

Supplementary Data:

Table S1. Intensity ratios of the carbonyl peak for TOFA and corresponding biodiesel.

Methyl Esters (biodiesel) from treatments	%Transmittance @ 1707–1712 cm ⁻¹	%Transmittance @ 1741 cm ⁻¹	Absorption @ 1707–1712 cm ⁻¹	Intensity Ratio with TOFA Absorption as max.	Absorption @ 1741 cm ⁻¹	Intensity Ratio with 47% Absorption as max.
1	65.2	73.7	34.8	0.6225	26.3	0.5596
2	64.2	72.9	35.8	0.6406	27.1	0.5766
3	64.2	71.8	35.8	0.6404	28.2	0.6000
4	53.5	79.7	46.5	0.8318	20.3	0.4319
5	53.7	79.2	46.3	0.8283	20.8	0.4426
6	52.7	74.9	47.3	0.8462	25.1	0.5340
7	-	58.5	-	0.0000	41.5	0.8830
8	-	56.9	-	0.0000	43.1	0.9170
9	-	58.7	-	0.0000	41.3	0.8787
10	73.5	61.8	26.5	0.4741	38.2	0.8128
11	72.4	62.1	27.6	0.4937	37.9	0.8064
12	72.6	61.6	27.4	0.4902	38.4	0.8170
13	74.9	60.8	25.1	0.4490	39.2	0.8340
14	78.2	59.1	21.8	0.3900	40.9	0.8702
15	76.0	59.7	24.0	0.4293	40.3	0.8574
16	54.1	74.2	45.9	0.8211	25.8	0.5489
17	53.8	73.7	46.2	0.8265	26.3	0.5596
18	53.5	73.7	46.5	0.8318	26.3	0.5596
19	-	53.9	-	0.0000	46.1	0.9809
20	-	53.8	-	0.0000	46.2	0.9830
21	-	53.9	-	0.0000	46.1	0.9809
22	-	53.0	-	0.0000	47.0	1.0000
23	-	53.2	-	0.0000	46.8	0.9957
24	-	53.8	-	0.0000	46.2	0.9830
25	85.7	60.2	14.3	0.2558	39.8	0.8468
26	84.5	61.3	15.5	0.2773	38.7	0.8234
27	86.8	60.2	13.2	0.2361	39.8	0.8468
28	77.0	65.1	23.0	0.4114	34.9	0.7426
29	78.1	64.9	21.9	0.3918	35.1	0.7468
30	78.7	64.2	21.3	0.3810	35.8	0.7617
31	65.1	72.5	34.9	0.6243	27.5	0.5851
32	67.5	70.7	32.5	0.5814	29.3	0.6234
33	67.9	71.9	32.1	0.5742	28.1	0.5979
34	80.2	63.6	19.8	0.3542	36.4	0.7745
35	80.1	63.3	19.9	0.3560	36.7	0.7809
36	81.0	63.3	19.0	0.3399	36.7	0.7809
37	60.1	76.2	39.9	0.7138	23.8	0.5064
38	60.4	76.0	39.6	0.7084	24.0	0.5106

39	59.0	77.0	41.0	0.7335	23.0	0.4894
40	-	57.0	-	0.0000	43.0	0.9149
41	-	56.9	-	0.0000	43.1	0.9170
42	-	56.9	-	0.0000	43.1	0.9170
43	86.5	59.3	13.5	0.2415	40.7	0.8660
44	84.6	60.2	15.4	0.2755	39.8	0.8468
45	83.6	60.6	16.4	0.2934	39.4	0.8383
46	-	56.7	-	0.0000	43.3	0.9213
47	-	56.7	-	0.0000	43.3	0.9213
48	-	57.1	-	0.0000	42.9	0.9128
TOFA	44.1	-	55.9	1.0000	0.0	0.0000

Table S2. Results of heterogeneous catalysis to produce biodiesel.

Expt.#	Oil Wt./g	Ratio	MeOH vol./mL	Cat. Wt./g	Time/h	Yield/g	%Yield	Acid Value
HETBDH1	40	17.5	29.47	2.64	3	31.5272	78.818	29.49
HETBDH2	40	15	25.26	8	2	32.1093	80.2733	21.83
HETBDH3	40	20	33.68	8	4	34.7513	86.8783	12.65
HETBDH4	40	21.7	36.54	6	3	32.7522	81.8805	18.53
HETBDH5	40	17.5	29.47	6	1.3	30.6993	76.7483	30.58
HETBDH6	40	17.5	29.47	6	3	31.5092	78.773	25.34
HETBDH7	40	20	33.68	8	4	34.1966	85.4915	13.59
HETBDH8	40	21.7	36.54	6	3	32.3844	80.961	21.37
HETBDH9	40	15	25.26	4	2	31.9371	79.8428	26.43
HETBDH10	40	17.5	29.47	6	4.7	31.2402	78.1005	28.58
HETBDH11	40	20	33.68	4	2	32.2481	80.6203	24.93
HETBDH12	40	20	33.68	4	2	32.1575	80.3938	25.54
HETBDH13	40	17.5	29.47	6	3	30.867	77.1675	28.08
HETBDH14	40	15	25.26	8	2	30.6238	76.5595	26.05
HETBDH15	40	20	33.68	8	2	31.5881	78.9703	28.83
HETBDH16	40	17.5	29.47	6	3	30.484	76.21	31.53
HETBDH17	40	17.5	29.47	6	1.3	28.6757	71.6893	45.18
HETBDH18	40	20	33.68	8	2	30.509	76.2725	36.76
HETBDH19	40	17.5	29.47	9.36	3	31.1942	77.9855	34.04
HETBDH20	40	15	25.26	8	4	30.9604	77.401	22.03
HETBDH21	40	17.5	29.47	2.64	3	30.6593	76.6483	41.03
HETBDH22	40	15	25.26	4	4	31.4576	78.644	49.94
HETBDH23	40	17.5	29.47	9.36	3	30.5101	76.2753	33.65
HETBDH24	40	15	25.26	8	4	30.3366	75.8415	34.98
HETBDH25	40	20	33.68	4	4	31.2678	78.1695	49.02
HETBDH26	40	15	25.26	4	4	31.7118	79.2795	47.16
HETBDH27	40	13.3	22.4	6	3	30.079	75.1975	44.36
HETBDH28	40	15	25.26	4	2	30.9185	77.2963	33.74
HETBDH29	40	20	33.68	4	4	31.0527	77.6318	51.37
HETBDH30	40	17.5	29.47	6	4.7	30.0747	75.1868	35.84
HETBDH31	40	13.3	22.4	6	3	31.5873	78.9683	44.18
TOFA	40							113.18