

**Supplementary Information for the manuscript entitled: Fuel-range liquid
hydrocarbon products from simultaneous catalytic deoxygenation of mixtures
of fatty acids obtained from the hydrolysis of rapeseed oil**

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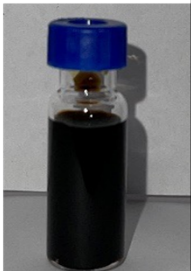




With no catalyst			With catalyst (Pt/C)	
350 °C	380 °C	400 °C	350 °C	400 °C
				

Figure S11: Appearance of oil/wax products obtained at different reaction temperatures for 1 h reaction time (with and without 5 wt% Pt/C catalyst).

Table SI1: List of compounds oil/wax products obtained at different reaction temperatures for 1 h reaction time (with and without 5 wt% Pt/C catalyst) (feed = 10 g)

Alkanes	Yield (wt %)				
	350 °C	380 °C	400 °C	350* °C	400* °C
Heptane	-	0.91	1.65	-	-
Cyclohexane, methyl-	-	-	-	-	-
Cyclopentane, ethyl-	-	-	-	-	-
Octane	-	1.1	2.73	-	-
Cyclohexane, ethyl-	-	-	-	-	-
Nonane	0.16	1.14	3.27	-	-
Decane	0.12	0.99	3.07	-	-
Cyclopentane, butyl-	-	-	-	-	-
Decane	-	-	-	-	-
Cyclohexane, butyl-	-	0.34	-	-	-
Cyclopentane, pentyl-	-	-	-	-	-
Undecane	0.14	1.18	-	-	0.3
Cycloheptane, methyl-	-	-	0.23	-	-
Octane, 2,4,6-trimethyl-	-	-	2.71	-	-
Cyclopentane, hexyl-	-	-	0.22	-	-
Cyclohexane, pentyl-	-	-	-	-	-
Dodecane	0.15	1.32	3	-	0.57
Cyclohexane, octyl-	-	0.16	0.26	-	-
Cyclopentane, 1-butyl-2-propyl-	-	-	0.22	-	-
Cyclohexane, hexyl-	-	-	-	-	-
Tridecane	-	0.66	1.63	-	0.73
Cyclopentane, 1-hexyl-3-methyl-	-	-	0.61	-	-
Tetradecane	-	-	1.29	-	0.86
Dodecane, 2-cyclohexyl-	-	-	0.4	-	-
Pentadecane	1.6	0.48	6.32	5.38	5.86
Cyclohexane, undecyl-	-	-	0.49	-	-
Hexadecane	-	4.88	1.13	0.57	1.19
2,6,10-Trimethyltridecane	-	-	-	-	1.73
Decane, 2,5-dimethyl-	-	-	-	-	0.65
Cyclododecane	-	0.16	-	-	-
Cyclohexane, undecyl-	-	0.23	-	-	-
Cyclohexadecane	-	0.12	-	1.02	-
Hexadecane	-	0.56	-	-	-
Decane, 4-cyclohexyl-	-	2.8	0.27	-	-
Cyclohexane, 1,5-diethyl-2,3-dimethyl-	-	-	0.66	-	-
Cyclopentane, 1-pentyl-2-propyl-	-	-	1.05	-	0.85
Cyclopentane, 1-butyl-2-pentyl-	-	-	0.84	-	-
Dodecane, 2-cyclohexyl-	-	-	-	-	-
Cyclohexane, nonadecyl-	-	-	-	-	-
1-Cyclopentyleicosane	-	-	1.13	-	-
Pentadecane, 4-methyl-	0.47	-	-	-	-
Hexadecane, 2-methyl-	1.14	-	-	-	2.11

Tetradecane, 5-methyl-	-	-	-	-	0.54
Tetradecane, 4-methyl-	-	-	-	-	0.66
Tetradecane, 3-methyl-	-	-	-	-	1.4
Heptadecane	2.64	11.96	12.64	76.13	63.49
Cyclopentadecane	0.55	1.43	-	-	-
Cyclohexane, undecyl-	1.29	2.96	2.44	-	-
Cyclopentane, decyl-	-	1.84	-	-	-
Octadecane	0.54	0.85	-	2.08	1.53
Cyclopentane, 1-hexyl-3-methyl-	-	-	1.13	0	0
Cyclooctane, tetradecyl-	-	-	-	-	-
1,3-Dimethyl-(3,7-dimethyloctyl), cyclohexane	-	1.86	-	-	-
Heptadecane, 3-methyl-	-	-	-	-	-
Nonadecane	-	-	0.41	-	1.69
Eicosane	-	0.61	1.08	-	0.47
Heneicosane	-	0.21	0.25	-	-
Docosane	-	-	0.69	-	-
Tricosane	-	-	0.25	-	-
Total	7.19	36.75	52.08	51.68	84.61

