

# Supplementary Materials: HHV Predicting Correlations for Torrefied Biomass Using Proximate and Ultimate Analyses

Daya Ram Nhuchhen and Muhammad T. Afzal

**Table S1.** HHV, proximate analyses and ultimate analyses of torrefied biomass (dry basis).

Material	MJ/kg	Proximate Analysis (%)				Ultimate Analysis (%)					Ref.
	HHV	VM	FC	ASH	C	H	N	O	S		
<i>Acacia mangium</i> (hardwood)	31.70	14.92	80.05	5.03	83.58	3.09	0.84	7.45	0.01	[19]	
<i>Acacia mangium</i> (hardwood)	21.90	70.06	27.47	2.47	54.95	5.47	0.60	36.47	0.04	[19]	
Ash wood	20.00	74.00	24.10	1.90	51.90	5.70	0.25	40.20	0.00	[20]	
Ash wood	21.00	66.20	31.70	2.10	55.40	5.50	0.25	36.80	0.00	[20]	
Ash wood	24.20	51.90	45.60	2.50	62.10	5.10	0.30	30.10	0.00	[20]	
Birch	20.21	88.57	11.34	0.09	49.42	6.38	0.12	44.07	0.02	[21]	
Birch	20.01	87.97	11.94	0.08	49.61	6.16	0.13	44.10	0.02	[21]	
Birch	20.78	85.15	14.76	0.09	51.25	6.18	0.11	42.46	0.02	[21]	
Birch	20.51	82.64	17.27	0.10	51.34	5.94	0.13	42.59	0.02	[21]	
Birch	22.93	73.78	26.09	0.13	56.92	5.86	0.09	37.13	0.02	[21]	
Birch	23.76	88.19	11.25	0.56	49.56	6.07	0.18	43.63	0.00	[22]	
Birch	24.57	83.40	16.04	0.55	52.19	5.95	0.23	41.08	0.00	[22]	
Birch	25.33	79.67	19.68	0.65	54.87	5.76	0.23	38.49	0.00	[22]	
Birch	23.68	86.67	12.99	0.34	49.21	6.11	0.22	44.12	0.00	[22]	
Birch	24.67	81.37	18.41	0.22	52.29	6.00	0.26	41.24	0.00	[22]	
Birch	25.08	75.47	24.28	0.25	54.02	5.82	0.26	39.65	0.00	[22]	
Camphorwood	18.90	82.62	16.21	1.17	50.42	6.12	0.41	41.87	0.00	[23]	
Camphorwood	20.45	79.20	19.36	1.44	52.29	5.97	0.30	40.02	0.00	[23]	
Camphorwood	22.35	70.91	26.55	2.54	60.37	4.89	0.22	31.98	0.00	[23]	
Cassava rhizome	18.50	70.40	18.90	10.70	46.30	5.60	0.88	36.40	0.09	[12]	
Cassava rhizome	19.18	68.70	20.80	10.50	49.30	5.10	0.96	34.00	0.09	[12]	
Cassava rhizome	19.65	64.70	23.10	12.20	49.10	5.10	0.94	32.60	0.09	[12]	
Cassava rhizome	19.79	65.80	22.60	11.60	50.60	5.20	0.97	31.50	0.09	[12]	
Cassava rhizome	21.12	58.70	29.50	11.80	52.50	4.50	1.10	30.00	0.09	[12]	
Cedar wood	19.87	81.96	17.12	0.92	54.24	5.71	0.28	38.86	0.00	[23]	
Cedar wood	20.61	79.25	18.76	1.99	52.35	5.90	0.25	39.53	0.00	[23]	
Cedar wood	23.17	65.34	32.64	2.02	59.79	5.17	0.22	32.81	0.00	[23]	
Corncob	19.01	74.70	19.30	6.00	48.20	5.40	0.94	39.40	0.08	[12]	
Corncob	21.28	64.20	28.30	7.50	54.50	5.50	1.20	31.20	0.10	[12]	
Corncob	21.45	61.90	29.90	8.20	53.40	4.90	1.20	32.20	0.11	[12]	
Corncob	23.83	49.40	40.00	10.60	62.30	4.60	1.50	20.90	0.10	[12]	
Cotton stalk	19.30	74.00	19.50	6.50	47.87	5.84	0.94	38.71	0.19	[24]	
Cotton stalk	19.50	72.50	20.50	7.00	49.01	5.63	1.09	37.11	0.22	[24]	
Cotton stalk	19.40	72.00	21.20	6.80	49.49	5.66	1.05	36.72	0.25	[24]	
Cotton stalk	21.00	70.00	22.00	8.00	50.88	5.67	1.27	33.95	0.25	[24]	
Cotton stalk	20.70	64.00	27.00	9.00	51.96	5.55	1.19	31.94	0.28	[24]	
Cotton stalk	21.90	58.50	30.00	11.50	54.52	5.14	1.35	27.17	0.32	[24]	
Cotton stalk	22.00	62.00	28.00	10.00	53.28	5.28	1.28	29.79	0.30	[24]	
Cotton stalk	23.30	53.00	32.00	15.00	54.23	4.95	1.47	24.06	0.33	[24]	
Cotton stalk	23.10	49.00	38.00	13.00	62.64	4.91	1.77	17.31	0.39	[24]	
Cotton stalk (dried)	17.09	74.25	18.56	7.19	51.92	5.95	0.91	34.03	0.00	[25]	
Cotton stalk (dried)	18.85	69.76	20.32	9.92	56.18	5.43	0.83	27.64	0.00	[25]	
Cotton stalk (dried)	20.31	56.23	32.49	11.28	65.35	4.92	0.96	17.49	0.00	[25]	
Cotton stalk briquette-bottom	30.54	30.85	59.00	10.15	78.66	1.64	1.11	7.91	0.54	[26]	
Cotton stalk briquette-center	31.47	23.91	67.23	8.87	81.08	2.01	0.75	6.81	0.47	[26]	
Cotton stalk briquette-top	30.79	39.73	52.25	8.02	79.52	2.60	2.34	6.97	0.63	[26]	
Cotton stalk particle	29.28	22.32	63.41	14.27	67.43	1.35	0.09	16.56	0.30	[26]	
Eucalyptus	22.44	66.81	31.59	1.60	56.88	5.90	0.00	35.62	0.00	[27]	
Eucalyptus	23.81	69.78	28.22	2.00	60.66	5.68	0.00	31.65	0.00	[27]	
Eucalyptus	26.70	58.97	38.83	2.20	67.87	5.18	0.00	24.55	0.00	[27]	
Eucalyptus	20.60	75.00	24.70	0.30	57.80	4.90	0.00	37.00	0.00	[28]	
Eucalyptus	21.50	70.90	28.90	0.20	59.70	4.70	0.00	35.40	0.00	[28]	

Eucalyptus	23.90	55.60	44.10	0.30	68.20	4.20	0.00	27.30	0.00	[28]
