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# Pyrolysis-GC/MS of Black Carbon: past and future

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Analytical pyrolysis uses controlled thermal degradation (flash heating at ~500–700 ºC under anaerobic conditions) to break down large molecules. When combined with GC/MS it facilitates chemical characterisation of macromolecular organic substances.

In the last 15 years a substantial body of research has probed the chemical properties of Black Carbon (BC) using pyrolysis-GC/MS. Generally speaking, with only limited success. It confirmed the obvious aromatic nature of BC, enrichment of PAHs and heterocyclic N during fire and it gave information on the variable susceptibility of different biocomponents to thermal impact. Drawbacks often mentioned are the interference of analytical artefacts with the products of BC and the large proportion of non-pyrolysable residue. As a result, analytical pyrolysis is not on the wish list of most researchers of biomass-derived BC.

However, the majority of these studies employed a low pyrolysis temperature (meaning incomplete pyrolysis), focussed on markers of biomass that survived charring (instead of on the products obtained from the BC itself), did not discuss the pyrolysates in detail (e.g. the important pyrolysis product benzene is frequently ignored, rendering it difficult to compare studies), did not quantify the pyrograms (small differences between samples overlooked) and involved recent laboratory charcoal (which behaves differently from aged natural BC under pyrolytic conditions).

Aiming to prompt initiative to re-evaluate the available data, this presentation is a short overview of BC studies involving pyrolysis-GC/MS. In addition, some preliminary results obtained with an improved method are presented, showing that the pyrograms harbour so far ignored information on e.g. burning intensity.