Exploration of Eco-Friendly Hydrochar's Potential in Advanced Oxidative Processes for Dicamba Degradation within a Circular Bio-Economy Framework

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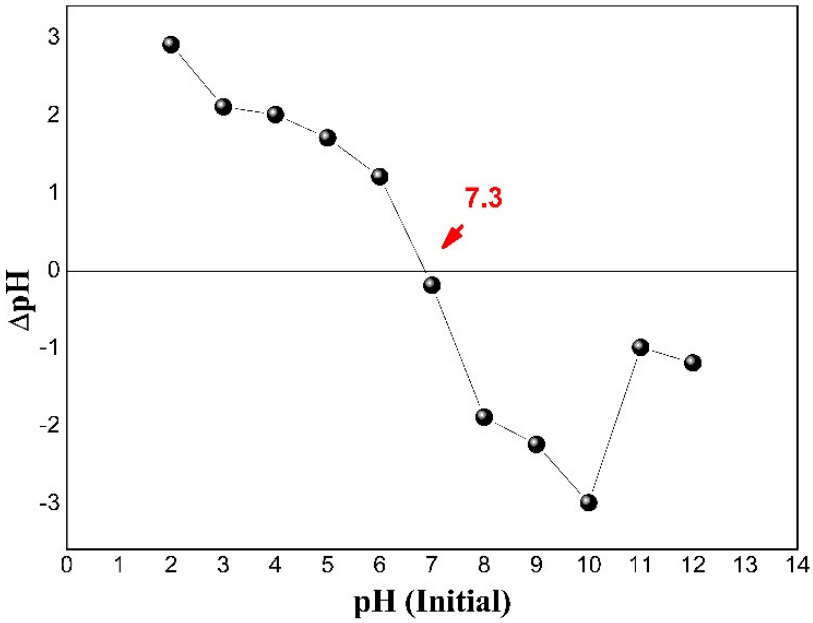

Figure S1. pH_{PZC} for Hy-Fe produced via hydrothermal synthesis (HTC).

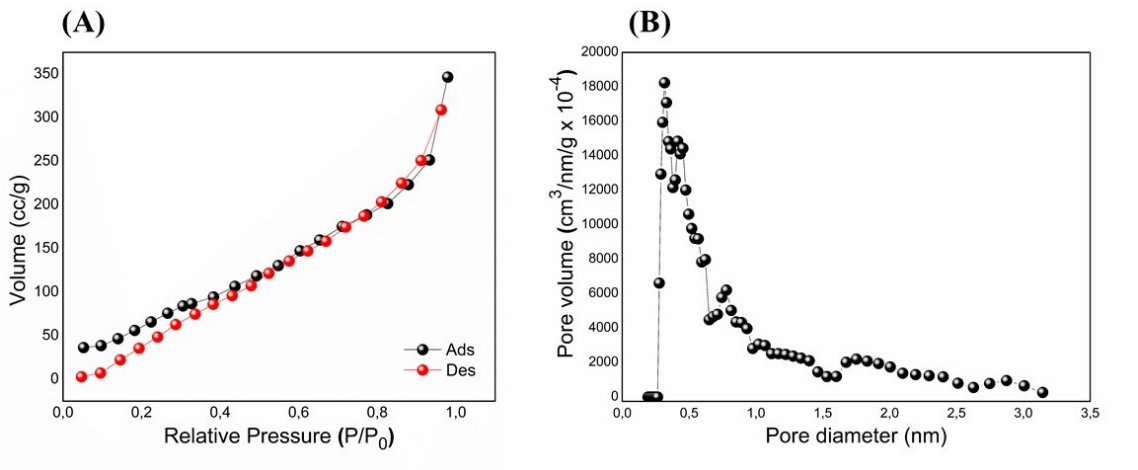

Figure S2. (A) N_2 adsorption-desorption isotherms and (B) Pore distribution for Hy-Fe produced via hydrothermal synthesis.

