

OT1 Mass spectrometry's role in studies of biomass emissions important to climate change

Simin D. Maleknia¹⁻³ and Mark A. Adams¹⁻³

1. School of Biological, Earth & Environmental Sciences, University of New South Wales, Sydney, NSW, Australia
2. Faculty of Agriculture & Natural Resources, University of Sydney, Sydney, NSW, Australia
3. Bushfire Cooperative Research Centre, East Melbourne, VIC, Australia

Global warming, climate change, biogenic VOCs, wildfires, atmospheric chemistry

Development and application of mass spectrometry for analysis of biomass emissions

Volatile organic compounds (VOCs) are continually emitted from all types of vegetation with substantial impact on the global atmosphere. Changing climates, especially increased temperatures, are widely expected to increase ambient rates of emission of biogenic VOCs and are also predicted to increase the frequency and intensity of wildfires worldwide. Wildfires significantly affect the complexity of atmospheric reactions of VOCs and contribute to a range of toxic compounds resulting from pyrolysis of plant oils and other constituents.

Monitoring VOCs and their atmospheric reactions is important in managing the effects of climate change. We've applied advanced methods including proton-transfer reaction mass spectrometry (PTR-MS) and pyrolysis gas chromatography mass chromatography (GC-MS) for the analysis of trace levels VOCs from Australian eucalypt forests and temperature-dependent release of VOCs from combustion of plant tissues. These studies identified that specific classes of VOC compounds are released as a function of increasing temperature (i.e. from ambient to wildfires). Toxic compounds identified in the combustion of stemwood and leaf were further correlated with the presence of varying content of cellulose and lignin [1,2]. These results are valuable for emissions modelling of greenhouse gas compositions of the atmosphere.

[1] S.D. Maleknia, T.L. Bell, M.A. Adams, *Int. J. Mass Spectrom.*, in press.

[2] S.D. Maleknia, M.A. Adams, *Aspects of Applied Biol.*, in press.