

ATMOSPHERIC LEVELS OF BENZENE AND C1-C2 CARBONYLS IN SAN NICOLAS DE LOS GARZA, NUEVO LEON, MEXICO: Source implications and health risk

Table S.1. Performance specifications and characteristics of the used instruments f to measure air criteria pollutant in this study.

Criteria Air Pollutants				
Variable	O₃	NO, NO₂, NO_x	CO	SO₂
Analyzer	Dasibi UV Spectrophotometry Model 1008-RS	Thermo Scientific Chemical Luminescence Model 42 i	TECO GFC IR Model 48	TECO UV Fluorescence Model 43 A
Range	0 - 0.05 and 0 - 1.0 ppm	0 - 0.05 to 100 ppm and 0 - 0.1 to 150 mg/m ³	0 - 1 to 1000 ppm	0 - 10 ppm and 0 - 25 mg/m ³
Precision	0.001 ppm	± 0.4 ppb	± 0.1 ppm	1 ppb
Noise	± 0.001 ppm	0.2 ppb RMS	0.05 ppm	1 ppb RMS
Linearity	± 0.001 ppm	± 1% full scale	± 1% full scale	± 1% full scale
LOD	< 0.40 ppb	< 0.40 ppb	0.10 ppm	< 0.50 ppb
Meteorological Parameters				
Variable	Wind Speed	Wind Direction	Temperature	Pressure
M50 Weather Sensor (Multiparametr sensors), Met One Instruments	010 Wind Speed Sensor Met One Instruments	020 Wind Direction Sensor Met One Instruments	060A-2 Air Temperature Sensor Met One Instruments	090-CI Air Pressure Sensor Met One Instruments
Range	0 - 50 ms ⁻¹	0 - 360°	-40°C to +50°C	500 - 1100 hPa
Accuracy:	± 2%	± 5°	± 0.4°C	± 2 hPa
Resolution:	0.1 ms ⁻¹	< 1°	0.1°C	0.1 hPa

Table S.2. Differences indicated by the Friedman test for benzene mean concentrations among diurnal sampling periods (B1: 09:00- 10:30 am; B2: noon – 01:30 pm; B3: 03:00-04:30 pm) and among sampling seasons (summer, autumn and winter).

Sampling	Σ (Ranks)	Average (Ranks)	Groups		p-values	Summer B1	Summer B2	Summer B3
Summer B3	25.000	1.087	A		Summer B1	1	0.015	< 0.0001
Summer B2	47.000	2.043		B	Summer B2	0.015	1	0.004
Summer B1	66.000	2.870		C	Summer B3	< 0.0001	0.004	1
Sampling	Σ (Ranks)	Average (Ranks)	Groups		p-values	Autumn B1	Autumn B2	Autumn B3
Autumn B3	25.000	1.250	A		Autumn B1	1	0.008	< 0.0001
Autumn B2	38.000	1.900	A		Autumn B2	0.008	1	0.101
Autumn B1	57.000	2.850		B	Autumn B3	< 0.0001	0.101	1
Sampling	Σ (Ranks)	Average (Ranks)	Groups		p-values	Winter B1	Winter B2	Winter B3
Winter B3	14.000	1.273	A		Winter B1	1	0.030	0.0005
Winter B2	20.000	1.818	A		Winter B2	0.030	1	0.408
Winter B1	32.000	2.909		B	Winter B3	0.0005	0.408	1
Sampling	Σ (Ranks)	Average (Ranks)	Groups		p-values	Summer	Autumn	Winter
Winter	50.000	1.515	A		Summer	1	0.010	< 0.0001
Autumn	62.000	1.879	A		Autumn	0.010	1	0.304
Summer	86.000	2.606		B	Winter	< 0.0001	0.304	1