Eucalyptus	26.00	41.90	57.90	0.40	75.00	3.60	0.00	21.00	0.00	[28]
Eucalyptus	26.00	38.90	62.00	0.10	75.10	3.60	0.00	21.10	0.00	[28]
Eucalyptus	20.80	66.00	33.80	0.20	60.60	4.20	0.00	35.00	0.00	[28]
Eucalyptus	23.30	49.50	50.20	0.30	69.00	3.00	0.00	27.70	0.00	[28]
Eucalyptus	22.80	43.80	55.90	0.30	71.30	2.20	0.00	26.30	0.00	[28]
Eucalyptus	22.00	41.70	57.80	0.30	73.20	1.50	0.00	25.00	0.00	[28]
Eucalyptus	22.30	38.80	60.70	0.40	74.70	1.20	0.00	23.70	0.00	[28]
Eucalyptus	19.60	80.50	19.00	0.50	48.95	6.17	0.20	44.08	0.00	[29]
Eucalyptus	20.10	78.70	20.80	0.50	50.94	5.87	0.10	42.49	0.00	[29]
Eucalyptus	22.20	75.40	23.90	0.70	52.73	6.06	0.10	40.32	0.00	[29]
Eucalyptus	21.80	74.50	24.50	1.00	52.47	5.84	0.10	40.49	0.00	[29]
Eucalyptus	22.50	73.30	25.80	0.90	53.71	5.85	0.10	39.34	0.00	[29]
Eucalyptus	21.90	74.10	24.90	1.00	53.26	5.94	0.10	39.60	0.00	[29]
Eucalyptus	19.70	79.10	20.10	0.80	49.60	5.95	0.10	43.45	0.00	[29]
Eucalyptus	20.60	72.90	26.20	0.90	54.31	5.75	0.20	38.75	0.00	[29]
Eucalyptus	22.70	69.60	29.20	1.20	55.03	5.73	0.10	37.84	0.00	[29]
Eucalyptus	22.80	69.20	30.40	0.40	55.18	5.78	0.10	38.45	0.00	[29]
Eucalyptus	22.90	69.50	29.60	0.90	55.69	5.85	0.20	37.26	0.00	[29]
Eucalyptus	23.30	68.50	30.30	1.20	56.12	5.83	0.20	36.46	0.00	[29]
Eucalyptus	20.80	76.00	23.20	0.80	57.34	5.85	0.10	36.11	0.00	[29]
Eucalyptus	22.80	69.00	30.10	0.90	57.28	5.55	0.10	36.07	0.00	[29]
Eucalyptus	23.40	67.00	31.90	1.10	57.16	5.44	0.20	35.90	0.00	[29]
Eucalyptus	25.00	61.50	36.90	1.60	62.48	5.22	0.20	30.41	0.00	[29]
Eucalyptus	25.20	59.60	39.10	1.30	61.29	5.43	0.20	31.68	0.00	[29]
<i>Eucalyptus saligna</i> (hardwood)	22.70	73.77	25.34	0.89	55.41	5.73	0.45	37.48	0.04	[19]
<i>Eucalyptus saligna</i> (hardwood)	32.40	16.52	81.04	2.44	85.02	3.16	0.57	8.80	0.01	[19]
Grape pomace	24.32	69.30	29.20	1.40	57.82	6.12	2.16	32.49	0.00	[30]
Grape pomace	24.84	67.70	31.30	1.10	59.50	6.04	1.70	31.66	0.00	[30]
Grape pomace	25.75	67.10	30.90	1.90	60.22	6.28	1.69	29.91	0.00	[30]
Grape pomace	25.65	64.60	33.70	1.70	60.82	6.04	1.76	29.69	0.00	[30]
Grape pomace	26.10	64.60	33.20	2.10	61.73	6.18	1.83	28.17	0.00	[30]
Grape pomace	27.03	58.60	37.90	3.40	63.65	5.60	2.10	25.24	0.00	[30]
Grape pomace	28.31	54.30	43.00	2.70	66.48	5.76	2.26	22.82	0.00	[30]
Grape pomace	23.12	63.90	27.80	8.20	51.33	5.83	2.02	32.59	0.00	[30]
Grape pomace	25.29	51.20	38.20	10.50	56.30	4.84	2.37	25.99	0.00	[30]
Hardwood (mixture of oak and birch)	22.97	71.48	27.52	1.00	57.12	6.04	0.00	35.84	0.00	[27]
Hardwood (mixture of oak and birch)	22.63	70.85	27.55	1.60	57.47	5.61	0.00	35.23	0.00	[27]
Hardwood (mixture of oak and birch)	23.79	63.24	34.66	2.10	60.11	5.58	0.00	32.21	0.00	[27]
Juniper	21.31	79.10	19.72	1.15	56.83	5.75	0.20	36.16	0.01	[31]
Juniper	21.12	78.08	20.69	1.21	56.75	5.77	0.18	36.05	0.02	[31]
<i>Leucaena</i>	21.09	86.90	12.60	0.50	51.44	7.36	0.70	40.00	0.00	[32]
<i>Leucaena</i>	21.27	84.90	14.50	0.60	51.69	7.46	0.70	39.56	0.00	[32]
<i>Leucaena</i>	21.49	84.10	15.40	0.50	52.24	7.46	0.70	39.10	0.00	[32]
<i>Leucaena</i>	21.47	83.70	15.70	0.60	52.09	7.46	0.70	39.16	0.00	[32]
<i>Leucaena</i>	21.19	83.00	16.00	1.00	51.68	7.33	0.69	39.30	0.00	[32]
<i>Leucaena</i>	21.24	83.00	15.80	1.20	51.77	7.31	0.69	38.73	0.00	[32]
<i>Leucaena</i>	23.39	79.60	19.50	0.90	56.69	6.34	0.79	35.28	0.00	[32]
<i>Leucaena</i>	23.71	76.10	22.70	1.20	57.21	6.42	0.79	34.38	0.00	[32]
<i>Leucaena</i>	23.98	77.60	21.50	0.90	57.68	6.54	0.79	34.09	0.00	[32]
<i>Leucaena</i>	23.83	77.30	21.60	1.10	57.46	6.43	0.79	34.22	0.00	[32]
<i>Leucaena</i>	21.66	81.60	17.30	1.10	53.41	6.33	0.69	38.47	0.00	[32]
<i>Leucaena</i>	23.19	71.30	27.80	0.90	57.18	5.65	0.89	35.38	0.00	[32]
<i>Leucaena</i>	23.89	67.50	30.80	1.70	58.19	5.70	0.88	33.52	0.00	[32]
<i>Leucaena</i>	23.94	66.20	32.30	1.50	58.71	5.52	0.89	33.39	0.00	[32]
<i>Leucaena</i>	25.34	60.00	38.20	1.80	61.18	5.50	0.98	30.54	0.00	[32]
<i>Leucaena</i>	21.00	85.30	14.00	0.70	51.34	7.05	0.70	40.51	0.00	[33]
<i>Leucaena</i>	21.20	84.30	14.90	0.80	51.98	7.04	0.76	39.48	0.00	[33]
<i>Leucaena</i>	21.20	82.20	16.90	0.90	52.52	6.34	0.69	39.54	0.00	[33]