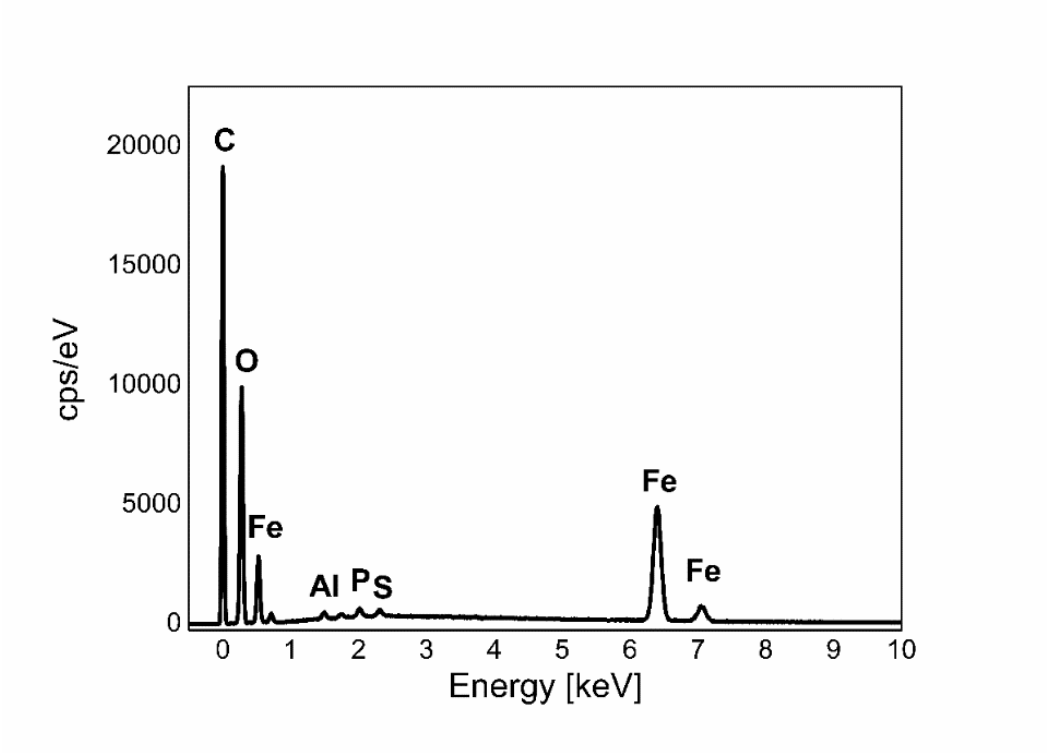

Figure S3. EDS analysis for Hy-Fe produced via hydrothermal synthesis (HTC).

