

Emergent Biochar Specifications

2. Physical & Chemical Properties

2.1 Elemental analysis

Table 1. Elemental composition of AR-B sample

	C (wt.%)	O (wt.%)	H (wt.%)	N (wt.%)	H/C	O/C
EWS As-Received Biochar 1 st Trial	81.00	11.82	3.11	0.40	0.038	0.15
EWS As-Received Biochar 2 nd Trial	80.12	11.50	3.11	0.41	0.039	0.14

2.2 BET Surface area and porosity

Table 2. Surface area and porosity of AR-B sample

Sample	BET Surface Area (m ² g ⁻¹)	Total Pore Volume (cm ³ g ⁻¹)	Average Pore Width (nm)
AR-B – Run1	57.26	0.032	2.2
AR-B – Run 2	88.65	0.046	2.1
AR-B – Run 3	70.97	0.039	2.2

Table 3. Instrument precision tested by repeating the AR-B Run 1 sample

Sample	BET Surface Area (m ² g ⁻¹)	Total Pore Volume (cm ³ g ⁻¹)	Average Pore Width (nm)
AR-B – Run1	57.26	0.032	2.2
AR-B – Run 1 Repeat 1	55.54	0.030	2.2
AR-B – Run 1 Repeat 2	70.04	0.036	2.0
AR-B – Run 1 Repeat 3	64.44	0.033	2.1

ENGAGE Project Phase I Report: Biochar Characterization
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Sample	(Surface area) S _{BET} (m ² /g)	S _{micro} (m ² /g)	S _{meso} (m ² /g)	V _{0.97} (cm ³ /g)	V _u (cm ³ /g)	V _{meso} (cm ³ /g)	Ash	Carbon
Gray Pine with bark	413	323	90	0.18	0.12	0.06	1.11- 1.27%	80.2%
Spruce without Bark	502	423	79	0.21	0.16	0.05	0.991%	83.8%
<i>Alcarbon IC-60 (Commercial Activated carbon)</i>	1109	963	146	0.45	0.37	0.08		
<i>Standard Silica Alumina Measured</i>	199	0	199	0.61	0.00	0.61		
<i>Standard Silica Alumina</i>	210 ±21	0	210 ±21	0.62 ±0.08	0.00	0.62 ±0.08		

Summary of Analytical Results of ESW Carbon Samples EWS Biochar (received on 2016Oct21)

Parameter	Results	Method
Carbon Content on a dry basis	81.61% ± 0.044% at 95% confidence	ASTM E777 Standard Test Method for Carbon and Hydrogen in the Analysis Sample of Refuse-Derived Fuel
Ash Content	2.70% ± 0.756% at 95% confidence	ASTM D2866 Standard Test Method for Total Ash Content of Activated Carbon
pH	8.55 at a biochar-to-water ratio of 1 : 4.6	Saturated media extract method

Note: The EWS sample was ground and dried in air to 103°C to constant weight. A subsample was taken for the lab analyses. This sample preparation was based on In-house method modified based on ASTM E829.