Alkenes	Yield (wt %)				
	350 °C	380 °C	400 °C	350* °C	400* °C
2-Heptene, (E)-	-	0.25	0.33	-	-
2-Octene, (E)-	-	0.2	0.27	-	-
trans--4-Nonene	-	-	0.22	-	-
4-Nonene	-	-	0.37	-	-
(Z)-5-Decene	-	-	0.4	-	-
2-Decene, (E)-	-	0.19	0.23	-	-
4-Undecene, (E)-	-	0.2	0.53	-	-
2-Undecene, (E)-	-	0.24	-	-	-
3-Dodecene, (Z)-	-	0.16	-	-	-
5-Tetradecene, (E)-	-	0.16	-	-	-
1-Hexadecene	-	2.1	-	-	-
8-Heptadecene	-	1.57	-	0.94	1.13
5-Octadecene, (E)-	0.13	-	-	1.27	0.57
9-Octadecene, (E)-	-	-	-	3.67	-
9-Eicosene, (E)-	1.77	5.04	-	-	-
9-Eicosene, (E)-	5.44	-	-	-	-
5-Eicosene, (E)-	1.68	-	-	-	-
9-Eicosene, (E)-	0.81	-	-	-	-
5-Heptadecene, 1-methyl	0.29	-	-	-	-
Cyclohexene, 1-decyl-	0.22	-	-	-	-
Total	10.32	10.13	2.35	3.57	1.69

Aromatics	Yield (wt %)				
	350 °C	380 °C	400 °C	350* °C	400* °C
Toluene	-	-	0.12	-	-
1-Phenyl-1-butene	-	-	0.12	-	-

Benzene, hexyl-	-	-	0.17	-	-
Benzene, heptyl-	-	-	0.31	-	-
Benzene, (1-methyldecyl)-	0.12	0.13	0.2	3.41	3.07
Benzene, undecyl-	-	0.05	0.21	0.4	2.07
Benzene, (1,1-dimethylnonyl)-	-	-	-	1	1.06
Total	0.12	0.18	1.13	4.81	6.2

Oxygenates	Yield (wt %)				
	350 °C	380 °C	400 °C	350* °C	400* °C
2-Ethyl-oxetane	-	0.18	0.39	-	-
Octanoic acid	-	0.25	-	-	-
Nonanoic acid	0.12	0.39	-	-	-
n-Decanoic acid	0.13	0.36	-	-	-
Undecanoic acid	-	0.27	-	-	-
Acetic acid n-octadecyl ester	0.36	1.36	1.78	-	-
n-Nonadecanol-1	0.73	0	2.38	-	-
(3-Methylphenyl) methanol, 2-methylpropyl ether	-	0.35	-	-	-
Carbonic acid, decyl undecyl ester	0.13	0.54	1.17	-	-
Carbonic acid, octadecyl propyl ester	0.38	-	-	-	-
Oxalic acid, butyl 1-menthyl ester	0.12	0.58	-	-	-
n-Heptadecanol-1	-	1.59	-	-	-
Oxalic acid, cyclohexylmethyl octyl ester	0.18	0.21	-	-	-
Oxalic acid, cyclohexylmethyl nonyl ester	0.13	-	-	-	-
n-Pentadecanol	0.25	-	-	-	-
(3-Methylphenyl) methanol, 2-methylpropyl ether	0.2	-	-	-	-
Pentadecanoic acid	0.3	-	-	-	-
2-n-Heptylcyclopentanone	0.14	0.26	-	-	-
Phenol, 4-undecyl-	-	0.31	-	-	-
Octadecanoic acid	1.46	0.33	-	-	-
2(3H)-Furanone, dihydro-5-tetradecyl-	0.46	0.23	-	0.61	-
Total	6.93	7.06	7.33	0.61	-



