

Supplementary Information

Concentration Profiles of Regulated and Unregulated Pollutants Emitted from the Combustion of Soybean Biodiesel and Diesel/Biodiesel Blend Originating of a Diesel Cycle Engine

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Table S1. Student's *t*-test comparing the averages of pollutants PM, BTE and aldehydes between B100 and B100 Adt, considering operating time of the engine at 15, 30 and 60 minutes and storage periods T1, T2 and T3

Student's <i>t</i> -test - B100 × B100 Adt									
Pollutant	Fuel	Average	S	Fuel	Average	S	<i>t</i> calc	<i>t</i> tab	Situation
PM	B100/15	9104	1056	B100 Adt/15	6309	1848	2.27	2.77	H0
	B100/30	3515	838	B100 Adt/30	4256	729	1.05	3.18	H0
	B100/60	2945	27	B100 Adt/60	4087	206	7.41	3.18	H1
	B100-T1	4970	225	B100 Adt-T1	4381	1052	0.94	2.77	H0
	B100-T2	3069	360	B100 Adt-T2	3260	756	0.45	2.44	H0
	B100-T3	3104	410	B100 Adt-T3	3544	23	1.85	2.77	H0
Benzene	B100/15	1562	145	B100 Adt/15	1128	395	1.78	2.77	H0
	B100/30	1684	139	B100 Adt/30	1348	134	2.71	3.18	H0
	B100/60	1216	118	B100 Adt/60	1074	214	1.00	2.77	H0
	B100-T1	1056	52	B100 Adt-T1	1046	95	0.10	2.77	H0
	B100-T2	336	8	B100 Adt-T2	416	40	2.25	2.77	H0
	B100-T3	338	19	B100 Adt-T3	324	12	0.73	2.77	H0
Toluene	B100/15	228	15	B100 Adt/15	261	167	0.37	3.18	H0
	B100/30	189	32	B100 Adt/30	202	118	0.18	2.77	H0
	B100/60	458	181	B100 Adt/60	621	83	1.42	2.77	H0
	B100-T1	291	60	B100 Adt-T1	233	17	1.06	2.77	H0
	B100-T2	246	30	B100 Adt-T2	292	64	0.75	2.77	H0
	B100-T3	228	26	B100 Adt-T3	225	9	0.10	2.77	H0
Ethylbenzene	B100/15	768	122	B100 Adt/15	658	6	1.20	3.18	H0
	B100/30	886	103	B100 Adt/30	576	132	2.77	3.18	H0
	B100/60	841	172	B100 Adt/60	677	178	1.14	2.77	H0
	B100-T1	684	19	B100 Adt-T1	672	64	0.20	2.77	H0
	B100-T2	198	14	B100 Adt-T2	229	18	0.16	2.77	H0
	B100-T3	197	18	B100 Adt-T3	187	3	0.66	2.77	H0
Formaldehyde	B100/30	20.4	1.3	B100 Adt/30	14.0	4.9	1.79	4.30	H0
	B100/60	3.8	2.0	B100 Adt/60	8.4	0.4	3.21	4.30	H0
	B100-T1	30.1	9.1	B100 Adt-T1	22.1	9.2	0.87	4.30	H0
	B100-T2	18.9	3.4	B100 Adt-T2	15.1	0.1	1.57	4.30	H0
	B100-T3	10.9	2.7	B100 Adt-T3	13.5	3.1	1.08	2.77	H0
Acetaldehyde	B100/30	18.0	2.6	B100 Adt/30	17.2	0.8	0.46	4.30	H0
	B100/60	3.8	0.7	B100 Adt/60	5.2	0.9	1.77	4.30	H0
	B100-T1	23.4	4.7	B100 Adt-T1	17.4	3.2	1.48	4.30	H0
	B100-T2	11.8	1.1	B100 Adt-T2	13.9	0.6	2.39	4.30	H0
	B100-T3	9.8	1.9	B100 Adt-T3	11.9	1.7	0.55	2.77	H0

Table S2. Student's *t*-test comparing the averages of pollutants PM, BTE and aldehydes between B5 and B100, considering operating time of the engine at 15, 30 and 60 minutes and storage periods T1, T2 and T3

