

Stable Isotope Tracing of Bioethanol Combustion Inputs into the Atmosphere using GC-IRMS

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At an increasing rate, biofuels are becoming an integral part of our world's energy supply as we turn from non-renewable fossil fuels to renewable, biologically based, substances. But renewable does not mean environmentally friendly; in fact many of the environmental effects of the production and combustion of biofuel remains a mystery. My seminar will focus on a new technique developed at the University of Miami for tracing biofuel combustion inputs into the atmosphere using $^{12}\text{C}/^{13}\text{C}$ ratio determined by GC-IRMS. Using measurements from traditional fossil fuels, biofuels, and C4 plants the research group established ethanol's $\delta^{13}\text{C}$ end member Signatures. Using this research it is possible to construct models for atmospheric input from the combustion of bioethanol. The implications of this research, and further studies in similar fields are key to our continued and increased utilization of bioethanol as a fuel source. Should biofuels ever become economically advantageous, it is important that we understand its environmental impact.