# Sulfur K-edge XANES Spectroscopy in Soil Organic Matter Studies. (S02-lehmann152913-Poster)

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## Abstract:

Synchrotron-based sulfur K-edge X-ray Absorption Near-Edge Structure spectroscopy (XANES) was used to speciate and quantify the different oxidation states of soil sulfur (organic and inorganic forms of S) in soils following land use changes. Direct measurement of S in bulk soil indicated the presence of large background on the spectra, which could not easily be corrected without affecting the results. However, humic acid extractions using 0.1 M NaOH/0.4 M NaF mixtures produced better signals, which can even be improved by additional filtration using a 0.2um membrane filters under pressure. Traditional wet chemical analyses of soil S using hydriodic acid (HI) reduction showed that the major proportion (98%) of total S in most agricultural soils was present in organic forms, out of which 77-84% was constituted by C-bonded S, whereas ester SO4-S constituted merely 16-23% of the organic S pool in bulk soils. These values were constant regardless of cropping and did not change between different particle size fractions. S-XANES spectroscopy, however, showed clear differences of S oxidation states between landuse systems and physical soil separates making it a useful tool to assess S cycling in soil.

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