Supplementary Online Material

Short- and long-term flammability of biochars

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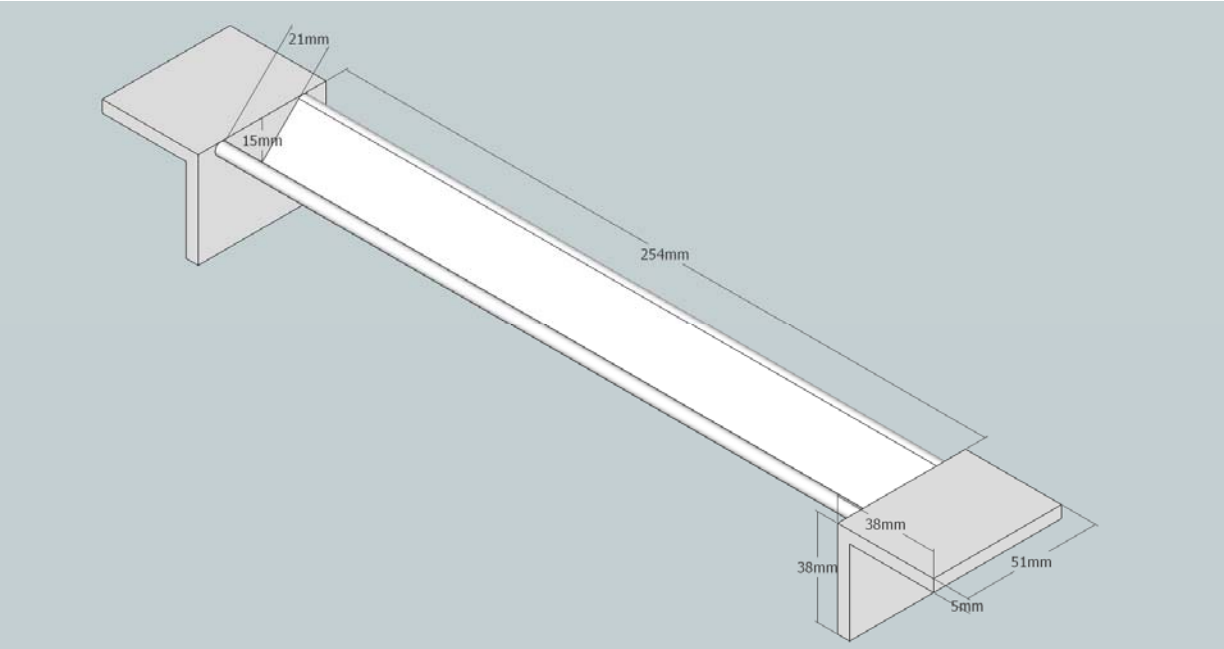
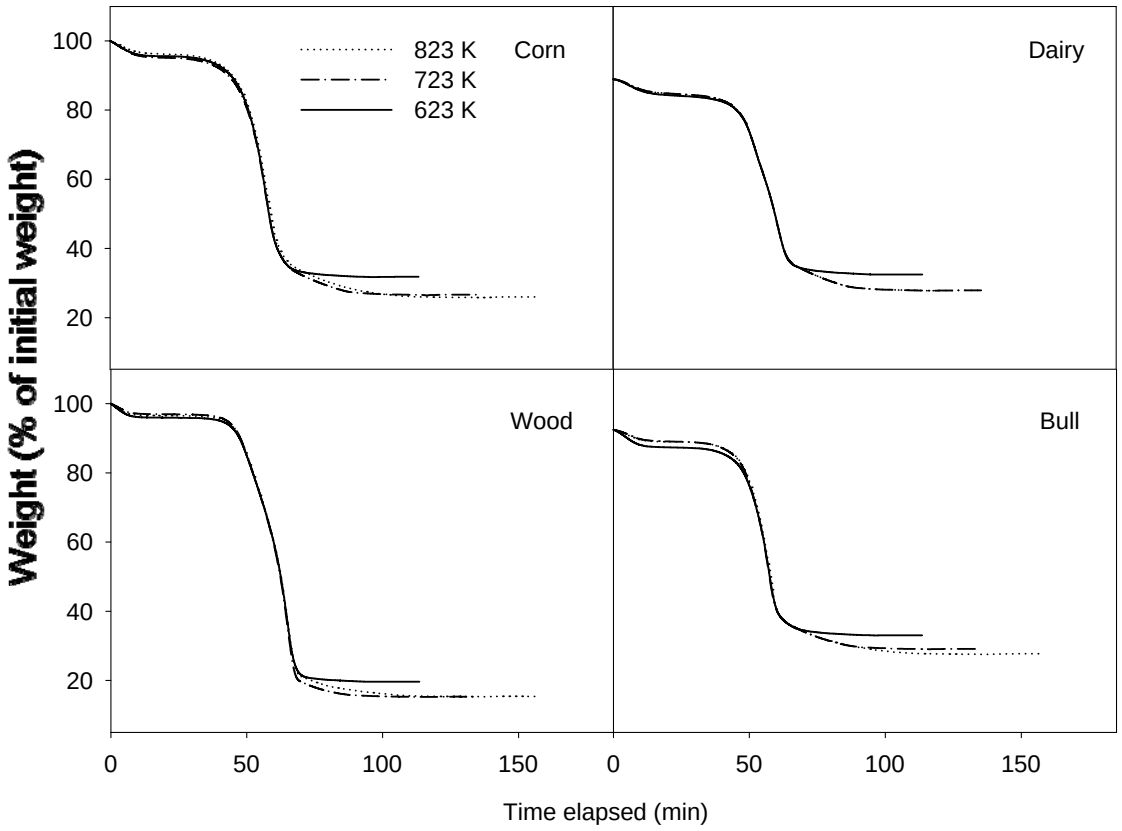
Supplementary Table S1. Relationship between flammability and properties of stored biochar. (*, **, ***, ^{ns} denote significant relationship at $p<0.05$, 0.01, 0.001, and not significant, respectively; significant relationships shown in bold; NA not available)

