


Supplementary Information

New Proposal for Sugarcane Vinasse Treatment by Hydrothermal Carbonization: An Evaluation of Solid and Liquid Products

*Laís G. Fregolente,^a Antonio J. R. de Castro,^b Altair B. Moreira,^a Odair P. Ferreira^b and
Márcia C. Bisinoti *,^a*

^a*Laboratório de Estudos em Ciências Ambientais, Departamento de Química e Ciências Ambientais,
Instituto de Biociências, Letras e Ciências Exatas, Universidade Estadual Paulista (Unesp),
Campus São José do Rio Preto, Rua Cristóvão Colombo, 2265, 15054-000 São José do Rio Preto-SP, Brazil*

^b*Laboratório de Materiais Funcionais Avançados (LaMFA), Departamento de Física,
Universidade Federal do Ceará, CP 6030, 60455-900 Fortaleza-CE, Brazil*

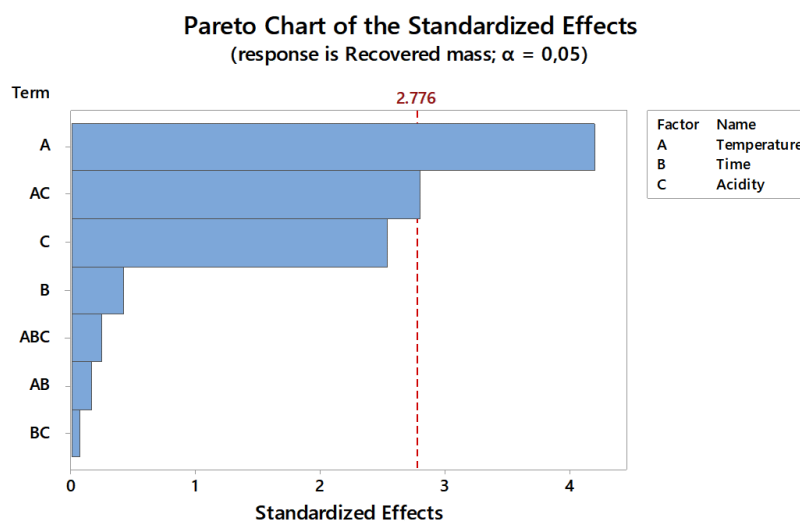


Figure S1. Pareto chart of the temperature, acidity and residence time effects for recovered mass as response.

*e-mail: mbisinoti@hotmail.com

Table S1. Concentration of nutrients present in hydrochar

Hydrochar	Na / (mg kg ⁻¹)	Al / (mg kg ⁻¹)	Ca / (mg kg ⁻¹)	Fe / (mg kg ⁻¹)	Cu / (mg kg ⁻¹)	K / (mg kg ⁻¹)	Mg / (mg kg ⁻¹)	Zn / (mg kg ⁻¹)
C1	4.4	24.4	15.8	4.9	69.4	0.20	0.16	8.1
C2	4.8	0.8	29.4	0.3	8.3	0.02	0.07	7.0
M	5.5	17.9	40.3	0.8	25.9	0.05	0.08	9.5
D2	11.8	0.2	22.4	0.4	69.4	0.11	0.22	46.9
D3	9.5	19.8	7.8	2.3	73.6	0.07	0.09	23.5
D4	12.2	1.9	20.9	2.3	68.6	0.11	0.23	49.7

C1 and C2: reactions performed at 100 °C; M: reaction performed at 150 °C; D2-D4: reactions performed at 200 °C.

Table S2. Concentration of nutrients present in process water

Process water	Na / (mg L ⁻¹)	Al / (mg L ⁻¹)	Ca / (mg L ⁻¹)	Fe / (mg L ⁻¹)	Cu / (mg L ⁻¹)	K / (mg L ⁻¹)	Mg / (mg L ⁻¹)	Zn / (mg L ⁻¹)
C1	49.2	22.9	3.8	50.5	3.4	60.5	42.7	61.8
C2	48.4	43.0	11.0	52.4	40.0	61.7	53.9	59.1
M	56.8	50.0	5.4	63.9	18.8	72.8	50.9	71.4
D2	48.9	42.7	7.7	53.8	2.6	60.3	50.1	57.3
D3	50.0	23.5	2.3	30.7	1.7	63.5	41.9	59.1
D4	47.8	44.8	5.4	51.4	1.7	57.2	45.3	47.3

C1 and C2: reactions performed at 100 °C; M: reaction performed at 150 °C; D2-D4: reactions performed at 200 °C.

Table S3. Instrumental conditions for flame atomic absorption spectrometry (FAAS) analysis

Element	Wavelength / nm	Slit width / nm	Lamp current / mA	Flame type / (L min ⁻¹)	Analytical curve / (mg L ⁻¹)
Na	589.0	0.2	–	air / acetylene, 13.50 / 2.00	1.0; 3.0; 5.0; 7.0; 11.0
Al	309.3	0.5	10.0	N ₂ O / acetylene, 10.60 / 8.60	1.0; 3.0; 5.0; 7.0
Ca	239.9	0.2	10.0	N ₂ O / acetylene, 11.00 / 6.35	10.0; 20.0; 40.0; 60.0
K	766.5	0.2	–	air / acetylene, 13.50 / 2.00	1.0; 3.0; 5.0; 7.0; 9.0
Mg	202.6	1.0	10.0	air / acetylene, 13.50 / 2.00	0.5; 1.0; 2.0; 5.0
Fe	372.0	0.2	5.0	air / acetylene, 13.50 / 2.00	0.5; 1.0; 3.0; 5.0
Cu	324.8	0.5	4.0	air / acetylene, 13.50 / 2.00	0.5; 1.0; 3.0; 5.0
Zn	213.9	1.0	5.0	air / acetylene, 13.50 / 2.00	0.1; 0.5; 1.0; 1.5; 2.0

–: concentration was determined through emission mode.