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CORRECTION

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Correction: Hydrothermal liquefaction *vs.* fast/flash pyrolysis for biomass-to-biofuel conversion: new insights and comparative review of liquid biofuel yield, composition, and properties

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Correction for 'Hydrothermal liquefaction *vs.* fast/flash pyrolysis for biomass-to-biofuel conversion: new insights and comparative review of liquid biofuel yield, composition, and properties' by Farid Alizad Oghyanous, *et al.*, *Green Chem.*, 2025, **27**, 7009–7041, **https://doi.org/10.1039/D5GC01314C**.

Authors have made three modifications to the published review article to provide better clarity to the discussion.

1. The beginning of the second paragraph in section 2.2.2 Hydrothermal liquefaction, has been modified to clarify the mention of organic solvent, whereby:

"Instead of utilizing the moisture of biomass as the solvent, organic solvents are also investigated in HTL as they play a key role in bio-crude oil yield. The selection of solvent affects both the temperature needed to achieve the maximum bio-crude yield in the HTL process and the overall yield of bio-crude oil." has been modified to "While HTL is conventionally defined as a TP occurring in water or aqueous media, some studies have also explored the use of organic solvents or co-solvents to enhance bio-crude oil yield and alter reaction severity. Reaction media play a critical role in determining product yield and composition; the choice of solvent can influence both the optimal reaction temperature and the resulting bio-crude oil yield.".

2. Tables 1 and 2 have been modified by reporting the maximum liquid biofuel yields on a dry basis (db) whenever both the product and feedstock weights were clearly defined on a dry basis to enable more meaningful comparisons. If a different yield basis was used in the original reference, it is now explicitly indicated in parentheses in the table. Sources where the yield basis was not specified are indicated with footnote *b*.

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Table 1 Biomass elemental composition, ash content, and operational conditions for fast/flash pyrolysis of various biomass for maximizing pyrolysis oil production

Biomass											
Name	C (wt%)	H (wt%)	N (wt%)	O (wt%)	Ash (wt%)	T (°C)	Residence time (s)	Particle size (mm)	Reactor type	Max. pyrolysis oil yield[a] (wt%, (db))	Ref.
Lignocellulosic biomass											
Kraft lignin	—	—	—	—	—	399.85	—	—	Fixed bed	24.30	55[b]
						499.85				30.20	
						599.85				26.00	
Wood chips	—	—	—	—	—	399.85	—	—		57.40	
						499.85				65.40	
						599.85				71.10	
Oat straw	44.11	5.98	0.62	43.65	5.64	500	0.75–2.50	0.25–0.75	Drop tube	51.16	56[b]
						600				28.51	
						700				8.47	
Corn straw	43.12	6.19	1.44	35.68	13.57	500	0.75–2.75			52.09	
						600				26.30	
						700				9.41	
Palm kernel shell	48.82	5.68	0.42	45.08	3.87	600	5.00–6.00	0.075–0.125	Entrained flow	42.48	6
						700				56.13	
						800				46.01	
						900				37.92	
Microalgae											
Chlorella vulgaris	43.75	6.07	7.86	41.61	5.54	600	5.00–6.00	<0.105	Entrained flow	—	6
						700				42.24	
						800				43.63	
						900				45.37	
Scenedesmus sp.	32.10	4.80	5.30	22.10	35.20	480	2.00	2.00	Fluidized bed	55.00 (dry ash-free)	57
Chlorella vulgaris remnant	45.04	6.88	6.64	29.42	8.34	500	—	0.42–0.70	Fluidized bed	28.20	41
Macroalgae											
Saccharina japonica	32.89	6.17	0.93	60.01	20.21	350	<3.00	0.30–0.50	Bubbling fluidized-bed	44.99 (including water)	58
						375				40.21 (including water)	
						400				37.41 (including water)	
						425				30.75 (including water)	
						450				28.40 (including water)	
						500				26.67 (including water)	
Ulva lactuca	33.60	5.10	3.30	28.20	29.10	550	0.50–2.00	<1.00	Centrifugal	65.00 (dry ash-free)	59
Seaweed powder	36.44	5.14	3.72	39.36	14.71	400	60.00	—	Thermogravimetric analyzer	23.57	60
						500				31.87	
						600				36.87	
						700				37.99	
Municipal sludge											
Mixed activated and primary sludge	38.30	5.00	3.40	37.30	16.00	400	1.70	1	Fluidized bubbling bed	48.00	61
						500				53.00	
Digested sewage sludge	25.50	4.50	4.90	25.80	37.20	450	<1.00	0.50–3.00	Conical spouted bed	70.00 (dry ash-free)	43
						500				77.00 (dry ash-free)	
						600				70.50 (dry ash-free)	
Sewage sludge	40.60	7.10	7.70	41.20	37.20	450	<100.00 ms	0.50–3.00	Conical spouted bed reactor	71.30 (dry ash-free)	62
						500				77.00 (dry ash-free)	
						600				72.30 (dry ash-free)	
Food waste											
Waste fish oil	—	—	—	—	—	525	17.00	—	Continuous pilot plant tubular	72.83 (including water)	63
Potato peel waste	43.80	6.00	4.10	46.20	9.30	450	8.00	1	Laboratory auger	22.70	64[b]
Potato peel waste residue	47.80	6.40	4.00	41.80	6.50					25.60	
Grape seeds powder	50.90	5.40	2.50	36.90	4.10	750	600.00	—	Oven	28.92	65[b]
						850				32.56	