Biochar properties	All biochars		Only flammable biochars		Only flammable biochars (slow pyrolysis)		Only flammable biochars (fast pyrolysis)	
	r^2	n	r^2	n	r^2	n	r^2	n
Volatiles	0.022 ^{ns}	34	0.050 ^{ns}	11	0.056 ^{ns}	5	0.216 ^{ns}	6
Ash	-0.016 ^{ns}	34	0.225 ^{ns}	11	-0.048 ^{ns}	5	0.199 ^{ns}	6
Fixed carbon	0.004 ^{ns}	34	**-0.400***	11	-0.047 ^{ns}	5	**-0.656***	6
Fixed carbon - ash free mass basis	0.011 ^{ns}	34	-0.270 ^{ns}	11	-0.049 ^{ns}	5	-0.619 ^{ns}	6
Fixed carbon yield - feedstock mass basis	0.028 ^{ns}	24	-0.033 ^{ns}	5	-0.033 ^{ns}	5	NA	NA
Ash free mass	0.016 ^{ns}	34	-0.225 ^{ns}	11	0.048 ^{ns}	5	-0.199 ^{ns}	6
Volatiles - ash free mass basis	-0.015 ^{ns}	34	0.270 ^{ns}	11	0.049 ^{ns}	5	0.619 ^{ns}	6
Ctot	0.033 ^{ns}	24	-0.045 ^{ns}	5	-0.045 ^{ns}	5	NA	NA
Corg	0.052 ^{ns}	24	-0.007 ^{ns}	5	-0.007 ^{ns}	5	NA	NA
Cinorg	-0.065 ^{ns}	24	-0.100 ^{ns}	5	-0.098 ^{ns}	5	NA	NA
N tot	0.005 ^{ns}	24	-0.016 ^{ns}	5	-0.016 ^{ns}	5	NA	NA
H tot	0.103 ^{ns}	20	0.047 ^{ns}	5	0.047 ^{ns}	5	NA	NA
O tot	0.002 ^{ns}	20	0.068 ^{ns}	5	0.058 ^{ns}	5	NA	NA
Oc	0.092 ^{ns}	20	0.103 ^{ns}	5	0.103 ^{ns}	5	NA	NA
Ctot:N (g:g)	-0.085 ^{ns}	24	-0.007 ^{ns}	5	-0.007 ^{ns}	5	NA	NA
Corg:N (g:g)	-0.078 ^{ns}	24	-0.003 ^{ns}	5	-0.003 ^{ns}	5	NA	NA
C:N (mol:mol)	-0.085 ^{ns}	24	-0.007 ^{ns}	5	-0.007 ^{ns}	5	NA	NA
H:C (mol:mol)	0.124 ^{ns}	20	0.048 ^{ns}	5	0.048 ^{ns}	5	NA	NA
O:C (mol:mol)	-0.030 ^{ns}	20	0.078 ^{ns}	5	0.078 ^{ns}	5	NA	NA
H:Corg (mol:mol)	0.016 ^{ns}	20	0.030 ^{ns}	5	0.030 ^{ns}	5	NA	NA
O:Corg (mol:mol)	-0.066 ^{ns}	20	0.041 ^{ns}	5	0.041 ^{ns}	5	NA	NA
pH in water	NA	6	0.077 ^{ns}	5	0.077 ^{ns}	5	NA	NA
pH in KCl	0.076 ^{ns}	24	NA	NA	NA	NA	NA	NA
Electrical conductivity	0.062 ^{ns}	16	0.249 ^{ns}	6	NA	NA	NA	NA
CEC (mmol/kg)	**0.300***	18	0.031 ^{ns}	5	0.031 ^{ns}	5	NA	NA
P	-0.032 ^{ns}	34	-0.265 ^{ns}	11	0.001 ^{ns}	5	-0.360 ^{ns}	6
K	0.071 ^{ns}	34	0.004 ^{ns}	11	0.000 ^{ns}	5	0.064 ^{ns}	6
S	0.000 ^{ns}	34	-0.031 ^{ns}	11	-0.045 ^{ns}	5	0.005 ^{ns}	6