Student's <i>t</i> -test - B5 × B100									
Pollutant	Fuel	Average	S	Fuel	Average	S	<i>t</i> calc	<i>t</i> tab	Situation
PM	B5/15	4252	278	B100/15	9104	1056	5.43	3.18	H1
	B5/30	3237	511	B100/30	3515	838	0.47	3.18	H0
	B5/60	2759	101	B100/60	2945	27	2.41	3.18	H0
	B5-T1	2467	258	B100-T1	4970	225	12.67	2.77	H1
	B5-T2	2143	385	B100-T2	3069	360	3.50	2.44	H1
	B5-T3	1785	344	B100-T3	3104	410	4.26	2.77	H1
Benzene	B5/15	1059	73	B100/15	1562	145	5.36	2.77	H1
	B5/30	1193	349	B100/30	1684	139	1.84	4.30	H0
	B5/60	493	6	B100/60	1216	118	8.22	3.18	H1
	B5-T1	1102	133	B100-T1	1056	52	0.56	2.77	H0
	B5-T2	408	123	B100-T2	336	8	1.00	2.77	H0
	B5-T3	403	37	B100-T3	338	19	2.73	2.77	H0
Toluene	B5/15	653	56	B100/15	228	15	12.60	2.77	H1
	B5/30	724	258	B100/30	204	28	2.82	4.30	H0
	B5/60	291	26	B100/60	458	181	1.23	3.18	H0
	B5-T1	676	58	B100-T1	291	60	7.96	2.77	H1
	B5-T2	293	88	B100-T2	246	30	0.89	2.77	H0
	B5-T3	275	3	B100-T3	228	26	3.18	2.77	H1
Ethylbenzene	B5/15	63	6	B100/15	768	122	9.97	2.77	H1
	B5/30	578	154	B100/30	886	103	2.35	4.30	H0
	B5/60	253	28	B100/60	841	172	4.50	3.18	H1
	B5-T1	527	42	B100-T1	684	19	5.90	2.77	H1
	B5-T2	216	49	B100-T2	198	14	0.60	2.77	H0
	B5-T3	212	8	B100-T3	197	18	1.22	2.77	H0
Formaldehyde	B5/30	10.0	2.3	B100/30	20.4	1.3	5.59	4.30	H1
	B5/60	2.9	0.4	B100/60	3.8	2.0	0.85	3.18	H0
	B5-T1	16.0	0.9	B100-T1	30.1	9.1	2.17	4.30	H0
	B5-T2	10.6	0.3	B100-T2	18.9	3.4	3.37	4.30	H0
	B5-T3	13.9	4.3	B100-T3	10.9	2.7	1.01	2.77	H0
Acetaldehyde	B5/30	15.5	3.3	B100/30	18.0	2.6	0.86	4.30	H0
	B5/60	7.1	2.0	B100/60	3.8	0.7	2.14	3.18	H0
	B5-T1	20.2	0.3	B100-T1	23.4	4.7	0.95	4.30	H0
	B5-T2	11.3	0.0	B100-T2	11.8	1.1	0.57	4.30	H0
	B5-T3	17.6	4.2	B100-T3	9.8	1.9	1.59	4.30	H0

Table S3. Student's *t*-test comparing the averages of pollutants PM, BTE and aldehydes between B5 and B100 Adt, considering operating time of the engine at 15, 30 and 60 minutes and storage periods T1, T2 and T3