<i>Leucaena</i>	22.80	73.80	24.90	1.30	56.46	5.43	0.79	36.03	0.00	[33]
<i>Leucaena</i>	21.20	76.60	22.10	1.30	53.10	5.53	0.79	39.28	0.00	[33]
<i>Leucaena</i>	23.30	69.80	28.90	1.40	57.78	5.13	0.99	34.71	0.00	[33]

<i>Leucaena</i>	24.40	61.80	36.70	1.50	60.38	5.32	0.99	31.82	0.00	[33]
Loblolly pine chips	22.70	78.60	20.80	0.60	55.00	5.94	0.11	38.30	0.00	[34]
Loblolly pine chips	24.00	76.40	22.80	0.80	57.30	5.79	0.14	36.00	0.00	[34]
Loblolly pine chips	26.30	59.90	38.60	1.40	65.80	4.87	0.28	27.60	0.00	[34]
Mesquite	20.38	74.29	23.20	2.45	55.69	5.61	0.80	35.42	0.04	[31]
Mesquite	20.81	73.03	24.49	2.51	56.12	5.60	0.85	34.89	0.05	[31]
<i>Miscanthus</i>	18.90	72.80	23.80	3.40	49.20	5.80	0.25	41.40	0.00	[20]
<i>Miscanthus</i>	21.30	62.70	33.20	4.00	54.60	5.50	0.30	35.60	0.00	[20]
<i>Miscanthus</i>	24.60	46.50	47.70	5.80	63.00	5.00	0.35	26.00	0.00	[20]
<i>Miscanthus</i>	19.90	83.30	15.70	0.50	48.80	5.90	0.20	44.70	0.00	[35]
<i>Miscanthus</i>	21.40	81.90	17.50	0.70	49.60	5.90	0.30	43.80	0.00	[35]
<i>Miscanthus</i>	25.70	68.90	30.30	0.90	61.20	5.30	0.40	32.60	0.00	[35]
<i>Miscanthus</i>	20.30	84.80	14.20	0.90	49.60	5.70	0.10	43.20	0.00	[35]
<i>Miscanthus</i> A	21.60	65.24	33.33	1.43	55.00	5.72	0.00	37.85	0.00	[36]
<i>Miscanthus</i> B	20.60	78.20	20.47	1.33	52.99	5.92	0.00	39.76	0.00	[36]
<i>Miscanthus</i> D	24.50	61.60	36.45	1.95	62.16	5.59	0.00	30.30	0.00	[36]
<i>Miscanthus giganteus</i>	19.10	82.30	13.35	4.35	46.56	5.86	0.35	42.87	0.00	[37]
<i>Miscanthus giganteus</i>	19.37	81.74	13.37	4.90	47.36	5.73	0.44	41.58	0.00	[37]
<i>Miscanthus giganteus</i>	20.43	81.43	12.69	5.88	47.51	5.40	0.45	40.75	0.00	[37]
<i>Miscanthus giganteus</i>	19.45	80.35	14.79	4.86	49.28	5.27	0.50	40.09	0.00	[37]
<i>Miscanthus giganteus</i>	21.81	79.84	14.41	5.75	49.84	5.22	0.59	38.59	0.00	[37]
<i>Miscanthus giganteus</i>	21.57	64.87	27.23	7.90	52.88	4.55	0.55	34.12	0.00	[37]
Oil palm fibre	20.10	63.90	27.30	8.90	52.80	5.10	1.30	31.70	0.20	[28]
Oil palm fibre	21.40	56.60	32.40	11.00	54.90	5.00	1.50	27.50	0.10	[28]
Oil palm fibre	23.40	41.30	44.40	14.30	61.30	4.30	1.40	18.50	0.20	[28]
Oil palm fibre	23.70	32.80	52.40	14.80	65.50	3.40	1.90	14.20	0.20	[28]
Oil palm fibre	23.90	29.10	55.30	15.50	66.40	3.30	1.80	12.70	0.10	[28]
Oil palm fibre	20.30	39.20	44.80	16.00	56.90	2.90	2.30	21.70	0.20	[28]
Oil palm fibre	18.90	33.90	46.20	19.90	56.00	2.30	2.50	19.00	0.20	[28]
Oil palm fibre	19.10	32.30	45.70	22.10	55.90	2.10	2.70	16.90	0.20	[28]
Oil palm fibre	17.50	29.40	44.10	26.60	53.30	1.80	3.30	14.70	0.30	[28]
Oil palm fibre	14.90	25.30	38.40	36.40	50.50	2.00	4.10	6.80	0.20	[28]
Oil palm frond	20.20	70.90	24.70	4.50	52.70	5.60	0.26	36.90	0.07	[12]
Oil palm frond	21.21	66.40	28.60	5.00	55.20	5.20	0.27	34.20	0.08	[12]
Oil palm frond	21.95	63.50	31.10	5.40	56.40	4.90	0.32	32.90	0.07	[12]
Oil palm frond	22.48	61.00	33.40	5.60	58.40	5.00	0.36	30.60	0.07	[12]
Oil palm frond	24.41	53.00	40.60	6.40	63.20	4.70	0.35	25.30	0.08	[12]
Olive stone (Olive europaea)	22.00	77.10	22.53	0.37	55.04	5.80	0.17	38.60	0.02	[19]
Olive stone (Olive europaea)	33.30	15.98	82.74	1.28	86.28	3.32	0.46	8.65	0.01	[19]
Olive stones	20.67	60.78	23.17	16.05	40.13	4.28	1.93	37.61	0.00	[38]
Palm kernel shells	21.53	67.40	24.80	7.80	54.31	5.07	0.46	32.36	0.00	[39]
Palm kernel shells	21.89	63.80	28.30	7.90	55.35	4.88	0.46	31.41	0.00	[39]
Palm kernel shells	24.18	51.10	39.40	9.50	60.64	4.34	0.54	24.98	0.00	[39]
Palm kernel shells	20.92	68.91	25.59	5.50	54.96	5.93	0.60	33.01	0.00	[40]
Palm kernel shells	21.38	61.45	31.73	6.82	55.70	5.10	0.60	31.78	0.00	[40]
Palm kernel shells	20.99	54.72	37.27	8.01	53.91	5.37	0.89	31.82	0.00	[40]
Palm kernel shells	21.77	51.11	40.24	8.65	56.31	5.56	0.78	28.70	0.00	[40]
Pine	19.60	79.10	20.90	0.40	51.40	6.00	0.10	42.50	0.00	[20]
Pine	20.60	74.00	25.50	0.50	54.60	5.80	0.10	39.10	0.00	[20]
Pine	22.70	65.30	34.20	0.50	59.50	5.50	0.10	34.50	0.00	[20]
Pine	20.48	83.87	16.02	0.11	52.22	5.18	0.55	41.94	0.00	[41]
Pine	22.23	75.66	24.16	0.18	57.33	4.95	0.37	37.17	0.00	[41]
Pine	22.54	69.53	30.21	0.26	59.03	4.78	0.34	35.59	0.00	[41]
