CARBONYL PROFILES IN VEHICULAR EXHAUST EMISSIONS PRIOR TO THE MANDATED MTBE BAN IN CALIFORNIA.  
PART I: A SEPULEVEDA TUNNEL EXPERIMENT

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Background

Carbonyls are toxic, mutagenic and/or carcinogenic
Carbonyls play an important role in the atmospheric photochemical ozone formation
Fuel composition affects carbonyl profiles and emission rates

Objectives

Measure acrolein and methacrolein (and other carbonyls) with high accuracy using 2,4-DNPH C18 cartridges (Kochi Fung, AtmAA Inc. Calabasas, CA)
Obtain carbonyl emission profiles in California prior to 31 Dec 03 and after the mandated MTBE ban in California (Part II: Summer ‘04, Caldecott Tunnel, Berkeley)

Sampling and analysis

Site: Sepulveda Tunnel, 670 m (under LAX), South exit
Dates: December 11-12, 2003; 1-2 hr samples @ 2 LPM
Extraction “in situ” with acetonitrile immediately after sampling; HPLC-DAD @ 364, Nova-Pak C18, 60 A, 4 µm, 3.9x150mm, 1mL/min gradient acetonitrile:water:tetrahydrofuran.

Results (µg/m3) and Major Conclusions

- Highest levels: Formaldehyde (1.84 µg/m3) and acetaldehyde (1.13 µg/m3) observed during Fri rush period.
- Acrolein and methacrolein (up to 0.31 and 0.27 µg/m3) readily quantified.

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