

Table S1 Compounds identified in light oil derived from NM and DA at different temperature.

NO.	Retention time(min)	Compounds	Peak area (%)					
			NM-260	NM-300	NM-340	DA-260	DA-300	DA-340
1	2.27	2-Butanone	-	5.52	-	1.48	0.63	-
2	2.27	5,9-Dodecadien-2-one, 6,10-dimethyl-	-	-	-	-	-	2.81
3	2.82	Pentanal, 2-methyl-	2.17	-	-	-	-	-
4	2.82	Carbonic acid, hexyl prop-1-en-2-yl ester	-	-	-	0.38	-	-
5	2.82	Methyl Isobutyl Ketone	-	-	3.43	-	-	1.16
6	2.84	2-Pentanone	-	-	-	-	-	0.94
7	2.91	Butanal, 2-methyl-	-	4.01	-	1.09	-	-
8	2.92	1-Methyl-1-silacyclobutane	-	-	-	-	-	0.25
9	2.92	Pentanal, 2,4-dimethyl-	-	-	-	-	0.39	-
10	4.04	1H-Pyrrole, 1-methyl-	-	2.39	-	-	-	-
11	4.37	Pyridine	-	2.34	-	-	-	0.29
12	5.18	Cyclopentanone	5.12	8.37	-	0.94	1.56	2.50
13	5.89	Pyridine, 2-methyl-	-	-	-	-	-	0.67
14	6.15	Pyrazine, methyl-	-	2.78	-	0.35	0.64	2.01
15	6.47	Cyclopentanone, 2-methyl-	1.94	3.38	-	0.28	0.52	1.62
16	6.69	(R)-(+)-3-Methylcyclopentanone	-	-	-	-	-	0.64
17	6.71	Cyclopentanone, 3-methyl-	-	1.75	-	-	-	-
18	8.01	Cyclohexanone	-	2.35	-	-	0.45	0.85
19	8.36	2-Cyclopenten-1-one, 2-methyl-	11.79	13.06	-	4.41	5.69	5.52
20	8.65	Pyrazine, 2,5-dimethyl-	-	-	-	0.74	-	-
21	8.67	1,4-Benzenediamine	-	-	-	-	-	1.79
22	8.68	Pyrazine, 2,6-dimethyl-	0.95	4.35	-	-	0.86	1.31
23	8.71	Pyrimidine, 4,6-dimethyl-	-	-	-	1.59	0.47	-
24	8.80	2-Methyl-1-vinylimidazole	-	3.79	-	-	-	-
25	9.58	1-Methylcycloheptene	-	-	-	-	-	0.15
26	10.38	2-Cyclopenten-1-one, 3-methyl-	-	3.00	-	-	0.99	2.44
27	10.73	3-Pentenoic acid, 4-methyl-	-	-	-	-	0.37	-
28	11.08	2-Cyclopenten-1-one, 3,4-dimethyl-	-	1.66	-	-	-	0.94
29	11.17	6-Methyl-3-heptyne	-	4.17	-	-	-	-
30	11.18	4-Aminopyridine	-	-	-	-	1.26	1.31
31	11.21	2-Cyclopenten-1-one, 2,3-dimethyl-	11.82	14.14	-	0.33	2.73	3.39
32	11.25	Phenol	-	-	-	-	1.06	1.54
33	11.26	Pyrazine, 2-ethyl-6-methyl-	-	1.99	-	-	-	1.08
34	11.41	1,3-Benzenediamine, 2-methyl-	-	-	-	-	1.74	-
35	11.47	1,2-Benzenediamine, 4-methyl-	-	-	-	0.55	-	1.41
36	11.56	3-Amino-1,2,4-triazole-5-carboxylic acid	3.88	-	-	-	-	-
37	12.02	Cyclopentene, 1-(1-methylethyl)-	-	2.98	-	-	-	-
38	12.54	2-Pyrrolidinone, 1-methyl-	-	-	-	-	-	5.27
39	13.10	2-Cyclopenten-1-one, 3,4,5-trimethyl-	-	-	-	-	-	0.67