Pine	29.10	46.23	53.32	0.44	68.43	4.31	0.35	26.47	0.00	[41]
Pine	29.28	45.10	54.41	0.49	69.20	4.28	0.32	25.71	0.00	[41]
Pine	29.87	35.56	63.94	0.50	71.39	3.80	0.31	24.00	0.00	[41]
Pine shells	23.52	70.10	27.88	2.02	53.30	5.39	0.39	38.90	0.00	[38]
<i>Pinus illiotis</i> (softwood)	21.80	73.29	25.85	0.86	57.11	5.76	0.48	35.77	0.02	[19]
<i>Pinus illiotis</i> (softwood)	30.70	25.72	72.56	1.72	78.24	3.52	0.60	15.92	0.01	[19]
Residue ( <i>Eucalyptus saligna</i> )	22.50	69.86	28.11	2.03	57.04	5.64	0.67	34.58	0.04	[19]
Residue ( <i>Eucalyptus saligna</i> )	32.10	15.66	80.73	3.61	85.31	3.20	0.89	6.97	0.02	[19]
Residues (Norwegian forest)	20.56	72.38	25.34	2.38	51.13	5.93	0.49	40.26	0.07	[42]
Residues (Norwegian forest)	22.91	64.31	32.84	2.85	56.84	5.51	0.61	34.29	0.06	[42]
Rice husk	16.63	65.05	19.87	15.09	42.38	5.33	0.57	36.45	0.18	[43]
Rice husk	16.92	60.78	23.03	16.19	44.17	5.42	0.69	33.36	0.17	[43]

Rice husk	17.53	54.83	27.64	17.54	46.07	4.86	0.70	30.68	0.15	[43]
Rice husk	17.95	40.06	37.68	22.26	50.15	4.32	0.71	22.38	0.18	[43]
Rice husk (raw charred)	17.68	14.17	40.78	45.05	44.73	1.80	0.73	7.69	0.00	[44]
Rice husk (torrefied and charred)	18.55	13.30	44.43	42.27	48.89	1.85	0.86	6.13	0.00	[44]
Rice husk (torrefied and washed)	18.53	63.44	17.12	19.44	45.86	5.89	0.40	28.40	0.02	[44]
Rice husk (Torrefied)	18.73	59.16	20.66	20.18	47.45	4.26	0.41	27.68	0.03	[44]
Rice husk (torrefied, washed and charred)	18.12	15.94	42.24	41.82	45.96	1.95	0.75	9.52	0.00	[44]
Rice husk (washed and charred)	17.52	15.19	40.81	44.00	44.44	1.81	0.83	8.92	0.00	[44]
Rice husk (washed)	17.03	71.68	12.85	15.47	39.93	6.43	0.30	37.83	0.04	[35]
Rice husk briquette	24.51	18.77	33.61	47.62	47.09	0.53	0.06	4.31	0.38	[26]
Rice husk particle	22.96	26.94	29.85	43.20	48.78	1.13	0.07	6.32	0.49	[26]
Rice straw	17.38	68.90	16.20	14.90	45.80	5.50	0.90	32.80	0.09	[12]
Rice straw	18.45	62.50	19.60	17.90	47.40	4.90	0.97	28.80	0.08	[12]
Rice straw	18.78	59.80	21.70	18.50	49.10	5.10	0.98	26.20	0.07	[12]
Rice straw	18.89	58.90	22.20	18.90	46.90	5.00	1.00	28.10	0.07	[12]
Rice straw	20.73	46.00	30.00	24.00	51.40	4.40	1.20	18.90	0.07	[12]
Rice straw	20.30	77.50	18.00	4.50	51.19	6.04	0.24	37.72	0.29	[25]
Rice straw	21.30	75.00	19.70	5.30	51.14	5.89	0.25	37.12	0.29	[24]
Rice straw	21.40	74.50	20.00	5.50	51.41	5.71	0.26	36.86	0.28	[24]
Rice straw	21.20	72.00	21.80	6.20	51.31	5.77	0.21	36.21	0.26	[24]
Rice straw	22.60	69.00	26.50	4.50	57.40	5.63	0.28	32.09	0.16	[24]
Rice straw	24.60	62.00	32.00	6.00	57.06	5.58	0.29	30.93	0.17	[24]
Rice straw	26.50	58.00	37.00	5.00	57.38	5.57	0.29	31.64	0.12	[24]
Rice straw	28.50	44.00	48.00	8.00	60.08	5.47	0.29	26.13	0.12	[24]
Rice straw	28.60	43.50	49.00	7.50	66.14	4.90	0.40	20.91	0.13	[24]
Softwood (mixture of spruce, pine and larch)	22.08	79.62	20.28	0.10	54.55	6.29	0.00	39.06	0.00	[27]
Softwood (mixture of spruce, pine and larch)	22.33	78.07	21.63	0.30	55.53	6.08	0.00	38.09	0.00	[27]
Softwood (mixture of spruce, pine and larch)	23.61	71.51	28.09	0.40	58.47	5.98	0.00	35.16	0.00	[27]
Spruce	22.05	75.65	24.15	0.20	55.33	5.73	0.09	38.80	0.00	[45]
Spruce	22.35	82.56	17.36	0.08	55.27	5.99	0.07	38.67	0.00	[45]
Spruce	22.64	81.51	18.39	0.10	55.75	6.05	0.06	38.14	0.00	[45]
Spruce	20.81	85.72	14.17	0.11	51.34	6.18	0.07	42.42	0.02	[21]
Spruce	21.02	84.64	15.22	0.14	51.21	6.39	0.06	42.35	0.02	[21]
Spruce	21.33	83.92	15.95	0.12	52.55	6.15	0.06	41.23	0.02	[21]
Spruce	21.51	81.87	18.04	0.09	53.69	5.89	0.06	40.36	0.02	[21]
Spruce	22.97	74.74	25.12	0.14	56.99	5.87	0.07	37.07	0.02	[21]
Spruce	25.26	82.40	17.06	0.54	53.79	6.03	0.14	39.51	0.00	[22]
Spruce	26.05	80.76	18.72	0.52	56.56	5.85	0.16	36.90	0.00	[22]
Spruce	26.59	74.82	24.68	0.50	59.11	5.52	0.17	34.70	0.00	[22]
Spruce	24.91	82.29	17.36	0.35	52.99	5.98	0.12	40.56	0.00	[22]
Spruce	25.89	78.79	21.00	0.21	56.12	5.85	0.14	37.69	0.00	[22]
Spruce	26.45	72.83	26.96	0.21	58.48	5.60	0.14	35.58	0.00	[22]
Spruce (Norwegian)	16.55	75.19	24.33	0.48	52.72	5.88	0.06	40.86	0.03	[42]
Spruce (Norwegian)	19.53	80.21	19.37	0.44	48.86	6.08	0.05	44.57	0.03	[42]
Spruce wood	20.59	84.00	15.70	0.30	51.40	5.90	0.10	42.30	0.00	[46]