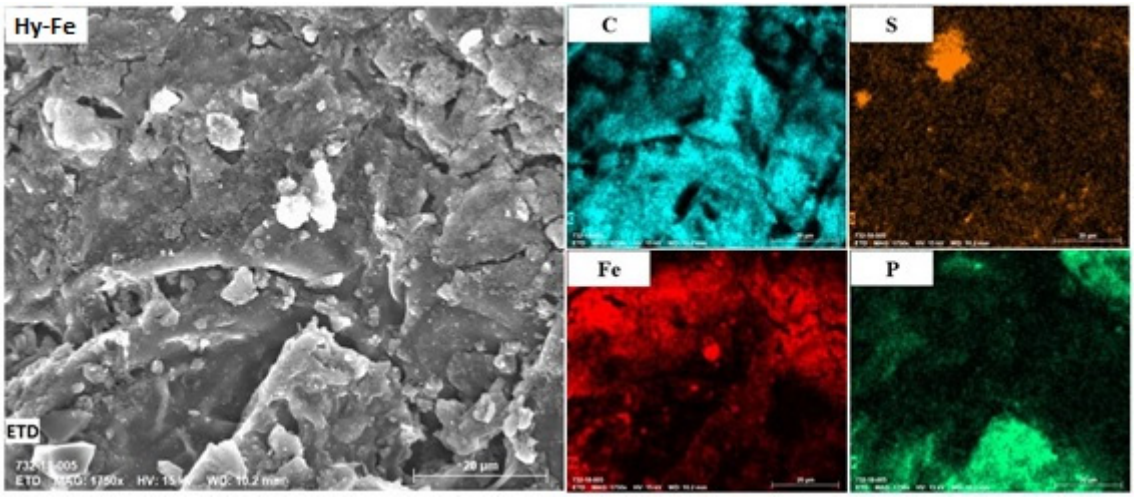

Figure S4. Chemical element mapping by EDS for Hy-Fe produced via hydrothermal synthesis (HTC).

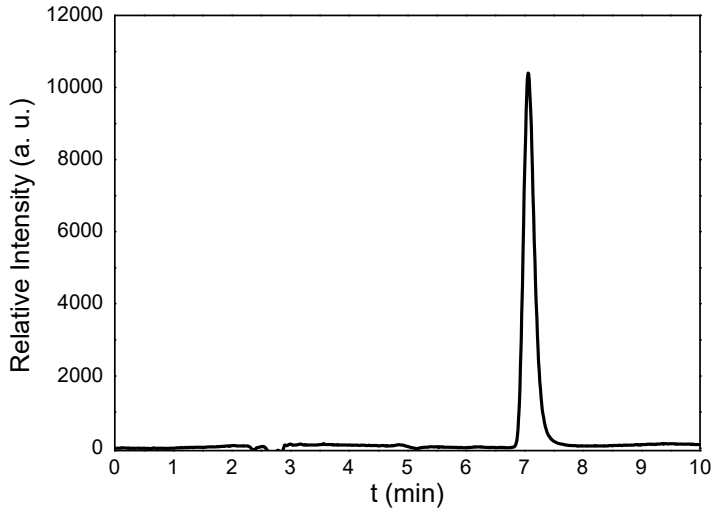

Figure S5. Chromatogram of standard dicamba (50.00 mg L^{-1}). Analysis conditions: C18 column, Keystone NA (Keystone Scientific, Bellefonte, PA), mobile phase of (v/v) 50% of acetonitrile/50% of H_2O with 0.01 % H_3PO_4 and flow rate of 1.00 mL min^{-1}, with quantification at 275 nm.

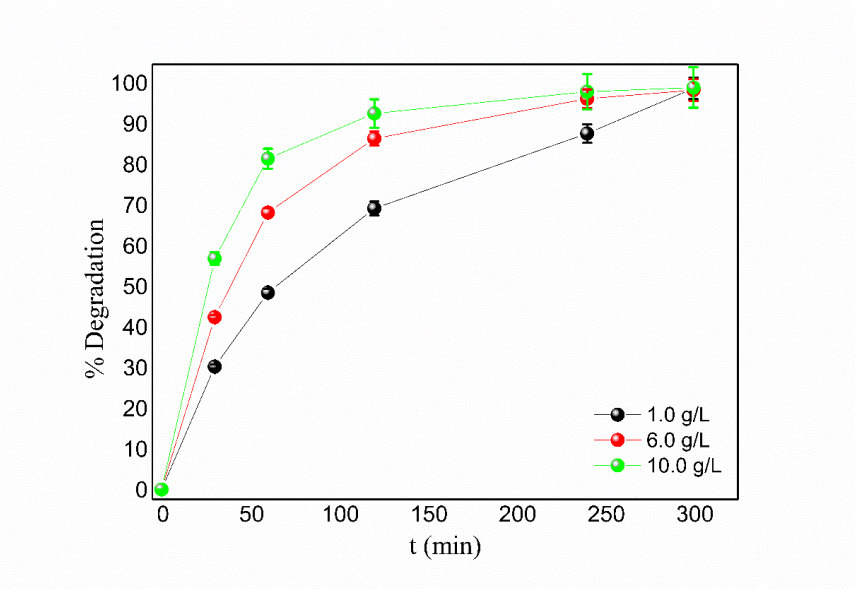

Figure S6. Evaluation of Hy-Fe dose on dicamba degradation. Experimental conditions: 100.00 mL of dicamba solution (50.00 mg L^{-1}); 1.00 mL of H_2O_2 1.00 mmol L^{-1}; 1.00 mL of aluminum sulfate solution ($Al_2(SO_4)_3$) (1.00 mol L^{-1}); 25 °C.