Figure S12: Appearance of oil/wax products obtained by varying 5 wt% Pt/C catalyst/HRSO mass ratios at 400 °C for 1 h reaction time

Table S12: List of compounds in the oil products oil/wax products obtained using different 5 wt% Pt/C catalyst/feed mass ratios (C/F)

Alkanes	Yield (wt %)			
	C/F = 0	C/F = 0.05	C/F = 0.1	C/F = 0.2
Heptane	1.65	-	-	-
Octane	2.73	-	-	-
Nonane	3.27	0.57	0.14	-
Octane, 2,4,6-trimethyl-	3.07	0.81	-	-
Decane	-	-	0.33	-
Undecane	-	1.08	0.50	0.30
Cycloheptane, methyl-	0.23	-	-	-
Octane, 2,4,6-trimethyl-	2.71	-	-	-
Cyclopentane, hexyl-	0.22	-	-	-
Dodecane	3.00	1.44	0.66	0.57
Cyclohexane, octyl-	0.26	-	-	-
Cyclopentane, 1-butyl-2-propyl-	0.22	-	-	-
Tridecane	1.63	1.04	0.60	0.73
Cyclopentane, 1-hexyl-3-methyl-	0.61	-	-	-
Tetradecane	1.29	0.93	0.62	0.86
Pentadecane	6.32	4.75	4.00	5.86
Dodecane, 2-cyclohexyl-	0.40	-	-	-
Pentadecane, 7-methyl-	-	0.37	0.46	-
Cyclohexane, undecyl-	0.49	0.58	-	-
Hexadecane	1.13	1.05	0.76	1.19
Cyclohexane, 1,5-diethyl-2,3-dimethyl-	-	0.18	-	-
Cyclopentane, 1-pentyl-2-propyl-	1.05	0.57	-	0.85
2,6,10-Trimethyltridecane	-	-	-	1.73
Decane, 2,5-dimethyl-	-	-	-	0.65
Tetradecane, 5-methyl-	-	-	-	0.54
Cyclohexane, 1,5-diethyl-2,3-dimethyl-	0.66	-	-	-
Cyclopentane, decyl-	0.27	0.39	-	-
Heptane, 3-ethyl-2-methyl-	-	-	0.12	-
Tetradecane, 2,6,10-trimethyl-	-	-	0.11	-
Tetradecane, 4-methyl-	-	-	-	0.66
Hexadecane, 2-methyl-	-	-	-	2.11
Tetradecane, 3-methyl-	-	-	-	1.40
Cyclopentane, 1-butyl-2-pentyl-	0.84	-	-	-
Heptadecane	12.64	36.62	42.31	63.49
Cyclopentane, 1-hexyl-3-methyl-	1.13	-	0.27	-
Octadecane	-	0.36	0.30	1.53
1-Cyclopentyleicosane	1.13	-	-	-
Cyclohexane, undecyl-	2.44	-	-	-
Nonadecane	0.41	1.34	1.34	1.69

Eicosane	1.08	0.20	0.47	0.47
Heneicosane	0.25	0.60	0.38	-
Docosane	0.69	0.19	0.36	-
Tricosane	0.25	0.19	5.09	-
Total	52.08	53.29	58.81	84.61

Alkenes	Yield (wt %)			
	0.00	0.05	0.10	0.20
2-Heptene, (E)-	0.33	-	-	-
2-Octene, (E)-	0.27	-	-	-
trans--4-Nonene	0.22	-	-	-
4-Nonene	0.37	-	-	-
(Z)-5-Decene	0.40	-	-	-
2-Decene, (E)-	0.23	-	-	-
4-Undecene, (E)-	0.53	-	-	-
3-Hexadecene, (Z)-	-	0.53	-	-
8-Heptadecene	-	1.13	0.47	1.13
3-Heptadecene, (Z)-	-	-	0.56	-
5-Octadecene, (E)-	-	-	-	0.57
9-Eicosene, (E)-	-	-	1.24	-
5-Eicosene, (E)-	-	-	1.09	-
Total	2.35	1.66	3.37	1.69