Spruce wood	21.42	80.30	19.30	0.40	53.60	5.90	0.10	40.00	0.00	[46]
Spruce wood	22.14	77.50	22.10	0.40	55.20	5.70	0.10	38.60	0.00	[46]
Spruce wood	22.19	77.30	22.30	0.40	55.20	5.60	0.10	38.70	0.00	[46]
Spruce wood	22.33	76.20	23.40	0.40	55.80	5.80	0.10	37.90	0.00	[46]
Spruce wood	27.59	51.50	47.80	0.70	69.20	5.00	0.10	25.00	0.00	[46]
Sugar cane	18.76	73.80	18.60	7.60	47.90	5.60	0.49	38.20	0.18	[12]
Sugar cane	20.01	66.70	23.80	9.50	50.90	5.40	0.30	33.70	0.17	[12]
Sugar cane	20.01	67.40	23.00	9.60	51.70	5.20	0.34	33.00	0.21	[12]
Sugar cane	21.65	58.40	31.70	9.90	56.50	5.10	0.46	27.80	0.23	[12]
Switch grass	27.11	67.52	27.51	4.98	56.21	4.44	0.42	32.81	1.14	[47]
Switch grass	23.53	78.99	17.38	3.63	50.87	5.56	0.31	38.14	1.48	[47]
Switch grass (densified and torrefied)	22.27	62.63	31.45	5.91	49.01	4.83	0.37	38.90	0.99	[47]
Wheat straw	18.10	65.60	25.00	9.40	47.40	5.50	1.00	36.80	0.00	[20]

Wheat straw	20.70	51.80	35.90	12.40	52.90	5.00	1.20	28.50	0.00	[20]
Wheat straw	23.00	39.80	45.10	15.20	57.00	4.50	1.40	21.90	0.00	[20]
Wheat straw	19.40	55.50	24.22	20.28	35.08	3.43	0.64	40.58	0.00	[38]
Willow	22.09	73.43	26.07	0.50	55.32	5.97	0.00	38.21	0.00	[27]
Willow	22.64	71.89	27.41	0.70	56.50	5.86	0.00	37.04	0.00	[27]
Willow	23.93	62.50	36.40	1.10	59.44	5.74	0.00	33.82	0.00	[27]
Willow A	21.80	74.03	23.82	2.15	55.29	6.07	0.81	35.72	0.00	[36]
Willow B	21.00	77.43	21.04	1.53	53.47	5.91	0.75	38.30	0.00	[36]
Willow D	23.60	68.34	29.83	1.84	59.19	5.69	0.35	32.79	0.00	[36]

Table S2. HHV, proximate analyses and ultimate analyses of raw biomass (dry basis).

Material	MJ/kg	Proximate Analysis (%)			Ultimate Analysis (%)					Ref.
	HHV	VM	FC	ASH	C	H	N	O	S	
<i>Acacia mangium</i> (Hardwood)	19.50	83.94	14.94	1.12	48.93	6.06	0.43	43.44	0.02	[19]
Alabama oak wood waste	19.23	74.70	21.90	3.30	49.50	5.70	0.20	41.30	0.00	[7]
Alfalfa stems	18.67	78.92	15.81	5.27	47.17	5.99	2.68	38.19	0.20	[9]
Almond	20.01	76.83	21.54	1.63	51.30	5.29	0.66	40.90	0.01	[7]
Almond hulls	18.89	73.80	20.07	6.13	47.53	5.97	1.13	39.16	0.06	[9]
Almond shells	19.49	76.00	20.71	3.29	49.30	5.97	0.76	40.63	0.04	[9]
Akhrot shell	20.01	80.55	18.65	0.71	50.22	5.70	0.00	43.37	0.00	[2]
Ash wood	18.10	82.10	16.20	1.70	49.20	5.60	0.20	43.30	0.00	[20]
Bagasse	17.33	73.78	14.95	11.27	44.80	5.35	0.38	38.55	0.01	[2]
Bamboo	17.55	75.83	20.55	3.62	43.84	6.05	0.07	46.53	0.00	[48]
Bamboo ( <i>Bambusa vulgaris</i> ) bottom	18.32	79.86	18.19	1.95	46.01	6.24	0.18	45.63	0.00	[49]
Bamboo ( <i>Bambusa vulgaris</i> ) middle	18.47	81.14	17.43	1.43	46.37	6.33	0.18	45.70	0.00	[49]
Bamboo ( <i>Bambusa vulgaris</i> ) mixture	18.21	80.13	17.75	2.12	45.79	6.24	0.24	45.60	0.00	[49]
Bamboo ( <i>Bambusa vulgaris</i> ) top	18.37	79.08	18.52	2.40	45.35	6.19	0.26	45.79	0.00	[49]
Bamboo leaf	17.76	71.67	8.31	20.02	39.81	5.68	3.26	31.32	0.00	[50]
Bamboo wood	20.55	86.80	11.24	1.95	48.76	6.32	0.20	42.77	0.00	[2]
Banana leaf	19.18	80.35	9.34	10.31	44.54	5.74	1.90	37.52	0.00	[50]
Banyan	18.46	80.21	18.64	1.15	46.20	6.08	0.08	46.53	0.00	[48]
Biomass mix	18.40	69.36	18.14	12.49	49.59	5.79	2.43	28.87	0.74	[9]
Birch	19.94	89.46	10.26	0.28	48.49	6.35	0.11	44.60	0.02	[21]
Birch	19.50	89.74	9.63	0.64	48.24	6.15	0.16	44.80	0.02	[22]
Birch (Norwegian)	20.36	89.46	10.26	0.28	48.94	6.35	0.11	44.60	0.02	[51]
Block wood	18.26	83.32	14.59	2.09	46.90	6.07	0.95	43.99	0.00	[7]
B-wood	20.05	76.53	21.62	1.85	50.26	6.91	1.03	39.66	0.00	[9]
Cabernet sauvignon	19.03	78.63	19.20	2.17	46.59	5.85	0.83	44.90	0.04	[7]
Camphorwood	18.86	85.51	13.42	1.07	47.66	6.02	0.69	44.55	0.00	[23]
Canyon live oak	18.98	88.20	11.30	0.50	47.84	5.80	0.07	45.76	0.01	[7]
Cassava rhizome	17.22	76.00	19.00	5.00	49.20	6.70	1.00	38.00	0.11	[12]
Caster bean cake	19.12	69.80	21.41	8.79	40.32	5.41	7.22	38.25	0.00	[23]
<i>Casuarina equisetifolia</i> leaf	18.48	79.50	16.46	3.93	46.12	6.90	1.18	41.84	0.00	[9]
<i>Casuarina</i> wood	18.77	78.58	19.58	1.83	48.50	6.24	0.31	43.12	0.00	[2]
Cedar wood	19.57	81.86	17.25	0.89	48.51	5.86	0.64	44.09	0.00	[23]
Chaparral wood	18.61	75.19	18.68	6.13	46.90	5.08	0.54	41.17	0.03	[2]