40	13.17	Ethanone, 1-(2-methyl-1-cyclopenten-1-yl)-	-	3.02	-	-	-	-
41	13.69	2-Cyclopenten-1-one, 3-ethyl-	-	-	-	-	-	1.14

42	13.98	Ethanone, 1-(1-cyclohexen-1-yl)-	-	-	-	-	-	2.02
43	14.00	2-Cyclopenten-1-one, 2,3,4-trimethyl-	-	-	-	-	0.57	-
44	14.02	Phenol, 2-methoxy-	-	5.20	-	-	-	-
45	14.04	p-Cresol	-	-	-	-	-	1.36
46	14.07	3-Heptyne, 2,2-dimethyl-	-	-	-	-	0.08	-
47	14.15	Allyldiethylamine	-	-	-	-	-	0.84
48	14.20	3-Penten-2-one, 4-(methylamino)-	-	-	-	-	-	2.18
49	14.26	Isobutyl ethylphosphonofluoridate	-	-	-	-	0.75	-
50	14.32	2,5-Pyrrolidinedione, 1-methyl-	-	-	-	-	0.68	-
51	14.36	Cyclopentene, 3-methyl-1-(1-methylethyl)-	-	0.07	-	-	-	1.12
52	14.40	Caprolactam	-	-	-	0.27	-	-
53	14.49	1-Ethyl-2-pyrrolidinone	-	-	-	-	-	4.39
54	14.63	3-Quinuclidinol	-	-	-	-	-	4.36
55	14.66	Pyrazole, 1-methyl-4-nitro-	-	-	-	-	2.52	-
56	14.71	1H-Imidazole, 1-methyl-4-nitro-	-	-	-	0.98	-	-
57	15.00	Cycloheptylamine	-	-	-	-	-	1.69
58	15.01	4-Methylcyclohexylamine	-	-	-	-	0.76	-
59	15.21	Pyrazine, 2-methoxy-3-methyl-	-	-	-	-	-	1.58
60	15.24	3-Octyne, 2-methyl-	-	-	-	-	1.04	-
61	15.29	4,6-Dimethyl-2-pyrimidone	-	3.32	-	-	-	-
62	15.49	2,5-Pyrrolidinedione, 1-ethyl-	-	-	-	-	1.67	1.31
63	15.80	Dexrazoxane	-	-	-	-	1.42	1.22
64	15.84	Imidazole, 1,4-dimethyl-2-nitro-	-	-	-	0.49	-	-
65	15.88	3-Penten-2-one, 4-(dimethylamino)-	-	-	-	-	-	0.66
66	16.01	Heptane, 4-methylene-	-	-	-	-	-	0.50
67	16.02	Cyclooctanamine	-	-	-	-	0.56	-
68	16.18	(E)-3-(Dimethylamino)-2-pentene	-	-	-	-	-	1.15
69	16.74	Cyclopentanone, 2,2-dimethyl-	-	-	-	-	-	0.48
70	16.77	1-Heptene, 2,6-dimethyl-	-	-	-	-	0.65	-
71	16.97	1,3-Diazatricyclo[3.3.1.1]decane	-	-	-	-	-	0.75
72	17.18	4-Pyranone, 2,3-dihydro-	-	-	-	-	-	1.17
73	17.32	3,4-Methylpropylsuccinimide	-	-	-	-	-	1.66
74	17.36	.alpha.-Methyl-.alpha.-propylsuccinimide	-	-	-	-	0.87	-
75	17.45	1-Propylpiperidine	-	-	-	-	-	0.44
76	17.53	4-Amino-2,6-dihydroxypyrimidine	-	-	-	-	-	1.67
77	17.54	Propylphosphonic acid, fluoroanhydride, 2-ethylhexyl ester	-	-	-	-	2.27	-
78	17.60	Pyrrolidine, 1-(1-oxopropyl)-	-	-	-	0.64	-	-
79	18.56	3-Piperidinone, 1-ethyl-6-methyl-	-	-	-	-	0.71	3.41
80	19.23	3-Amino-5-tert-butylpyrazole	-	-	-	-	-	0.66
81	19.28	Oxazole, 2,5-diethyl-4-methyl-	-	-	-	-	0.60	-
