

Valorization of Spent Vetiver Roots for Biochar Generation

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Supplementary Information

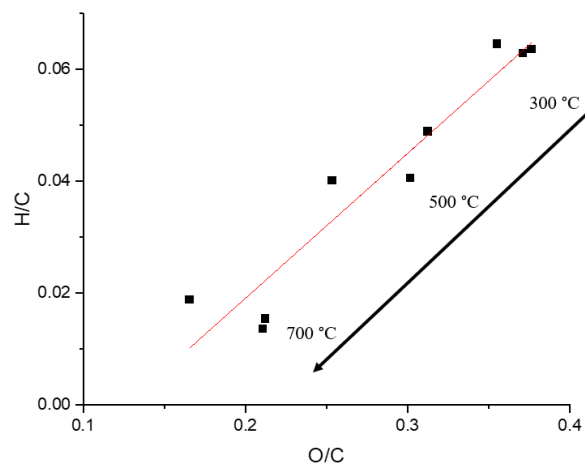


Figure S1: The Van Krevelen plot of biochar produced at 300, 500, and 700°C. Van Krevelen plot was generated using the atomic ratios of H/C and O/C of biochar produced at varied pyrolysis temperatures. At higher biochar production temperatures, the atomic ratios H/C and O/C were lower.

Table S1: Elemental Composition of Vetiver Root Biochar

Sample ID	Hg	As	Zn	Cd	Pb	Ni	Cr	Cu
	µg/kg							
B1-300-30	0.232	0.053	14.62	0.155	0.183	5.678	1.855	10.62
B2-300-60	0.206	0.040	11.98	0.147	0.177	4.446	1.826	7.592
B3-300-120	0.204	0.032	9.449	0.139	0.136	1.795	1.644	7.365
B4-500-30	0.193	0.018	9.312	0.121	0.127	1.743	0.920	7.003
B5-500-60	0.191	0.016	7.706	0.086	0.126	1.622	0.862	5.127
B6-500-120	0.190	0.015	6.947	0.075	0.106	0.876	0.725	4.667
B7-700-30	0.186	0.010	4.664	0.072	0.100	0.824	0.722	4.622
B8-700-60	0.186	0.009	4.336	0.068	0.097	0.341	0.673	4.522
B9-700-120	0.165	0.008	3.795	0.064	0.076	0.294	0.642	4.254

Biochars were prepared at three temperatures – 300, 500, and 700°C and three retention times – 30, 60, and 90 min. identified as B1 through B9.