Coconut coir	20.05	66.58	29.70	3.72	50.29	5.05	0.45	40.63	0.16	[7]
Coconut coir	19.08	79.23	17.85	2.92	46.33	3.74	1.46	45.56	0.00	[50]
Coconut coir pitch	18.07	66.02	28.82	5.16	43.36	4.98	1.63	44.87	0.00	[2]
Coconut leaf	20.83	80.75	12.92	6.33	47.89	6.19	1.66	37.93	0.00	[50]
Coconut shell	20.50	77.19	22.10	0.71	50.22	5.70	0.00	43.37	0.00	[2]
Coffee husk	19.80	78.50	19.10	2.40	47.50	6.40	0.00	43.70	0.00	[9]
Corn stover	17.93	66.58	26.65	6.73	45.48	5.52	0.69	41.52	0.04	[9]
Corn straw	17.68	73.15	19.19	7.65	44.73	5.87	0.60	41.04	0.07	[9]
Corn cob	19.06	80.50	17.50	2.00	49.70	5.90	0.38	42.00	0.03	[12]
Corn cob	18.51	80.10	17.80	2.10	46.60	5.97	0.49	44.84	0.00	[39]
Corn cob	18.77	80.10	18.54	1.36	46.58	5.87	0.47	45.46	0.01	[7]
Corn cob	17.00	86.50	12.50	1.00	49.00	5.40	0.04	44.60	0.00	[7]
Corn cob	18.76	88.25	9.51	2.23	43.77	4.67	1.17	48.16	0.00	[50]

Cotton gin waste	17.48	83.41	14.97	1.61	42.66	6.05	0.18	49.50	0.00	[7]
Cotton residue	16.90	72.80	20.59	6.61	47.30	5.96	1.79	38.42	0.19	[9]
Cotton stalk	16.90	76.80	16.80	6.45	42.10	5.64	0.22	45.28	0.28	[24]
Cotton stalk	15.83	65.40	17.30	17.30	39.47	5.07	1.20	37.14	0.02	[7]
Cotton stalk	17.40	76.10	18.80	5.10	47.07	4.58	1.15	42.10	0.00	[9]
Cotton stalk (dried)	16.53	75.38	18.09	6.53	48.43	6.93	0.93	37.18	0.00	[25]
Cotton stalk briquette	18.64	79.13	17.50	3.37	49.93	5.73	0.27	39.16	1.54	[26]
Cotton stalk particle	19.32	82.34	15.73	1.93	50.72	5.32	0.46	41.50	0.07	[26]
Cotton gin trash	16.42	67.30	15.10	17.60	39.59	5.26	2.09	35.38	0.00	[7]
Dal lake weed	8.89	47.70	3.60	48.70	19.12	2.00	4.22	25.96	0.00	[7]
Douglas fir pellet	20.38	79.93	19.85	0.22	47.90	6.55	0.08	45.57	0.00	[52]
Dougllass fir	22.10	73.00	25.80	1.20	56.20	5.90	0.00	36.70	0.00	[7]
Dougllass fir wood	20.38	87.30	12.60	0.10	50.64	6.18	0.06	43.00	0.02	[2]
Dried grains-solubles	21.75	82.50	13.64	3.89	50.24	6.89	4.79	33.42	0.77	[9]
Esparto plant	19.10	80.50	16.80	2.20	46.94	6.44	0.86	43.56	0.00	[9]
<i>Eucalyptus saligna</i> (hardwood)	19.60	82.55	16.66	0.79	49.79	6.02	0.37	42.95	0.08	[19]
Eucalyptus	18.40	81.10	18.90	0.01	50.79	5.10	0.00	44.10	0.00	[28]
Eucalyptus	20.17	79.11	19.29	1.60	48.51	6.40	0.00	43.59	0.00	[27]
<i>Eucalyptus globulus</i> wood	19.23	81.60	17.30	1.10	48.18	5.92	0.39	44.18	0.01	[2]
<i>Eucalyptus grandis</i>	19.35	82.55	16.93	0.52	48.33	5.89	0.15	45.13	0.01	[7]
Eucalyptus saw dust	18.50	83.60	16.20	0.20	49.37	6.40	2.02	42.01	0.00	[7]
Eucalyptus wood	18.64	75.35	21.30	3.35	46.04	5.82	0.30	44.49	0.00	[7]
Grape pomace	20.04	72.60	21.90	5.40	46.45	5.96	2.17	40.03	0.00	[30]
Groundnut shell	19.85	72.70	21.60	5.70	48.59	5.64	0.58	39.49	0.00	[2]
Hardwood (mixture of oak and birch)	18.17	82.62	16.78	0.70	46.47	5.86	0.10	46.87	0.00	[27]
Hardwood chips	19.48	84.74	14.83	0.65	55.04	5.36	0.01	38.95	0.00	[53]
Hazelnut shell	19.90	68.90	30.00	1.10	50.34	5.84	0.40	42.33	0.00	[9]
Ipil ipil	20.22	79.90	17.70	2.40	48.30	6.80	0.00	42.50	0.00	[9]
Jackfruit leaf	17.03	70.05	13.67	16.28	42.33	4.70	3.12	33.57	0.00	[50]
Jawar straw	17.95	75.97	15.15	8.88	42.10	5.60	0.04	43.38	0.00	[2]
Jujuba wood	19.77	83.63	14.14	2.32	47.63	6.12	0.15	43.78	0.00	[2]
Juniper	20.18	82.85	15.19	2.03	52.36	6.03	0.30	39.30	0.01	[31]
Lauan wood	20.41	81.12	18.61	0.27	48.64	6.75	0.10	44.24	0.00	[54]
Lawn grass	17.66	74.94	12.39	12.67	37.79	5.46	2.34	41.74	0.00	[50]
<i>Leucaena</i>	20.30	86.10	13.10	0.80	49.70	7.34	0.69	41.47	0.00	[33]
<i>Leucaena</i>	20.30	87.30	12.20	0.50	49.85	7.36	0.63	41.59	0.00	[32]
Loblolly pine	21.77	65.70	33.90	0.40	56.30	5.60	0.00	37.70	0.00	[7]
Loblolly pine chips	20.00	84.60	14.80	0.60	50.50	6.26	0.09	42.60	0.00	[34]
Macadamia shell	21.01	75.92	23.68	0.40	54.41	4.99	0.36	39.69	0.01	[7]
Mango leaf	18.83	73.87	14.75	11.38	43.89	4.57	1.59	38.57	0.00	[50]
Mango wood	19.17	85.64	11.36	2.98	46.24	6.08	0.28	44.42	0.00	[2]
Marabu	20.72	81.30	17.20	1.50	48.60	6.30	0.00	43.60	0.00	[9]
Mast tree leaf	22.37	84.00	10.74	5.26	50.60	5.93	2.69	35.52	0.00	[50]
Mesquite	19.76	78.22	19.76	1.98	51.60	5.89	0.73	39.76	0.04	[31]
Mulberry stick	18.36	75.10	22.80	2.10	44.23	6.61	0.51	46.25	0.00	[7]
