



## **Monitoring of changes in C and N forms in soils affected by forest fires by thermal analysis and pyrolysis/GC-MS**

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Wildfires are a dominant ecological factor in Mediterranean ecosystems. Wildfires affect the quality and quantity of SOM pools in soils and soil structure. Monitoring of changes in C and N forms in soils affected by wildfires provides vital information towards predictions on soil recovery and long term carbon gains or losses.

The aim of this study is to improve the understanding of the effect of forest fires on the soil properties, soil organic matter (SOM) structure, SOM transformations and soil recovery of Andalusia forest soils (Spain).

This project proposes a multidisciplinary approach to study the effect of forest fires on soil organic matter dynamics. This includes molecular and thermal characterisation of soil and SOM by Pyrolysis-GC-MS, and Thermogravimetry (TG) and differential scanning calorimetry (DSC) coupled to isotope ratio mass spectrometer (IRMS) and a quadrupole mass spectrometer (QMS).

The effect of heating/fire on soil organic matter led to a decrease in soil moisture, and the proportion of labile materials, and an increase in aromatisation and removal of oxygen-containing functional groups. There was an increase in recalcitrant N species in soils affected by fire, but little change in C species. Changes in the proportions of C and N species in labile and recalcitrant fractions could be associated with differences

in the chemical composition of burnt and unburnt soils and SOM fractions. These could be indicators for the presence of pyromorphic humic materials in soils. Synthesis of the results from these techniques indicate some of the changes in the biochemistry of carbon and nitrogen pools in soils affected by fire, which could be used to assess soil quality and soil recovery.