82	19.46	N-[2-Hydroxyethyl]succinimide	-	-	-	0.68	2.01	2.21
83	19.75	Tetrapropylammonium bromide	-	-	-	-	-	0.51
84	19.76	Piperazine, 1,4-dimethyl-	-	-	-	-	0.49	-

85	20.52	Benzenamine, 3,5-dimethoxy-	-	-	-	-	-	-	0.58
86	21.05	Resorcinol, 2TMS derivative	-	-	-	-	0.08	-	1.24
87	21.44	2-Pyrrolidinemethanamine, 1-ethyl-	-	-	-	-	-	-	5.54
88	21.51	Piperidine, 1-methyl-	-	-	-	-	1.30	-	-
89	21.60	2-Propanone, 1-(1-methyl-2-piperidinyl)-	-	3.02	-	-	-	-	-
90	22.36	Benzoxazole, 2-[2-(4-morpholyl)ethyl]thio-	-	-	-	-	-	-	0.98
91	22.38	2,5-Pyrrolidinedione, 1-butyl-	-	-	-	-	1.32	-	-
92	22.41	1-Piperidinecarboxaldehyde	-	-	-	0.42	-	-	-
93	22.54	O-Ethyl S-2-diisopropylaminoethyl ethylphosphonothiolate	-	-	-	-	-	-	1.00
94	22.57	Propyl S-2-(dipropylamino)ethyl propylphosphonothiolate	-	-	-	0.58	-	-	-
95	30.93	2-Methyl-3-(methylthio) furan	-	-	-	0.52	-	-	-
96	30.97	3,3-Diacetyl-2,3,4,5-tetrahydro-2-oxofuran	-	-	-	0.30	-	-	-
97	31.13	4'-Methyl- $\alpha$ -pyrrolidinopropiophenone	-	-	-	-	-	-	1.53
98	31.17	Butylamine, 3-methyl-1-[5-tetrazolyl]-	-	-	-	-	0.67	-	-
99	31.37	1-Phenethyl-pyrrolidin-2,4-dione	-	-	-	-	0.62	-	-
100	32.59	L-Proline, N-valeryl-, decyl ester	-	-	-	1.78	-	-	-
101	32.59	l-Proline, N-allyloxycarbonyl-, hexyl ester	-	-	-	-	1.62	-	-
102	32.63	1,2-Cyclopentanedione, 3,3,5,5-tetramethyl-	-	-	-	-	-	-	0.59
103	32.80	l-Norvaine, N-allyloxycarbonyl-, decyl ester	-	-	-	-	-	-	1.22
104	32.83	2H-imidazole-2-thione, 1,3-dihydro-4-(2-methylpropyl)-	11.18	-	-	8.53	-	-	-
105	32.89	Hydantoin, 1-butyl-	-	-	-	-	7.41	-	-
106	32.90	3,6-Diisopropylpiperazin-2,5-dione	-	-	13.63	3.77	0.62	-	-
107	33.19	Diethyltrisulphide	-	-	-	18.12	7.06	-	3.02
108	33.22	5-Chloro-2,3-dihydro-1-benzofuran	8.86	-	-	-	-	-	-
109	33.30	Phenol, 3,5-dimethoxy-	-	-	16.84	0.80	-	-	1.38
110	33.88	Benzene, 1,3,5-trimethoxy-	-	-	-	-	0.77	-	0.36
111	34.53	4,4-Dimethyl-2,5-dioxo-1-vinylimidazolidine	-	-	-	-	0.88	-	-
112	34.73	l-Proline, N-butoxycarbonyl-, isohexyl ester	-	-	-	-	-	-	0.71
113	34.76	d-Proline, N-isobutoxycarbonyl-, butyl ester	8.19	-	-	-	-	-	-
114	34.80	l-Proline, N-isobutoxycarbonyl-, tridecyl ester	-	-	-	-	4.06	-	-
115	34.81	2H-Naphtho[1,8-bc]furan-2-one	-	-	12.28	-	-	-	-