Millet grain waste	15.21	77.10	14.50	8.40	40.56	5.26	0.40	45.50	0.00	[2]
Millet straw	18.05	78.28	16.45	5.27	43.71	5.85	0.01	45.16	0.00	[2]
<i>Miscanthus</i>	17.90	82.20	15.10	2.70	48.40	5.80	0.20	42.90	0.00	[20]
<i>Miscanthus</i>	17.47	87.50	11.70	0.80	46.70	6.00	0.20	45.67	0.00	[35]
<i>Miscanthus</i>	11.81	54.40	5.70	39.90	30.11	3.97	0.84	25.18	0.00	[39]
<i>Miscanthus giganteus</i>	18.36	91.16	4.36	4.47	45.50	5.91	0.38	43.73	0.00	[37]
Narrow-leaf cattail	16.27	79.19	10.39	10.42	39.66	5.18	0.93	43.81	0.00	[50]
Neem wood	20.26	85.86	12.19	1.93	48.26	6.27	0.08	43.46	0.00	[2]
Oak wood (large branch)	19.17	81.75	16.18	2.07	47.56	6.67	2.34	41.36	0.00	[9]
Oak wood (medium branch)	19.24	80.82	16.18	3.00	47.16	6.32	2.50	41.01	0.00	[9]
Oak wood (small branch)	19.20	77.45	18.50	4.05	48.76	6.35	2.70	40.38	0.00	[9]
Oil palm fiber	17.10	72.50	20.50	7.00	48.27	4.46	2.23	37.76	0.28	[28]
Oil palm frond	18.21	79.10	16.90	4.00	44.80	5.50	0.31	45.30	0.12	[12]
Oil palm fruit bunch	16.96	79.00	16.46	4.53	45.90	5.80	1.20	42.60	0.00	[9]
Olive cake	21.60	62.10	34.60	2.80	53.70	6.70	0.60	36.20	0.00	[9]
Olive kernel	22.40	65.01	33.37	1.70	54.60	6.80	0.80	36.10	0.00	[9]
Olive kernel	19.90	73.62	24.25	2.13	52.44	6.17	1.32	37.85	0.09	[9]

Olive kernel shell	21.40	60.50	36.10	3.30	53.20	6.70	0.50	36.30	0.00	[9]
Olive pits	21.59	82.00	16.28	1.72	52.80	6.69	0.45	38.25	0.05	[9]
Olive stone ( <i>Olive europaea</i> )	20.50	82.41	17.22	0.37	51.62	5.97	0.25	41.78	0.01	[19]
Olive stones	17.54	63.80	21.74	14.46	36.95	4.79	1.63	42.17	0.00	[38]
Paddy straw	14.52	72.70	11.80	15.50	35.97	5.28	0.17	43.08	0.00	[7]
Palm kernel shells	20.42	75.20	18.30	6.50	50.86	5.52	0.37	36.75	0.00	[39]
Palm kernel shells	17.93	75.00	20.58	4.40	51.83	6.28	0.44	37.03	0.00	[40]
Palm kernel shells	20.71	77.28	17.59	5.14	48.34	6.20	2.62	37.44	0.26	[9]
Peach pit	19.42	79.10	19.80	1.10	48.60	6.27	0.47	43.04	0.02	[7]
Peanut shell	18.60	84.90	13.40	1.70	46.59	6.00	2.06	43.65	0.00	[9]
<i>Pennisetum</i>	16.98	93.34	0.67	5.99	43.74	5.98	0.24	44.06	0.00	[55]
Pepper plant	15.39	64.71	20.86	14.44	36.11	4.26	2.72	41.86	0.49	[9]
Pine	19.20	86.70	12.90	0.40	51.30	6.00	0.10	42.30	0.00	[20]
Pine	18.44	92.23	7.71	0.05	46.73	6.46	0.41	46.35	0.00	[41]
Pine	18.44	92.23	7.71	0.05	46.73	6.46	0.41	46.35	0.00	[41]
Pine chips	19.79	72.40	21.65	5.95	49.66	5.67	0.51	38.07	0.08	[9]
Pine chips	18.46	85.98	13.76	0.27	47.21	6.64	0.17	45.76	0.00	[56]
Pine shells	18.82	68.41	30.08	1.51	47.08	5.52	0.30	45.60	0.00	[38]
<i>Pinus illiottis</i> (softwood)	20.00	82.10	17.20	0.70	51.10	6.14	0.41	41.56	0.09	[19]
Pistachio shell	19.26	82.03	16.84	1.13	48.79	5.91	0.56	43.41	0.01	[7]
Pistachio shell	18.22	81.64	16.95	1.41	50.20	6.32	0.69	41.15	0.22	[9]
Plywood	18.96	82.14	15.77	2.09	48.13	5.87	1.45	42.46	0.00	[2]
Poplar (hybrid)	19.02	84.81	12.49	2.70	50.18	6.06	0.60	40.43	0.02	[9]
Rape stalk	18.98	77.27	19.53	3.20	47.53	6.20	0.37	42.46	0.00	[57]
Rape straw	18.34	76.54	18.81	4.65	46.17	6.12	0.46	42.47	0.10	[9]
Red wood	20.72	79.72	19.92	0.36	50.64	5.98	0.05	42.88	0.03	[7]
Refused derived fuel	19.50	72.00	17.60	10.40	44.72	6.21	0.69	38.36	0.00	[2]
Residue ( <i>Eucalyptus saligna</i> )	19.50	80.98	17.76	1.26	49.66	6.09	0.54	42.39	0.06	[19]
Residue (forest)	19.50	79.80	20.00	0.20	53.16	6.25	0.30	40.00	0.09	[9]
Residue (logging chips)	18.79	82.17	16.07	1.77	47.29	6.20	0.42	44.19	0.00	[56]
Residue 1 (forest)	18.80	83.00	15.10	1.90	50.82	5.69	0.00	41.50	0.00	[58]
Residue 2 (forest)	19.00	80.30	15.00	4.70	48.70	5.53	0.00	41.07	0.00	[58]
Residue 3 (forest)	18.70	82.40	15.90	1.70	50.23	5.70	0.00	42.37	0.00	[58]
Residue 4 (forest)	19.40	82.90	14.50	2.60	49.87	5.75	0.00	41.78	0.00	[58]
Residue 5 (forest)	18.60	79.30	17.80	2.90	50.49	5.73	0.00	40.88	0.00	[58]
Residues (Norwegian forest)	19.52	74.74	22.94	2.34	47.58	6.10	0.48	43.62	0.07	[42]
Rice husk	15.16	64.89	19.83	15.23	42.13	5.40	0.55	36.47	0.17	[43]
Rice husk	16.58	70.60	12.87	16.53	39.37	5.13	0.32	38.59	0.06	[44]
Rice husk	14.69	61.81	16.95	21.24	38.50	5.20	0.45	34.61	0.00	[2]
Rice husk	16.47	61.20	16.30	22.50	38.20	5.60	0.00	33.70	0.00	[9]
