Biodiesel use and production has significantly increased in the United States and in other parts of the world in the past decade. This is mainly because of the reduction in production of petroleum-based diesel. Also, recent research has shown that emission of some pollutants such as CO, particulate matter (PM), SO_2, hydrocarbons, and polycyclic aromatic hydrocarbons (PAHs) is greatly reduced with biodiesel. However, some research findings have shown that some unregulated emissions such as carbonyls in the gas-phase are increased with biodiesel. Very limited research has been done to investigate the carbonyl emissions in the particle-phase.

In this study, an Armfield CM-12 automotive diesel engine was used to generate particulate matter from two biodiesel feedstocks (soybean and waste vegetable oil biodiesel). The PM emissions were sampled by a variety of instruments: - engine exhaust particle sizer, EEPS (TSI Inc, Model 3090) for measuring particle size distributions between 5.6 and 560 nm in real-time; scanning mobility particle sizer, SMPS (TSI Inc, Model 3936) also for particle size distributions between 2 nm and 1000 nm; Teflon filters for gravimetric mass, and quartz fiber filters (QFF) for chemical analysis of the exhaust PM using gas chromatography mass spectrometry (GCMS). PAHs, carbonyls, and alkanes have been measured in the biodiesel and diesel exhaust PM. Preliminary results show that the total PAHs emissions are reduced between 2 – 10 times with B20 soybean biodiesel, while the total carbonyl emissions seem to increase with biodiesel. Alkanes have also been found to be in higher concentrations in petrodiesel exhaust PM than in biodiesel exhaust PM.