Aromatics	Yield, wt %			
	0.00	0.05	0.10	0.20
Toluene	0.12	-	-	-
1-Phenyl-1-butene	0.12	-	-	-
Benzene, hexyl-	0.17	-	-	-
Benzene, heptyl-	0.31	-	-	-
Benzene, (1-methyldecyl)-	0.20	-	-	-
Benzene, undecyl-	0.21	-	-	-
Benzene, 1-ethyl-2-methyl-	-	0.09	-	-
Benzene, 1-methyl-2-propyl-	-	0.12	0.06	-
Benzene, 1-methyl-4-butyl	-	0.11	0.07	-
Benzene, (1,3-dimethylbutyl)-	-	0.11	0.17	-
1-Methyl-2-n-hexylbenzene	-	0.14	0.08	-
Benzene, (1-methylheptyl)-	-	0.11	0.08	-
Benzene, nonyl-	-	0.10	-	-
Benzene, (1-methyldecyl)-	-	4.37	4.62	4.90
Benzene, (1,1-dimethylnonyl)-	-	0.90	0.90	0.83
Benzene, undecyl-	-	0.57	0.47	0.47
Benzene, 1,4-dimethyl-2-(2-methylpropyl)-	-	0.12	0.11	-
Benzene, (1-methylundecyl)-	-	-	0.09	-
Benzene, (2,3-dimethyldecyl)-	-	-	0.06	-
Benzene, dodecyl-	-	0.15	-	-
Benzene, (1-methyldodecyl)-	-	0.10	-	-
Total	1.13	7.21	6.69	6.20

Oxygenated compounds	Yield, wt %			
	0.00	0.05	0.10	0.2
2-Ethyl-oxetane	0.39	-	-	-
1-Decanol, 2-octyl-	1.78	-	0.56	-
n-Nonadecanol-1	2.38	-	-	-
(3-Methylphenyl) methanol, 2-methylpropyl ether	0.35	-	-	-
1,3-Dimethyl-(3,7-dimethyloctyl)cyclohexane	0.99	-	-	-
1,3-Dimethyl-(3,7-dimethyloctyl)cyclohexane	0.87	-	-	-
Carbonic acid, decyl undecyl ester	0.57	-	-	-
8-Octadecanone	-	-	0.33	-
(3-Methylphenyl) methanol, 2-methylpropyl ether	-	0.21	-	-
Androstane-3,17-diol, 17-methyl-, (3.alpha.,5.alpha.,17.beta.)-, 3-acetate	-	0.75	1.04	-
1-Hexadecanol	-	0.80	-	-
9-Octadecanone	-	0.20	-	-
Coprostane	-	1.56	-	-
5.alpha.-Cholestane	-	3.43	-	-
10-Nonadecanone	-	0.26	-	-
1-Heptacosanol	-	-	4.22	-
Total	4.89	7.19	6.15	-

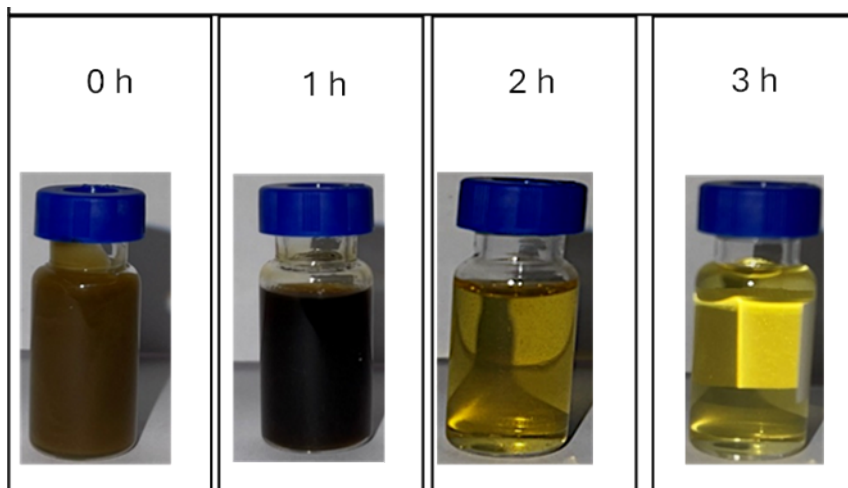


Figure S13: Appearance of oil/wax products obtained by varying reaction times at 400 °C at fixed 5 wt% Pt/C catalyst/HRSO mass ratio of 0.2

Table S13: List of compounds in oil/wax products obtained by varying reaction times at 400 °C at fixed 5 wt% Pt/C catalyst/HRSO mass ratio Of 0.2