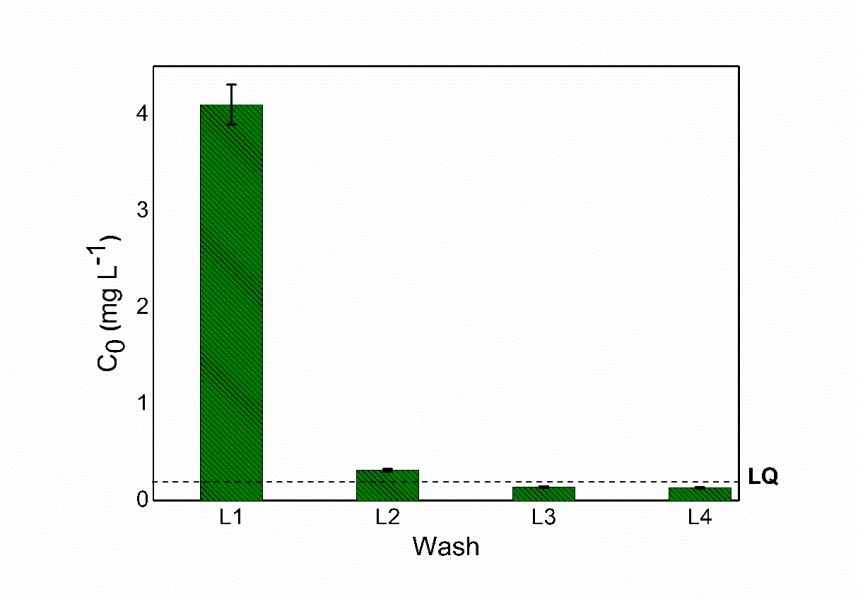

Figure S7. Quantification of dicamba concentration found in the different Personal Protective Equipment (PPE) washes.

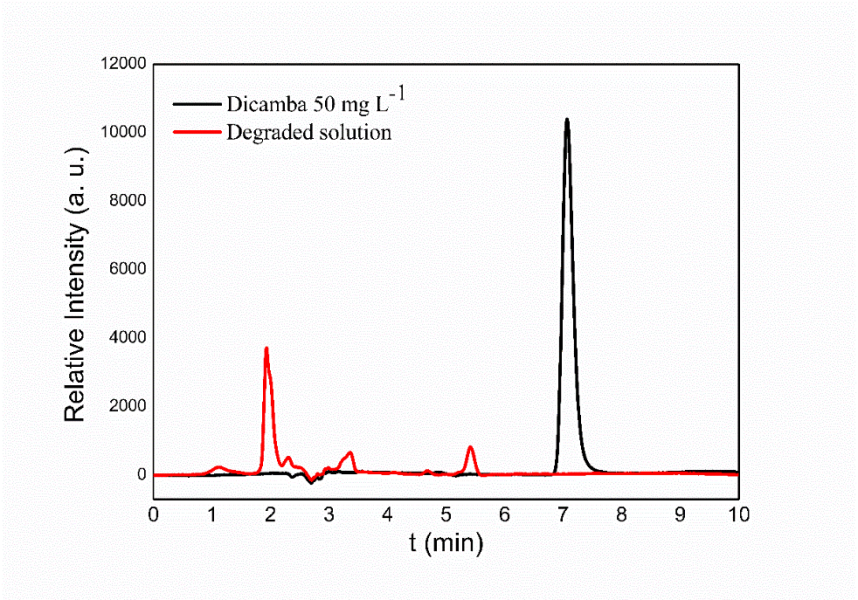

Figure S8. Comparison of the chromatogram of a 50.00 mg L^{-1} commercial dicamba solution, and the same solution after the degradation process for 5 hours. Analysis conditions: C18 column, Keystone NA (Keystone Scientific, Bellefonte, PA), mobile phase of (v/v) 50% acetonitrile/ 50% of H_2O with 0.01 % H_3PO_4 and flow rate of 1.00 ml min^{-1}, with quantification at 275 nm.