116	34.82	l-Proline, N-isobutoxycarbonyl-, nonyl ester	-	-	-	3.57	-	-	-
117	34.93	l-Leucine, N-cyclopropylcarbonyl-, heptadecyl ester	3.12	-	-	-	0.73	-	-
118	35.09	6,6-Dimethyl-cyclohex-2-en-1-ol	-	-	-	-	-	-	1.52
119	35.13	5-Isopropylidene-3,3-dimethyl-dihydrofuran-2-one	11.60	-	26.65	-	-	-	-
120	35.20	2-Hydroxy-3,5,5-trimethyl-cyclohex-2-enone	-	-	12.76	-	-	-	-
121	35.20	Pyrrolo[1,2-a]pyrazine-1,4-dione, hexahydro-3-(2-methylpropyl)-	10.86	-	14.42	10.41	15.18	-	-
122	35.20	5,10-Diethoxy-2,3,7,8-tetrahydro-1H,6H-	-	1.22	-	3.95	-	-	0.83

123	35.21	dipyrrolo[1,2-a:1',2'-d]pyrazine (2S,6R)-2,6-Dibutyl-4-methylpiperidine	-	-	-	4.94	5.04	-
124	38.64	2,5-Piperazinedione, 3-methyl-6-(phenylmethyl)-	-	-	-	1.31	-	-
125	40.40	2,5-Piperazinedione, 3-benzyl-6-isopropyl-	-	-	-	9.29	5.29	-
126	40.60	3,6-Dibutyl-1,2-dihydro-1,2,4,5-tetrazine	-	-	-	0.78	-	-
127	42.04	2,5-Piperazinedione, 3-(phenylmethyl)-	-	-	-	5.23	-	-
128	42.30	Pyrrolo[1,2-a]pyrazine-1,4-dione, hexahydro-3-(phenylmethyl)-	4.05	-	-	5.96	5.22	0.45
129	42.44	Cyclo-(1-leucyl-1-phenylalanyl)	-	-	-	2.54	0.94	-
130	42.59	2,5-Piperazinedione, 3-(hydroxymethyl)-6-(phenylmethyl)-	-	-	-	1.01	2.26	-
131	42.73	2,4-Difluorobenzoic acid, 3,5-difluophenyl ester	-	-	-	0.98	-	-

Table S2 Compounds identified in heavy oil derived from DA at different temperature.

NO.	Retention time(min)	Compounds	Peak area (%)		
			DA-260	DA-300	DA-340
1	4.27	4-Penten-2-one, 4-methyl-	0.80	-	-
2	5.31	3-Penten-2-one, 4-methyl-	3.77	1.07	-
3	6.44	2-Pentanone, 4-hydroxy-4-methyl-	3.00	1.47	3.12
4	7.33	Piperazine, 1-methyl-	0.76	-	-
5	13.63	4H-1,2,4-Triazol-3-amine, 4-propyl-	0.51	-	-
6	14.90	4-Piperidinone, 2,2,6,6-tetramethyl-	2.26	1.12	1.01
7	19.98	1-Tridecene	0.44	0.41	0.47
13	20.40	2-Butenal, 3-methyl-, dimethylhydrazone	0.37	-	-
8	21.51	Piperidine, 1-methyl-	-	-	1.84
9	22.54	Piperazine, 1,4-dimethyl-	-	-	0.86
12	22.55	2,3,4-Trimethyl-isoxazol-5(2H)-one	-	0.75	-
10	22.71	Indole, 3-methyl-	-	-	0.32
11	25.07	Benzonitrile, 2,4,6-trimethyl-	-	-	0.80
14	25.21	1-Pentadecene	1.00	2.98	2.44
15	25.29	1H-Indole, 2,3-dimethyl-	-	-	0.89
16	26.74	Tridecane, 7-methylene-	-	-	1.67
20	26.74	Cetene	-	1.14	-
21	26.74	Cyclododecane	0.27	-	-