Rice husk	17.40	80.45	8.60	10.95	41.20	6.13	0.22	41.11	0.00	[59]
Rice husk bran	15.29	61.83	19.53	18.64	38.92	5.12	0.55	36.77	0.00	[2]
Rice husk briquette	16.01	68.05	16.03	15.92	45.02	4.05	0.61	34.30	0.09	[26]
Rice husk particle	16.36	82.77	5.84	11.39	45.93	5.02	0.38	37.03	0.24	[26]
Rice husk patni-23	15.67	69.30	14.90	15.80	38.92	5.10	2.17	37.89	0.12	[2]
Rice husks	16.67	68.00	15.40	16.60	41.20	5.25	0.42	36.53	0.00	[39]
Rice straw	17.20	71.80	17.00	11.20	45.30	5.90	0.88	36.60	0.15	[12]
Rice straw	19.00	79.60	15.90	4.09	43.16	5.78	0.22	46.42	0.29	[24]
Rice straw	14.85	65.70	13.91	20.38	35.68	4.62	0.28	39.14	0.00	[2]
Rice straw	15.09	65.47	15.86	18.67	38.24	5.20	0.87	37.26	0.18	[9]
Rice straw	15.07	63.61	6.88	29.51	34.81	4.41	1.21	30.07	0.00	[50]
Rice straw	17.10	71.70	18.58	9.72	43.68	5.70	0.97	39.72	0.21	[60]
Rice straw	16.16	88.78	1.43	9.82	41.70	5.60	1.19	41.69	0.00	[55]
Rice straw	18.04	72.54	18.40	9.05	41.10	5.35	1.09	43.17	0.00	[57]
Sal seed husk	20.60	62.54	28.06	9.40	48.12	6.55	0.00	35.93	0.00	[7]
Senna leaves	18.13	57.20	25.50	17.30	36.20	4.72	4.29	37.49	0.00	[7]
Shea meal	19.80	66.30	28.70	5.00	48.56	5.86	2.88	37.70	0.00	[9]
Softwood (mixture of spruce, pine and larch)	18.38	82.92	16.98	0.10	46.65	5.89	0.00	47.35	0.00	[27]
Soplillo	22.58	77.80	20.70	1.50	48.80	6.50	0.00	43.20	0.00	[9]
Spire-mint	15.53	70.10	11.80	18.10	37.23	5.34	5.95	33.38	0.00	[7]
Spruce	20.42	86.50	13.27	0.23	50.31	6.24	0.07	43.38	0.00	[45]
Spruce	20.42	86.50	13.27	0.23	50.31	6.24	0.07	43.38	0.02	[21]
Spruce	20.70	85.18	14.14	0.68	50.96	6.18	0.12	42.06	0.02	[22]

Spruce (Norwegian)	19.89	86.50	13.27	0.23	50.31	6.24	0.07	43.38	0.02	[51]
Spruce (Norwegian)	19.05	81.24	18.38	0.38	47.20	6.21	0.02	46.18	0.03	[42]
Spruce wood	20.29	85.00	14.60	0.40	50.40	5.90	0.10	43.20	0.00	[46]
Subabul fresh wood	19.70	83.60	15.20	1.12	46.24	5.80	0.25	46.59	0.00	[2]
Subabul wood	19.78	80.05	18.30	1.20	48.15	5.87	0.03	44.75	0.00	[7]
Sudan grass	17.39	72.75	18.60	8.65	44.58	5.35	1.21	40.18	0.01	[7]
Sugar cane	17.94	73.80	17.90	8.30	47.40	5.90	0.55	37.70	0.15	[12]
Sugar cane leaves	17.41	77.40	14.90	7.70	39.75	5.55	0.17	46.82	0.00	[7]
Sugar cane straw	17.19	76.20	14.60	9.20	43.50	6.10	0.00	41.10	0.00	[9]
Sugarcane bagasse	18.37	83.66	13.15	3.20	45.48	5.96	0.15	45.21	0.00	[2]
Sugarcane bagasse	17.70	81.50	13.30	5.20	43.79	5.96	1.69	43.36	0.00	[9]
Sugarcane bagasse	17.32	82.60	14.70	2.70	47.20	7.00	0.00	43.10	0.00	[9]
Sugarcane residue	17.80	93.60	3.65	2.50	49.19	6.94	0.43	40.45	0.00	[59]
Sunflower seed shell	17.60	84.70	11.70	3.60	49.84	5.98	0.96	39.62	0.00	[9]
Sweet sorghum bagasse	18.68	79.16	16.20	4.64	41.48	5.34	0.27	48.15	0.12	[53]
Switch grass	20.60	80.63	15.87	3.50	45.71	6.38	0.60	42.43	1.38	[47]
Switch grass	18.06	76.69	14.34	8.97	46.68	5.82	0.77	37.38	0.19	[9]
Switch grass (densified raw)	19.14	80.23	16.15	3.62	45.40	5.72	0.28	43.80	1.20	[47]
Tan oak	18.93	90.60	9.20	0.20	48.67	6.03	0.06	44.99	0.04	[7]
Tea bush	19.84	76.50	21.80	1.70	47.67	6.13	1.33	43.16	0.00	[7]
Tea waste	17.10	85.00	13.60	1.40	48.60	5.50	0.50	44.00	0.00	[7]
Vine prunings	19.25	80.80	16.60	2.60	49.48	5.65	0.88	41.40	0.00	[39]
Walnut	19.97	78.50	20.80	0.70	48.20	6.25	1.61	43.24	0.00	[7]
Water hyacinth	16.65	76.85	12.17	10.98	37.42	3.30	2.04	46.27	0.00	[50]
Western hemlock wood	20.05	82.93	14.87	2.20	50.40	5.80	0.10	41.80	0.10	[2]
Wet grains	21.95	83.18	14.28	2.58	52.53	6.60	5.35	32.28	0.66	[9]
Wheat straw	16.80	76.30	15.70	8.00	45.30	5.60	0.90	40.20	0.00	[20]
Wheat straw	19.00	71.24	12.62	16.14	33.04	4.36	0.42	46.04	0.00	[38]
Wheat straw	17.00	63.00	23.50	13.50	45.50	5.10	1.80	34.10	0.00	[7]
Wheat straw	17.99	82.12	10.98	6.90	42.95	5.35	0.00	44.99	0.00	[2]
White fir	19.95	83.17	16.58	0.25	49.00	5.98	0.05	44.75	0.01	[7]
Willow	19.30	83.98	15.12	0.50	49.25	6.07	0.20	44.18	0.00	[27]
Willow	18.45	83.18	16.13	0.69	45.80	6.24	0.09	47.20	0.00	[48]
Willow wood	19.59	82.22	16.07	1.71	49.90	5.90	0.61	41.80	0.07	[9]
Wood chips	19.92	76.40	23.50	0.10	48.10	5.99	0.08	45.74	0.00	[7]



© 2017 by the authors; licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).