



## **In situ characterization of SOM as revealed by coupled LTA-PAS-FTIR approach**

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An original tool useful to study the dynamics, function and protection of soil organic matter (SOM) is the LTA-PAS-FTIR approach. Generally, the studies on SOM are carried out mainly using chemical extraction methods which modify both organic substances and mineral phases resulting in possible artifacts. Low-Temperature Ashing (LTA) by oxygen plasma can remove SOM from the mineral matrix of soil aggregates with minimal disturbance and damage to the inorganic constituents. It allows a controlled oxidation at low temperature of organic substances of undisturbed soil aggregates by removing SOM, layer by layer, without altering or damaging the residual layers, like a peeling of onion skins. PAS-FTIR spectroscopy allows to obtain IR spectra from the surface of irregular tri-dimensional specimens. When PAS (Photoacoustic) - FTIR spectroscopy is coupled with LTA, it is possible, at each step, to obtain spectroscopic evidences of the residual OM layers and, by difference, the spectra of the removed SOM. Therefore, the coupled LTA-PAS-FTIR approach can provide insights on the nature of SOM as well as the surface interaction of organic substances in undisturbed soil aggregates or in other solid materials. Some case studies on properties, function and protection of OM in undisturbed aggregates and on soil constituents are reported.