17	26.82	Ethanone, 1-(1H-indol-3-yl)-	-	-	1.57
22	26.83	1H-Indole, 5,6,7-trimethyl-	-	1.41	-
18	26.91	3H-Indole, 2,3,3-trimethyl-	-	-	0.99
23	27.27	2-Oxopiperidine-3-carboxylic acid, methyl ester	-	0.69	-
19	27.27	1,2-Dithiepane	-	-	0.33
24	28.96	2-Methyl-3-(methylthio) furan	0.67	-	-
25	29.11	2,3-Dimethyl-1H-imidazo(1,2-a)pyrrolo(3,2-e)pyridine	-	0.60	2.03

27	29.12	2(1H)-Pyridinone, 1-(2-methylphenyl)-	0.70	-	-
28	29.18	4-Ethoxy-6-methylhexahydropyrimidin-2-thione	0.72	-	-
26	29.53	2-Thiaadamantan-4-ol	-	-	1.00
29	29.89	E-14-Hexadecenal	0.71	1.98	2.68
30	30.05	Heptadecane	0.86	1.36	1.73
31	30.64	cis-2-Nonene	-	1.80	-
36	30.64	Cyclopropane, 1-methyl-2-pentyl-	1.28	-	1.82
45	30.87	Octanoic acid, pyrrolidide	0.80	-	-
32	30.87	Cyclohexane, 2-propyl-1,1,3-trimethyl-	-	1.28	-
37	30.87	Cyclohexane, 1,2,3-trimethyl-	-	-	2.28
38	31.00	Dodecane, 2,6,10-trimethyl-	-	-	1.02
46	31.00	l-Alanine, N-pivaloyl-, methyl ester	1.56	-	-
33	31.01	Tetradecane, 4-methyl-	-	0.93	-
34	31.10	10H-Phenothiazine, 10-methyl-	-	1.12	-
39	31.12	MDPPP	-	-	2.52
40	31.41	Benzene, 4-pentynyl-	-	-	2.39
47	31.42	Tetradecanoic acid	1.40	-	-
35	31.42	5-Hexadecenoic acid, 2-methoxy-, methyl ester	-	1.24	-
41	31.88	Cyclohexadecane, 1,2-diethyl-	-	-	1.98
48	31.88	Cyclodecane	0.69	-	-
42	32.20	2-Tridecanone	-	-	0.54
43	32.57	2-Hexadecene, 2,6,10,14-tetramethyl-	-	-	1.39
44	32.67	Cyclohexane, 1,2,3-trimethyl-, (1.alpha.,2.alpha.,3.beta.)-	-	-	0.48
49	32.80	2-Hexadecene, 3,7,11,15-tetramethyl-	4.31	7.31	7.83
51	32.89	2H-imidazole-2-thione, 1,3-dihydro-4-(2-methylpropyl)-	-	1.36	-
50	32.92	l-Proline, N-propoxycarbonyl-, pentyl ester	2.66	-	-
53	33.24	Benzenemethanol, 3-hydroxy-5-methoxy-	-	0.78	-
52	33.48	Cyclopentanecarboxylic acid, 4-methylene-2-phenyl-, methyl ester, trans-	0.98	-	-
54	33.55	Salvial-4(14)-en-1-one	-	0.73	1.47
58	33.82	(S)-6,6-Dimethyl-2-azaspiro[4.4]non-1-ene	1.46	1.33	-
57	34.12	E-15-Heptadecenal	-	0.66	-
55	34.12	1-Nonadecene	-	-	0.84
56	34.28	5-Imidazoethylamine, N-[4'-hydroxy-3-phenylpropionyl]-	-	-	1.34
59	34.76	Hexadecanoic acid, methyl ester	0.36	-	0.95
62	34.83	l-Proline, N-butoxycarbonyl-, heptyl ester	2.59	1.63	-
63	34.97	2,5-Piperazinedione, 3,6-bis(2-methylpropyl)-	0.88	-	-
