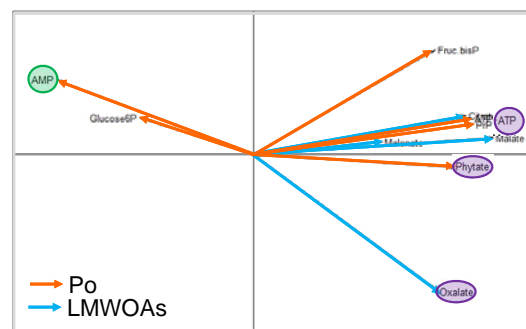
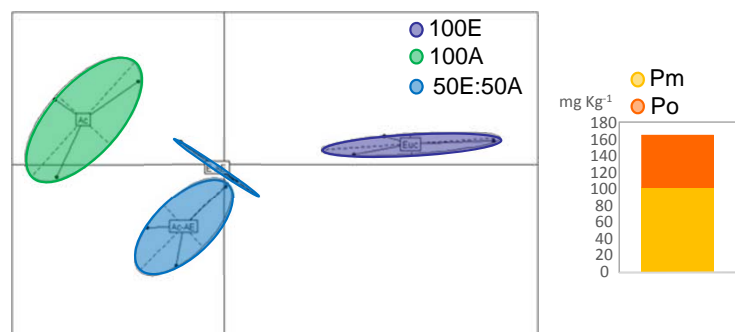
Methods

- Colorimetric P determination (NaOH-Pi = Pm and NaOH-Po = Po)
- Ion chromatography (Waithaisong *et al.*, 2015) to characterize organic P (Po) and low molecular weight organic acids (LMWOAs) forms

■ Itatinga (Brazil), low P soil



■ Kissoko (Congo), high P soil



CONCLUSIONS

In mixed stands, the effect of acacia introduction on Po and LMWOAs composition is more pronounced in high P than in low P soil, due to a much better N₂ fixation. Our results highlight that the introduction of a legume tree is able to strongly modify the composition of Po and LMWOAs in soil even after a first short-time rotation.