Ca	-0.052 ns	34	0.001 ns	11	0.042 ns	5	0.031 ns	6
Mg	**0.126***	34	0.111 ns	11	0.000 ns	5	0.190 ns	6
Na	-0.015 ns	34	-0.035 ns	11	-0.001 ns	5	0.272 ns	6
Fe	0.000 ns	34	-0.103 ns	11	0.002 ns	5	-0.263 ns	6
Mn	-0.008 ns	34	-0.046 ns	11	0.011 ns	5	-0.119 ns	6
Zn	0.000 ns	34	-0.234 ns	11	-0.281 ns	5	-0.301 ns	6
Cu	-0.007 ns	34	-0.017 ns	11	-0.002 ns	5	0.234 ns	6
Mo	-0.034 ns	34	-0.006 ns	11	-0.409 ns	5	0.000 ns	6
B	**0.222****	34	0.000 ns	11	0.000 ns	5	0.152 ns	6
Ni	0.108 ns	34	0.075 ns	11	-0.642 ns	5	0.044 ns	6
Cr	**0.310*****	34	0.278 ns	11	-0.555 ns	5	0.237 ns	6
Co	-0.004 ns	34	-0.117 ns	11	-0.009 ns	5	-0.074 ns	6
As	0.000 ns	34	-0.010 ns	11	-0.535 ns	5	-0.063 ns	6



Supplementary Fig. S1. Trough used for flammability tests. Fabricated from 3/16” thickness, 1” mild steel angle iron with 1-1/2” angle iron welded to the ends



Supplementary Fig. S2. Weight loss of biochar samples, for thermogravimetric analyses, to verify consistency in pyrolysis process.