Alkanes	Yield (wt%)			
	0 h	1 h	2 h	3 h
Hexane, 2-methyl-	-	-	-	0.22
Heptane	-	-	1.22	1.26
Octane	-	-	1.27	1.36
Nonane	-	-	1.30	1.39
Decane	-	-	1.30	1.39
Undecane	-	0.30	1.35	1.41
Dodecane	-	0.57	1.39	1.42
Tridecane	-	0.73	1.42	1.42
Tetradecane	-	0.86	1.45	1.45
Tetradecane, 2-methyl-	-	-	-	0.28
Pentadecane	1.40	5.86	6.52	6.24
Cyclohexadecane	1.38	-	-	-
Hexadecane	-	1.19	1.43	1.48
2,6,10-Trimethyltridecane	-	1.73	2.07	2.75
Decane, 2,5-dimethyl-	-	0.65	0.75	0.95
Tetradecane, 4-methyl-	-	0.54	0.72	1.17
Tetradecane, 5-methyl-	-	0.66	0.86	-
Hexadecane, 2-methyl-	-	2.11	2.84	3.27
Tetradecane, 3-methyl-	-	1.40	1.76	2.17
Heptadecane	4.90	63.49	60.63	56.25
Cyclopentane, 1-pentyl-2-propyl-	-	0.85	-	-
Cyclopentane, decyl-	-	-	0.26	-
Octadecane	-	1.53	1.81	1.60
Nonadecane	0.76	1.69	1.54	1.49
Eicosane	-	0.47	0.41	0.38
Total	8.44	84.61	92.36	93.09

Alkenes	Yield, wt%			
	0 h	1 h	2 h	3 h
8-Heptadecene	-	1.13	-	-
9-Octadecene, (E)-	1.81	-	-	-
5-Octadecene, (E)-	0.75	0.56	-	-
5-Eicosene, (E)-	0.41	-	-	-
Total	2.97	1.69	-	-

Aromatics	Yield (wt%)			
	0 h	1 h	2 h	3 h
o-Xylene	-	-	-	0.15
Benzene, 1-ethyl-3-methyl-	-	-	-	0.21
Benzene, 1-methyl-2-propyl-	-	-	-	0.16

Benzene, (1-methyldecyl)-	4.41	4.90	4.27	2.85
Benzene, undecyl-	0.51	0.47	0.48	0.44
Benzene, 1,3-didecyl-	2.16	-	-	-
Benzene, (1,1-dimethylnonyl)-	0.96	0.83	0.82	0.76
Total	1.17	6.20	5.57	5.76

Oxygenated compounds	Yield (wt%)			
	0 h	1 h	2 h	3 h
cis-7-Hexadecenoic acid	0.56	-	-	-
Octadecanoic acid	0.76	-	-	-
2(3H)-Furanone, dihydro-5-tetradecyl-	0.67	-	-	-
Total	1.99	-	-	-

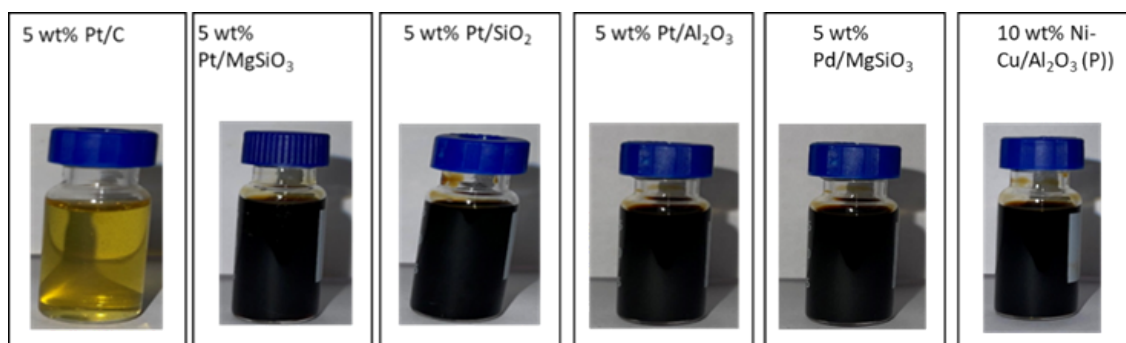


Figure S14: Appearance of oil products obtained from using different catalysts at 400 °C and catalyst/HRSO mass ratio of 0.2

