

Electronic Supplementary Information for

Catalytic pyrolysis of microalgae for production of aromatics and ammonia

Kaige Wang and Robert C. Brown

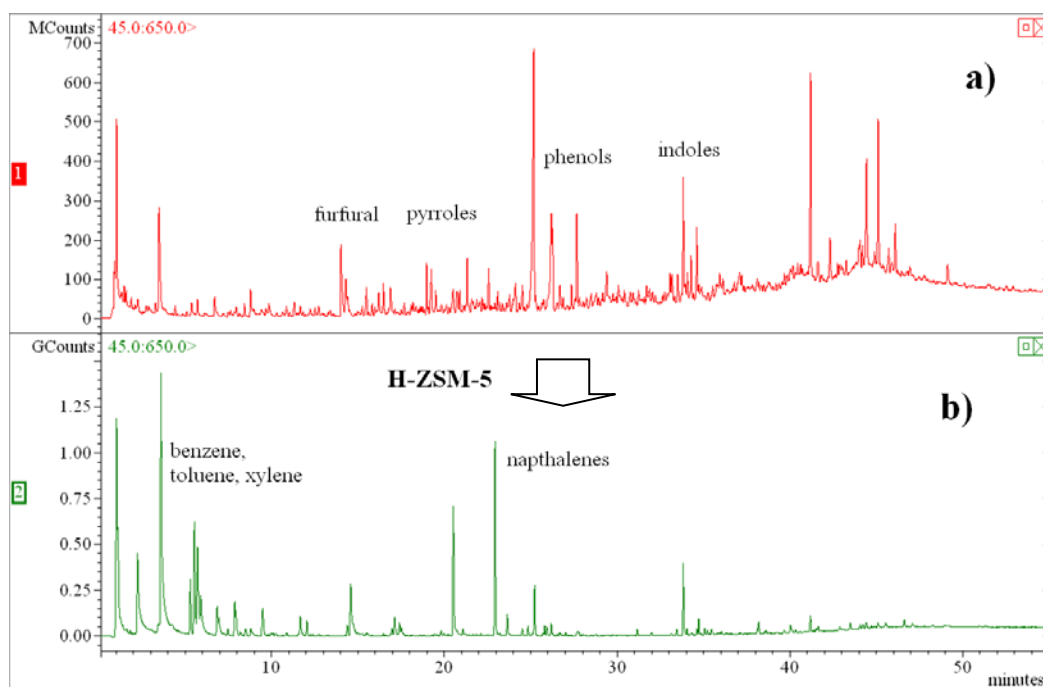


Figure S 1: Gas chromatographs of a) direct pyrolysis of *C.vulgaris* at 700°C and b) catalytic pyrolysis of *C.vulgaris* at 700°C using HZSM-5 and a catalyst-to-biomass ratio of 20.

Pyrolysis products identification

GC/MS chromatograph from direct pyrolysis of *C.vulgaris* was shown in Figure S1a. The major compounds were identified by mass spectra comparison with the NIST library and listed in Table S 1.

Table S 1. Major compounds from pyrolysis of *C. vulgaris* at 700°C

RT/min	Compounds	Formual	Area [*] /%
2.371	2,5-dimethyl-furan	C ₆ H ₈ O	1.39
3.429	propanenitrile	C ₃ H ₅ N	0.54
3.64	toluene	C ₇ H ₈	4.72
5.507	Enthyl-benzene	C ₈ H ₁₀	1.15
6.84	pyridine	C ₅ H ₅ N	0.52
8.549	4-methyl-pentanenitrile	C ₆ H ₁₁ N	0.34
8.9	styrene	C ₈ H ₈	1.05
14.181	acetic acid	C ₂ H ₄ O ₂	1.58
14.374	furfural	C ₅ H ₄ O ₂	1.24
15.597	pyrrole	C ₄ H ₅ N	0.49
16.57	2-methyl-1H-pyrrole	C ₅ H ₇ N	0.64
16.968	3-methyl-1H-pyrrole	C ₅ H ₇ N	0.66
17.018	5-methyl-2-Furancarboxaldehyde	C ₆ H ₆ O ₂	0.35
19.256	2,3,5-trimethyl-1H-Pyrrole	C ₇ H ₁₁ N	0.43
19.33	3,methyl-Pentanoic acid	C ₆ H ₁₂ O ₂	0.68
20.811	4-ethyl-2-methyl-Pyrrole	C ₇ H ₁₁ N	0.48
21.403	acetamide	C ₂ H ₅ NO	1.47
21.958	4-ethyl-2,3-dimethyl-pyrrole	C ₈ H ₁₃ N	0.31
24.611	benzyl nitrile	C ₈ H ₇ N	0.86
25.219	3,7,11,15-tetramethyl-2-hexadecen-1-ol	C ₂₀ H ₄₀ O	7.31
25.738	levoglucosenone	C ₆ H ₆ O ₃	0.72
26.211	3,7,11,15-tetramethyl-2-hexadecen-1-ol	C ₂₀ H ₄₀ O	0.73
26.272	phenol	C ₆ H ₆ O	1.39
26.325	3,7,11,15-tetramethyl-2-hexadecen-1-ol	C ₂₀ H ₄₀ O	1.52
26.778	benzene propanenitrile	C ₉ H ₉ N	0.51
27.746	4-methyl-phenol	C ₇ H ₈ O	2.12
33.146	picolinamide	C ₆ H ₆ N ₂ O	0.78
33.693	3-pyridinol	C ₅ H ₅ NO	0.59
33.922	indole	C ₈ H ₇ N	2.88
34.356	2,5-pyrrolidinedione	C ₄ H ₅ NO ₂	1.18
34.698	4-methyl-1H-indole	C ₉ H ₉ N	1.08
41.226	n-hexadecanoic acid	C ₁₆ H ₃₂ O ₂	5.34
41.648	Z-11.hexadecenoic acid	C ₁₆ H ₃₀ O ₂	1.09
44.452	Cis-vaccenic acid	C ₁₈ H ₃₄ O ₂	5.4
45.141	9,12-octadecadienoic acid (Z,Z)	C ₁₈ H ₃₂ O ₂	5.12
46.137	9,12,15-octadecatrienoic acid (Z,Z,Z)	C ₁₈ H ₃₀ O ₂	0.89
47.054	levoglucosan	C ₆ H ₁₀ O ₅	1.29

^{*}Based on peak area of GC chromatograph