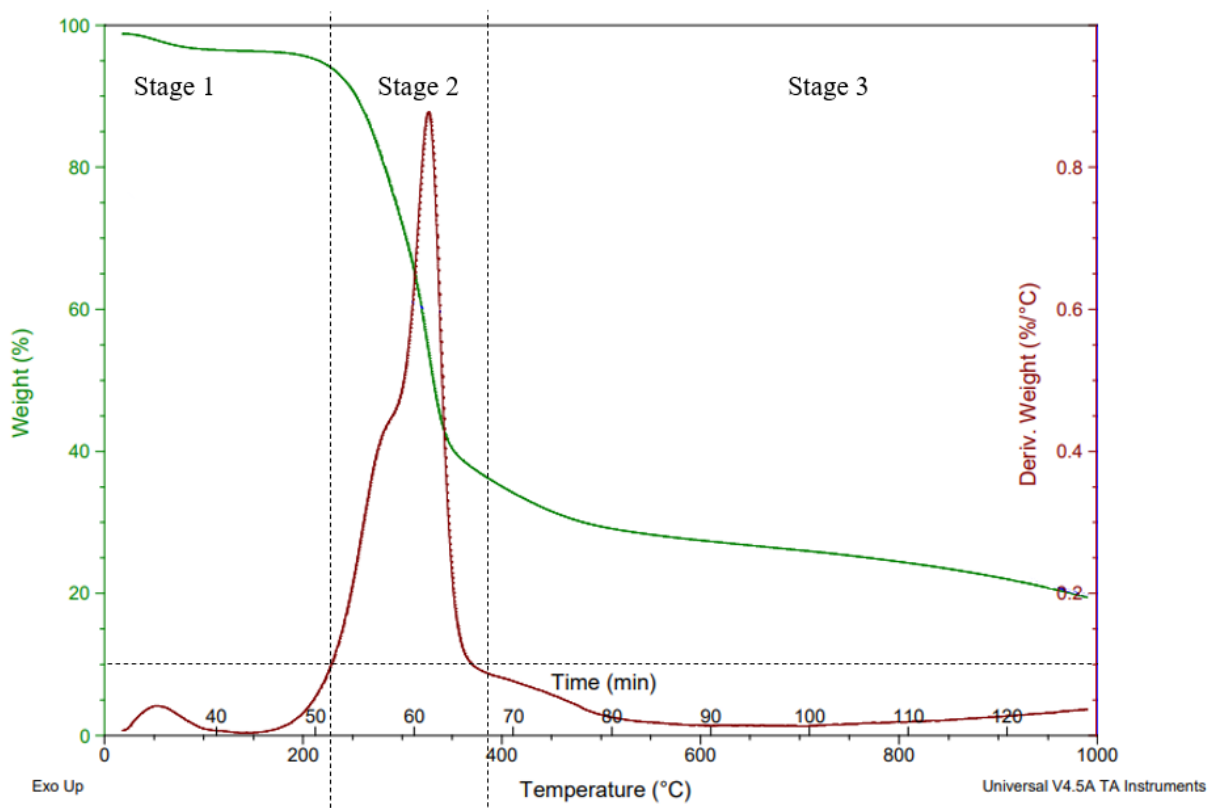


Figure S2: Thermogravimetric (TG) and derivative thermogravimetric (DTG) analysis for Vetiver Roots. Weight loss and derivative weight loss of the roots at heating rates of $10^{\circ}\text{C min}^{-1}$ through a temperature range of 25 to 1000°C . The whole mass loss curves for the roots can be separated into three stages, as shown in the diagram.

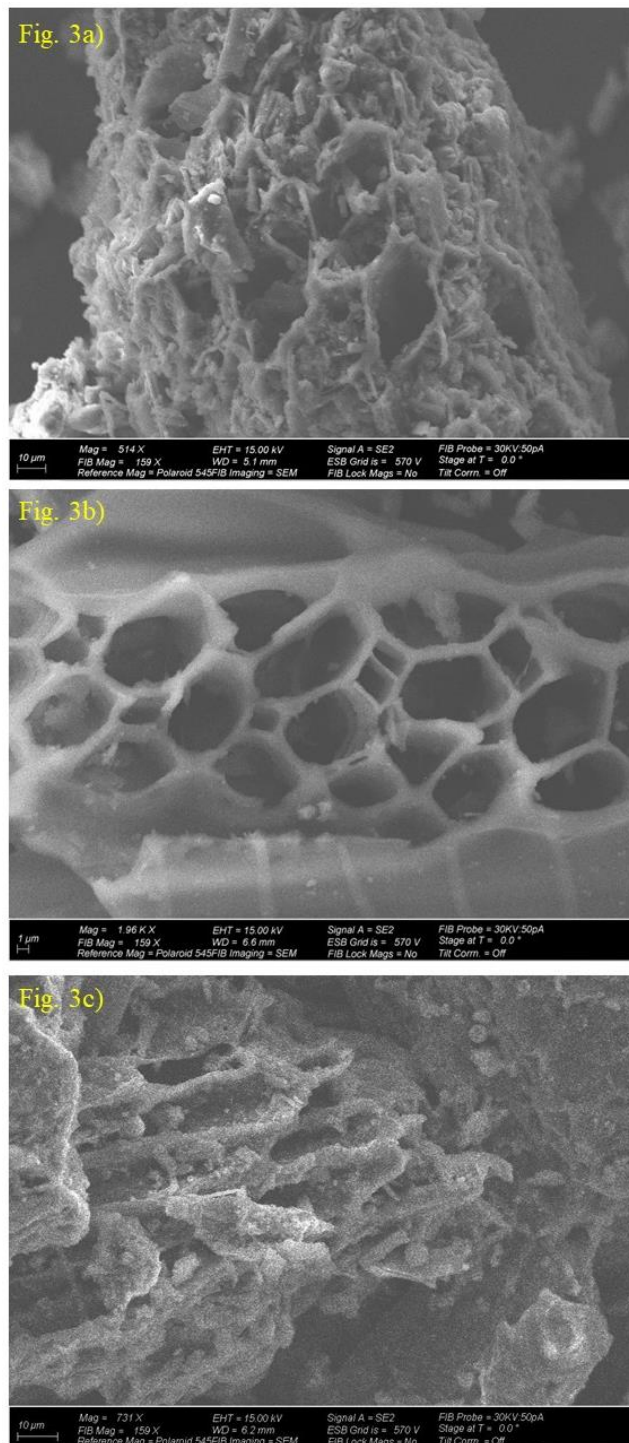


Figure S3. Spectroscopic analysis of vetiver biochar: Scanning Electron Microscope images for milled biochar particles: a) SEM for 300 °C - 60 min; b) SEM for 500 °C - 60 min; c) SEM for 700 °C - 60 min.