Table S14: List of compounds in oil products obtained from using different catalysts at 400 °C and catalyst/HRSO mass ratio of 0.2

Alkanes	Pt/C	Pt/MgSiO ₃	Pt/SiO ₂	Pt/Al ₂ O ₃	Pd/MgSiO ₃	NiCu/Al ₂ O ₃
Heptane	1.22	1.90	2.18	1.99	0.22	2.45
Octane	1.27	2.11	2.34	2.10	0.78	2.69
Nonane	1.30	2.15	2.24	2.12	1.18	2.60
Decane	1.30	2.19	2.34	2.25	1.46	2.81
Undecane	1.35	2.42	2.59	2.51	1.78	3.10
Dodecane	1.39	2.67	3.17	3.00	2.18	3.44
Tridecane	1.42	2.11	2.22	2.28	1.84	2.57
Tetradecane	1.45	1.70	1.62	1.96	1.28	1.94
Pentadecane	6.52	7.73	7.46	7.83	5.86	7.54
Hexadecane	1.43	2.02	1.59	1.92	1.47	1.72
Pentadecane, 7-methyl-	-	4.29	0.61	1.62	2.14	0.91
Cyclohexane, 1,5-diethyl-2,3-dimethyl-	-	-	0.42	-	-	-
Cyclopentane, 1-pentyl-2-propyl-	-	-	0.69	0.51	0.35	0.60
Cyclodecane, octyl-	-	-	3.04	-	-	2.02
Cyclohexane, 1,2-dimethyl-3-pentyl-4-propyl-	-	-	1.50	-	-	-
Tetradecane, 5-methyl-	0.72	1.31	-	0.48	0.65	-
Tetradecane, 4-methyl-	0.86	1.06	-	-	0.53	-
Hexadecane, 2-methyl-	2.84	1.28	-	-	-	-
Tetradecane, 3-methyl-	1.76	1.54	-	-	-	-
Cyclohexadecane	-	0.74	-	-	-	1.05
2,6,10-Trimethyltridecane	2.07	-	-	-	-	-
Decane, 2,5-dimethyl-	0.75	-	-	-	-	-
Undecane, 6-methyl-	-	1.33	-	0.50	0.70	-
Dodecane, 4-methyl-	-	-	-	0.55	-	-
1,3-Dimethyl-(3,7-dimethyloctyl)cyclohexane	-	-	-	-	-	1.64
Heptadecane	60.6	55.49	40.56	56.72	20.21	22.97
Cyclopentane, decyl-	0.26	-	0.63	0.46	0.58	-
Cyclopentane, undecyl-	-	-	-	-	-	1.71
Cyclohexane, undecyl-	-	-	0.90	-	0.54	2.14
10-Methylnonadecane	-	-	-	-	-	0.51
Cyclopentane, 1-pentyl-2-propyl-	-	-	1.13	-	-	-
Octadecane	1.81	1.44	0.93	0.89	0.83	0.51
Nonadecane	1.54	2.19	1.38	1.85	1.28	1.35
Eicosane	0.41	0.65	0.51	0.64	0.48	0.55
Total	92.3	98.32	80.04	92.18	46.3	66.82

Alkenes

1-Hexene	-	-	-	-	-	-
2-Heptene	-	-	-	-	-	0.44
9-Octadecene, (E)-	-	-	-	1.63	-	-
5-Octadecene, (E)-	-	-	-	-	0.94	-
5-Eicosene, (E)-	-	-	-	-	-	-
Total	-	-	-	1.63	0.94	0.44

Aromatics

Toluene	-	-	-	-	-	0.15
Benzene, (1-methyldecyl)-	1.28	0.63	0.95	1.23	-	0.17
Benzene, (1,1-dimethylnonyl)-	1.81	-	-	1.37	-	-
Benzene, undecyl-	1.48	0.36	0.53	0.60	0.14	0.19
Benzene, dodecyl-	-	0.68	0.82	-	0.28	-
Benzene, 1,4-dimethyl-2-(2-methylpropyl)-	-	-	-	-	-	-
Benzene, (2-methyl-1-propenyl)-	-	-	-	-	-	-
Total	5.57	1.67	2.3	3.20	0.42	0.51

Oxygenates

1-Decanol, 2-hexyl-	-	-	-	3.00	1.16	1.50
1-Hexadecanol	-	-	-	-	-	-
Total	-	-	-	3.00	1.16	1.50