[a] Maximum pyrolysis oil yield is reported on a dry basis (db). If the dry basis was not specified in the original reference, the reported yield basis (wt%) is indicated in parentheses. [b] References where the yield basis was not specified in the source.

Table 2 Biomass elemental analysis, ash content, and operational conditions for HTL of various feedstocks for bio-crude oil production

Biomass Name	C (wt%)	H (wt%)	N (wt%)	O (wt%)	Ash (wt%)	Solvent	T (°C)	Residence time (min)	Pressure (bar)	Max. bio-crude oil yield[a] (wt%, (db))	Ref.
Lignocellulosic biomass											
Corn stover	43.57	5.84	0.56	49.98	6.96	Water	250	0.00–60.00	75.84–234.42	22.20 at 15 min and 110.31 bar	97[b]
							300			29.25 at 0 min and pressure of 151.68	
							350			17.70 at 15 min and 179.26 and 217.18 bar	
							375			14.25 at 15 min and pressure of 196.5 and 241.31 bar	
Wheat straw	42.15	6.21	0.82	50.82	6.92	K_2CO_3	400	15.00	320.00	22.00 (dry ash-free)	98
Eucalyptus	47.85	5.81	0.10	46.23	1.15					28.00 (dry ash-free)	
Pinewood	49.90	6.30	0.30	42.80	0.59					27.00 (dry ash-free)	
Rice straw	36.20	5.20	0.70	40.30	—	Milli-Q water, tap water, seawater, recycled wastewater, industrial wastewater	350	30.00	180.00	36.40 in industrial wastewater	99[b]
Microalgae											
Chlorella vulgaris	52.60	7.10	8.20	32.20	7.00	Water, Na_2CO_3, HCOOH	350	60.00	—	38.00 in water (dry ash-free)	100
Nannochloropsis occulta	57.80	8.00	8.60	25.70	26.40					37.50 in water (dry ash-free)	
Spirulina	55.70	6.80	11.20	26.40	7.60					31.00 in water (dry ash-free)	
Porphyridium creuntum	51.30	7.60	8.00	33.10	24.40					22.00 in water (dry ash-free)	
Scenedesmus obliquus	33.40	4.70	4.40	16.50	40.80	Water	250	7.00–30.00	175–225	21.50 (dry ash-free)	101
							300		225–270	31.00 (dry ash-free)	
							350		260–280	35.05 (dry ash-free)	
Chlorella sp.	56.20	6.90	7.70	28.70	11.70	Water	350	1.40	180.00	39.70 (dry ash-free)	102
								5.80		36.80 (dry ash-free)	
Macroalgae											
Sargassum tenerrimum	32.10	4.70	0.93	60.72	26.50	Water, C_2H_5OH	260	15.00	45.00–120.00	18.50 in C_2H_5OH	103[b]
							280			25.20 in C_2H_5OH	
							300			20.00 in C_2H_5OH	
Ulva fasciata	—	—	—	—	25.40	Water	280	15.00	—	12.00	104
Enteromorpha sp.	—	—	—	—	23.20		280			7.00	
Sargassum tenerrimum	—	—	—	—	32.00		280			9.00	
Enteromorpha prolifera	28.75	5.22	3.65	32.28	30.10	Water, 5% Na_2CO_3	220	5.00–60.00	—	9.60 at 30 min in water	105[b]
							240			12.50 at 30 min in water	
							260			18.24 in 5% Na_2CO_3 at 30 min	
							280			19.80 in 5% Na_2CO_3 at 30 min	
							300			23 in 5% Na_2CO_3 at 30 min	
							320			17.65 at 30 min in water	
Municipal sludge											
Swine manure	46.02	6.10	2.57	45.31	11.45	Water	350	15.00	—	33.00 (dry ash-free)	106
Sewage sludge	51.94	7.28	8.33	32.44	25.10					37.00 (dry ash-free)	
Mixed primary and secondary sludge	47.90	5.70	3.70	32.30	9.80	Water	350	15.00	170.00	38.50	107
Primary sludge	47.80	6.50	3.60	34.10	7.50					34.70	
Secondary sludge	43.60	6.60	7.90	25.00	16.20					20.00	
Dehydrated sewage sludge	15.60	2.30	1.00	13.70	67.40	Water, 2.28 aqueous phase: 1 water	330	30.00	250.00	30.50 in cycle 2 in water and aqueous phase (dry ash-free)	108
Food waste											
Food waste	48.18	7.3	4.52	39.73	5.40	Water	280	30.00	—	29.00	109
							310			30.00	
							340			40.00	
Food waste	47.80	5.11	4.78	42.10	3.30	Water	200	30.00	353	11.80	110
							300	30.00	353	28.80	
							350	30.00	138–357	37.4 at 169 bar	
							400	30.00	353	30	
							500	1.00 and 30.00	353	23 at 1 min	
							600	1.00 and 30.00	353	30.5 at 1 min	
Mixed synthetic food waste	56.16	8.05	2.61	33.19	4.68	Water	280–360	10.00–60.00	12–110	46.9 at 360 °C and 40 min (dry ash-free)	111

