

## 4.059 Secondary Organic Aerosol Formation from the Green Leaf Volatile Cis-3-Hexen-1-ol.

Early Career Scientist

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Abstract:

*Cis*-3-hexen-1-ol (HXO) is a type of green leaf volatile, which is an important class of biogenic volatile compounds that are emitted due to plant stress. Chamber experiments were performed to examine secondary organic aerosol (SOA) formation from the photooxidation and ozonolysis of HXO using either nonacidified or acidified sulfate seed aerosol and under wet (relative humidity (RH) = 45-60%) or dry conditions (RH < 6%). For select ozonolysis experiments, a hydroxyl radical (OH) scavenger was utilized. Aerosol sizing measurements and off-line chemical analyses by gas chromatography/mass spectrometry (GC/MS) and ultra performance liquid chromatography/ electrospray ionization high-resolution quadrupole time-of-flight mass spectrometry (UPLC/ESI-HR-Q-TOFMS) were used to characterize HXO-derived SOA formation. Our results indicate that the level of HXO-derived SOA increases with elevated aerosol acidity and under low-RH conditions, indicating that the water dilutes the acidity, thus decreasing the SOA. Experiments performed in the presence of an OH scavenger showed that the SOA formation decreased compared to experiments without an OH scavenger, suggesting that the major channel contributing to SOA formation is the reaction with OH radicals. Chemical characterization of HXO-derived SOA reveals that organosulfates (OSs) were produced. Ambient fine aerosol (PM<sub>2.5</sub>) samples collected from Rio de Janeiro, Brazil, were also analyzed. Many of the HXO-derived OSs identified in the chamber experiments

were also found in the PM<sub>2.5</sub> samples collected in Rio de Janeiro, Brazil. This study provides direct evidence that the atmospheric oxidation of HXO yields biogenic SOA through the formation of polar OSs.