64	35.11	Palmitoleic acid	1.87	4.29	-
60	35.18	Z-9-Pentadecenol	-	-	2.17
65	35.19	2-Hydroxy-3,5,5-trimethyl-cyclohex-2-enone	4.67	-	-
61	35.26	1-Dodecanethiol	-	-	1.08
66	35.39	Simazine	-	0.64	-
67	35.55	n-Hexadecanoic acid	17.56	18.38	15.41
68	35.73	Indan, 1-(2-methylpropenyl)-2-thiocyanato-	-	-	0.90

70	35.99	9H-Pyrido[3,4-b]indole, 1-methyl-	-	1.14	-
71	38.16	2(3H)-Furanone, dihydro-5-tetradecyl-	-	0.75	-
69	38.16	6-Octadecenoic acid	-	-	1.18
72	38.44	3-Methyl-2-(3,7,11-trimethyldodecyl)thiophene	0.71	1.15	1.22
73	38.81	Octadec-9-enoic acid	-	1.92	2.93
74	38.81	Oleic Acid	3.64	-	10.87
75	38.92	9-Octadecenoic acid, (E)-	14.19	7.06	-
76	39.01	Bicyclo[8.2.0]dodecan-11-one, 12-chloro-	-	3.93	-
77	39.24	cis-Vaccenic acid	-	2.92	-
78	39.53	Hexadecanamide	3.15	5.52	-
84	40.16	N-Methyldodecanamide	1.26	2.46	-
79	40.16	Myristamide, N-methyl-	1.07	-	1.96
80	40.40	2,5-Piperazinedione, 3-benzyl-6-isopropyl-	1.99	-	-
85	40.88	Myristamide, N-ethyl-	3.72	1.29	-
81	40.88	Octanamide, N,N-dimethyl-	0.66	-	1.18
82	42.03	3,4-Difluoropropiophenone	2.31	-	-
83	42.23	Pyrrrolo[1,2-a]pyrazine-1,4-dione, hexahydro-3-(phenylmethyl)-	0.43	-	-
86	42.43	Cyclo-(1-leucyl-1-phenylalanyl)	1.26	0.94	-
89	42.61	9-Octadecenamide, (Z)-	3.72	4.61	2.72
90	43.05	Octadecanamide	0.29	0.93	4.70
92	43.15	1- $\beta$ -D-Ribofuranosyl-1,2,4-triazole-3(2H)-one	0.19	1.01	-
87	43.21	1,3-Dioxane, 4,5-dimethyl-2-pentadecyl-	-	-	0.72
91	43.21	Dodecanamide, N-butyl-	0.17	1.05	-
88	43.25	N-(1-Cyclopropylethyl)cyclohexanamine, TMS derivative	-	-	0.45
93	43.35	Phenol, 2,2'-methylenebis[6-(1,1-dimethylethyl)-4-methyl-	-	0.97	-
94	44.87	N-(2'-Benzoylphenyl)-2-phenylacetylenecarboxamide	-	0.64	-
98	44.87	Dodecanamide, N-3-methylbutyl-	0.42	-	1.87
99	44.93	Myristamide, N-(3-methylbutyl)-	0.91	-	-
95	44.93	Octanoic acid, morpholide	-	1.51	-
96	46.06	10-Methyl-undecanoic acid, pyrrolidide	-	0.91	-
100	46.07	12-Methyltridecanoic acid, pyrrolidide	0.93	-	-
101	47.57	Butanamide, N-heptyl-N-octyl-	0.57	-	-
97	47.68	3-[1-(4-Cyano-1,2,3,4-tetrahydronaphthyl)]propanenitrile	-	0.80	-
102	47.69	Cyclobutanecarboxamide, N-heptyl-N-octyl-	0.93	-	-
103	48.73	2,5-Piperazinedione, 3,6-bis(phenylmethyl)-	0.36	-	-