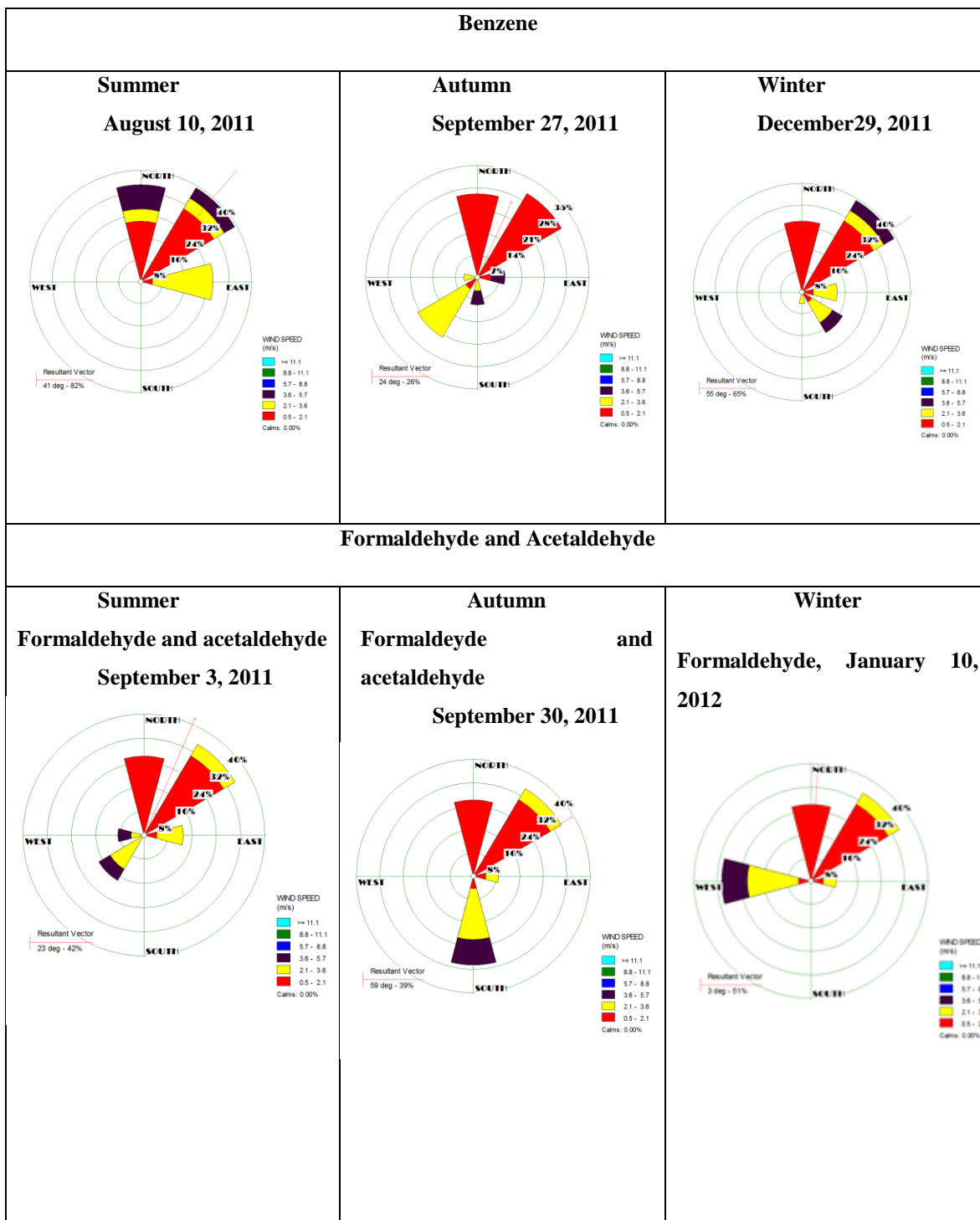
Table S.3. Differences indicated by the Friedman test for formaldehyde mean concentrations among diurnal sampling periods (B1: 09:00- 10:30 am; B2: noon – 01:30 pm; B3: 03:00-04:30 pm) and among sampling seasons (summer, autumn and winter).

Sampling	Σ (Ranks)	Average (Ranks)	Groups		p-values	Summer B1	Summer B2	Summer B3
Summer B3	26.000	1.130	A		Summer B1	1	0.953	< 0.0001
Summer B1	55.000	2.391		B	Summer B2	0.953	1	< 0.0001
Summer B2	57.000	2.478		B	Summer B3	< 0.0001	< 0.0001	1
Sampling	Σ (Ranks)	Average (Ranks)	Groups		p-values	Autumn B1	Autumn B2	AutumnB3
Autumn B2	16.000	1.143	A		Autumn B1	1	0.001	0.730
AutumnB3	32.000	2.286		B	Autumn B2	0.001	1	0.008
Autumn B1	36.000	2.571		B	AutumnB3	0.730	0.008	1
Sampling	Σ (Ranks)	Average (Ranks)	Groups		p-values	Winter B1	Winter B2	Winter B3
Winter B2	12.000	1.091	A		Winter B1	1	0.004	1.000
Winter B1	27.000	2.455		B	Winter B2	0.004	1	0.004
Winter B3	27.000	2.455		B	Winter B3	1.000	0.004	1
Sampling	Σ (Ranks)	Average (Ranks)	Groups		p-values	Summer	Autumn	Winter
Winter	40.000	1.212	A		Summer	1	0.020	< 0.0001
Autumn	68.000	2.061		B	Autumn	0.020	1	0.002
Summer	90.000	2.727		C	Winter	< 0.0001	0.002	1

Table S.4. Differences indicated by the Friedman test for acetaldehyde mean concentrations among diurnal sampling periods (B1: 09:00- 10:30 am; B2: noon – 01:30 pm; B3: 03:00-04:30 pm) and among sampling seasons (summer, autumn and winter).

Sampling	Σ (Ranks)	Average (Ranks)	Groups	p-values	Summer B1	Summer B2	Summer B3
Summer B3	28.000	1.217	A	Summer B1	1	0.100	0.010
Summer B1	48.000	2.087	B	Summer B2	0.100	1	< 0.0001
Summer B2	62.000	2.696	B	Summer B3	0.010	< 0.0001	1
Sampling	Σ (Ranks)	Average (Ranks)	Groups	p-values	Autumn B1	Autumn B2	Autumn B3
Autumn B2	18.000	1.286	A	Autumn B1	1	0.039	0.730
Autumn B1	31.000	2.214	B	Autumn B2	0.039	1	0.004
Autumn B3	35.000	2.500	B	Autumn B3	0.730	0.004	1
Sampling	Σ (Ranks)	Average (Ranks)	Groups	p-values	Winter B1	Winter B2	Winter B3
Winter B2	12.000	1.091	A	Winter B1	1	0.004	1.000
Winter B1	27.000	2.455	B	Winter B2	0.004	1	0.004
Winter B3	27.000	2.455	B	Winter B3	1.000	0.004	1
Sampling	Σ (Ranks)	Average (Ranks)	Groups	p-values	Summer	Autumn	Winter
Winter	42.000	1.273	A	Summer	1	0.0001	< 0.0001
Autumn	61.000	1.848	A	Autumn	0.0001	1	0.052
Summer	95.000	2.879	B	Winter	< 0.0001	0.052	1

Figure S1. Wind Roses in specific days when the concentrations of benzene, formaldehyde and acetaldehyde were higher.



Acetaldehyde, January 12, 2012