Figure S9. Apparent intoxication at 21 DAA (A) control solution (water), (B) commercial dicamba 50.00 mg L^{-1}, (C) commercial dicamba 50.00 mg L^{-1} degraded with Hy-Fe 1.00 g L^{-1}, (D) commercial dicamba 50.00 mg L^{-1} degraded with Hy-Fe 6.00 g L^{-1} e (E) commercial dicamba 50.00 mg L^{-1} degraded with Hy-Fe 10.00 g L^{-1}.

Figure S10. Apparent intoxication at 21 DAA (A) control solution (water), (B) commercial dicamba 50.00 mg L^{-1}, (C) commercial dicamba 50.00 mg L^{-1} degraded with constant agitation, (D) commercial dicamba 50.00 mg L^{-1} degraded with periodic agitation and (E) commercial dicamba 50.00 mg L^{-1} degraded without agitation.

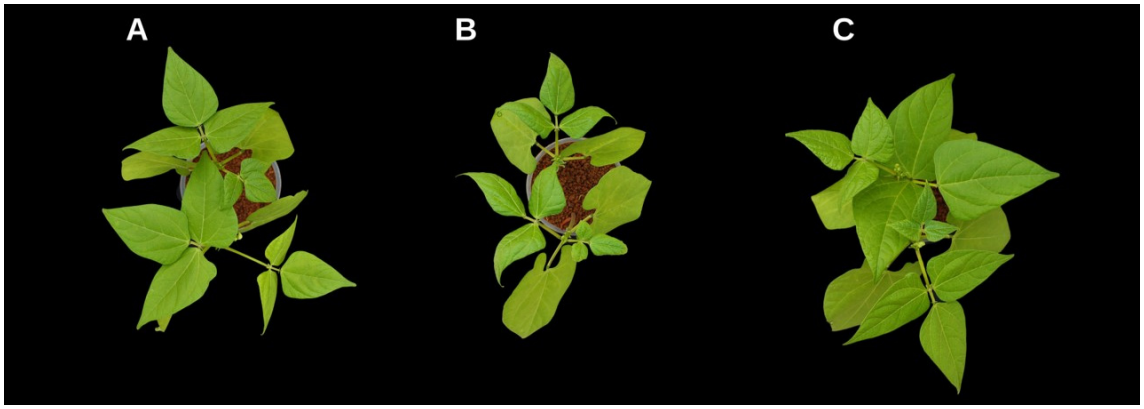

Figure S11. Apparent intoxication at 21 DAA (A) control solution (water), (B) commercial dicamba 5.00 mg L^{-1}, (C) commercial dicamba 5.00 mg L^{-1} degraded.

Table S1. Chemical composition of the inorganic portion of Hy-Fe by FRX.

Sample	Fe_2O_3 mass%	SiO_2 mass%	Al_2O_3 mass%	SO_3 mass%	P_2O_5 mass%	K_2O mass%	CaO mass%	Co_2O_3 mass%
Hy-Fe	52.41	19.82	14.30	5.81	4.19	0.13	0.10	0.14
	51.91	19.81	15.19	5.72	4.12	0.12	0.11	0.13

Table S2. Room temperature hyperfine parameters of Hy-Fe.

Samples	Fases	δ (± 0.05) mm/s	/2ξq (± 0.05) mm/s	B_{HF} (± 0.5) Tesla	Area (%)
Hy-Fe	(Fe^{3+})	0.25	0.53	-	100