[a] Maximum bio-crude oil yield is reported on a dry basis (db). If the dry basis was not specified in the original reference, the reported yield basis (wt%) is indicated in parentheses. [b] References where the yield basis was not specified in the source.

3. Fig. 6 has been modified to reflect levoglucosan as the major product.

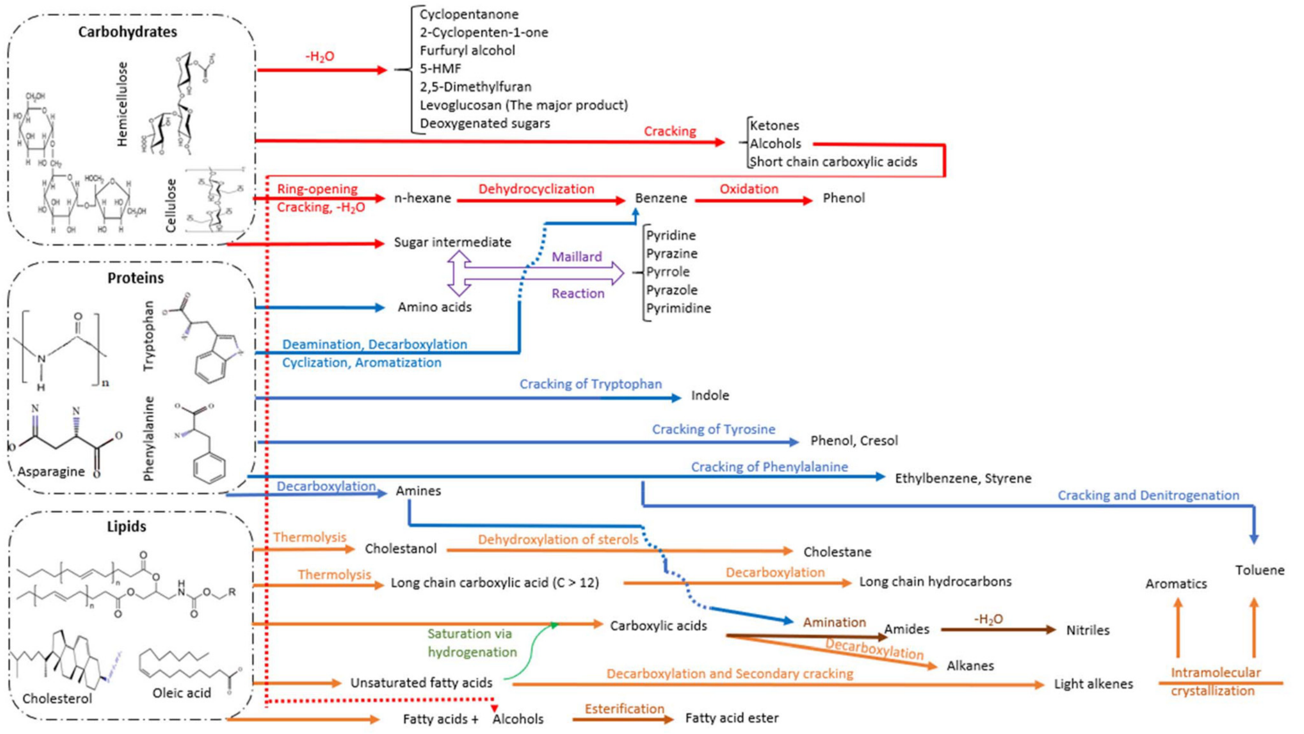

Fig. 6 Plausible reaction pathways of pyrolysis of carbohydrates, proteins, lipids, and lignin.[138,340–344]

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