Student's <i>t</i> -test - B5 × B100 Adt									
Pollutant	Fuel	Average	S	Fuel	Average	S	<i>t</i> calc	<i>t</i> tab	Situation
PM	B5/15	4752	278	B100 Adt/15	6309	1848	1.12	3.18	H0
	B5/30	3237	511	B100 Adt/30	4256	729	1.98	2.77	H0
	B5/60	2759	101	B100 Adt/60	4087	206	10.03	2.77	H1
	B5-T1	2467	258	B100 Adt-T1	4381	1052	3.06	2.77	H1
	B5-T2	2143	385	B100 Adt-T2	3260	756	2.63	2.44	H1
	B5-T3	1785	344	B100 Adt-T3	3544	23	8.82	2.77	H1
Benzene	B5/15	1059	73	B100 Adt/15	1128	395	0.29	2.77	H0
	B5/30	1193	349	B100 Adt/30	1348	134	0.74	3.18	H0
	B5/60	493	6	B100 Adt/60	1074	214	3.64	3.18	H1
	B5-T1	1102	133	B100 Adt-T1	1046	95	0.60	2.77	H0
	B5-T2	408	123	B100 Adt-T2	416	40	0.10	2.77	H0
	B5-T3	403	37	B100 Adt-T3	324	12	3.55	2.77	H1
Toluene	B5/15	653	56	B100 Adt/15	261	167	4.02	3.18	H1
	B5/30	724	258	B100 Adt/30	202	118	3.21	3.18	H1
	B5/60	291	26	B100 Adt/60	621	83	5.22	3.18	H1
	B5-T1	676	58	B100 Adt-T1	233	17	12.65	2.77	H1
	B5-T2	293	88	B100 Adt-T2	292	64	0.02	2.77	H0
	B5-T3	275	3	B100 Adt-T3	225	9	9.20	2.77	H1
Ethylbenzene	B5/15	63	6	B100 Adt/15	658	6	105	3.18	H1
	B5/30	578	154	B100 Adt/30	576	132	0.01	3.18	H0
	B5/60	253	28	B100 Adt/60	677	178	3.16	3.18	H0
	B5-T1	527	42	B100 Adt-T1	672	64	3.30	2.77	H1
	B5-T2	216	49	B100 Adt-T2	229	18	0.4	2.77	H0
	B5-T3	212	8	B100 Adt-T3	187	3	4.88	2.77	H1
Formaldehyde	B5/30	10.0	2.3	B100 Adt/30	14.0	4.9	1.02	4.30	H0
	B5/60	2.9	0.4	B100 Adt/60	8.4	0.4	14.55	3.18	H1
	B5-T1	16.0	0.9	B100 Adt-T1	22.1	9.2	0.94	4.30	H0
	B5-T2	10.6	0.3	B100 Adt-T2	15.1	0.1	22.56	4.30	H1
	B5-T3	13.9	4.3	B100 Adt-T3	13.5	3.1	0.13	2.77	H0
Acetaldehyde	B5/30	15.5	3.3	B100 Adt/30	17.2	0.8	0.69	4.30	H0
	B5/60	7.1	2.0	B100 Adt/60	5.2	0.9	1.20	3.18	H0
	B5-T1	20.2	0.3	B100 Adt-T1	17.4	3.2	1.21	4.30	H0
	B5-T2	11.3	0.0	B100 Adt-T2	13.9	0.6	6.24	12.70	H0
	B5-T3	17.6	4.2	B100 Adt-T3	11.9	1.7	2.15	3.18	H0

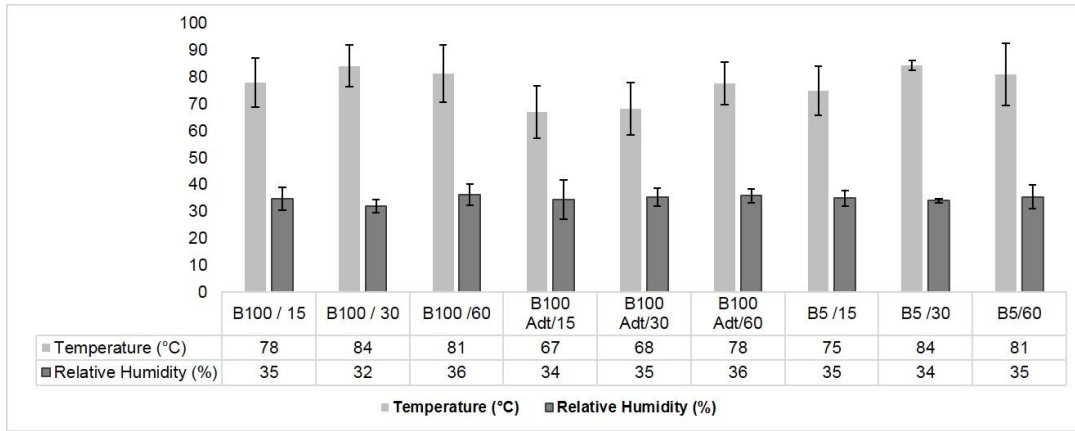


Figure S1. Average results for temperature and relative humidity of the B100, B100 Adt and B5 in periods of 15, 30 and 60 minutes.