Supporting Information.

1. Selection of optimal sonication time for MnO_2-Fique fiber biocomposite synthesis. A series of UV-Vis spectra in Figure 1 shows the effect of sonication times above 45 minutes for the *in situ* synthesis of MnO_2 on Fique fibers. Beyond 45 minutes we observed a decrease in the absorption maximum corresponding to colloidal MnO_2 nanoparticles (λ 320 nm). This is due to the reduction process of MnO_2 to Mn^{2+} caused by excessive exposure to ultrasound waves, as it has been reported previosly. Thus, it was established that the irradiation time of ultrasonic waves (22kHz, 130W), for optimal synthesis of MnO_2 nanoparticles was 45 minutes.

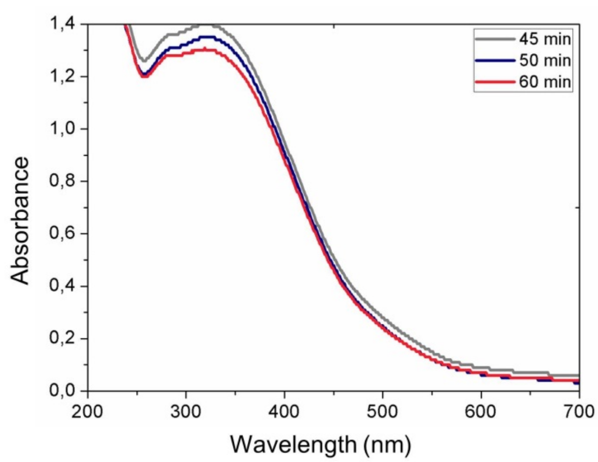

Figure S1.

2. Reuse assays data. These results correspond to eight reuse assays for bionanocomposites synthesized from a $KMnO_4$ concentration of 10 mM.

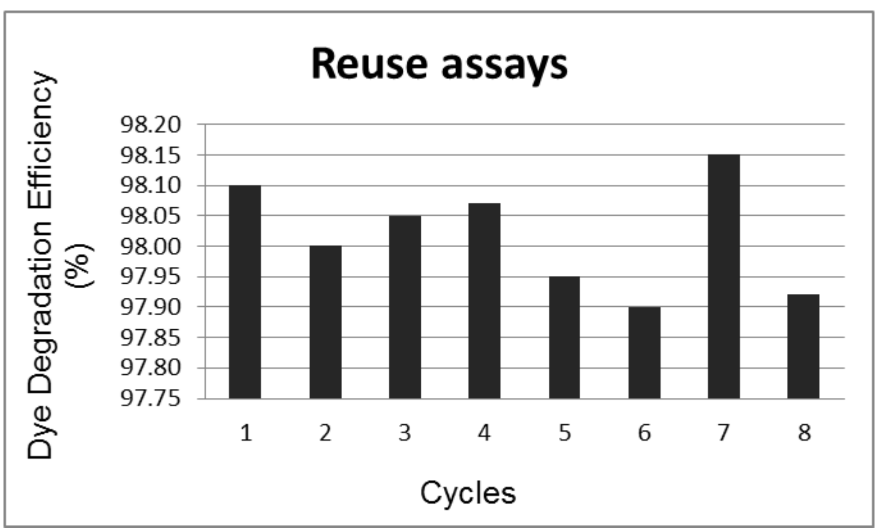

Figure S2.

Table S1. Dye Degradation reuse assays.

Cycles	Dye Degradation efficiency (CR% at $\lambda_{600\ nm}$)	
	Molar ratio dye: Mn (1:100)	Molar ratio dye: Mn (2:1)
1	98.10	98.00
2	98.00	95.95
3	98.05	96.05
4	98.07	95.08
5	97.95	91.16
6	97.90	89.38
7	98.15	88.61
8	97.92	85.36

3. Mass spectra of indigo carmine degradation products.

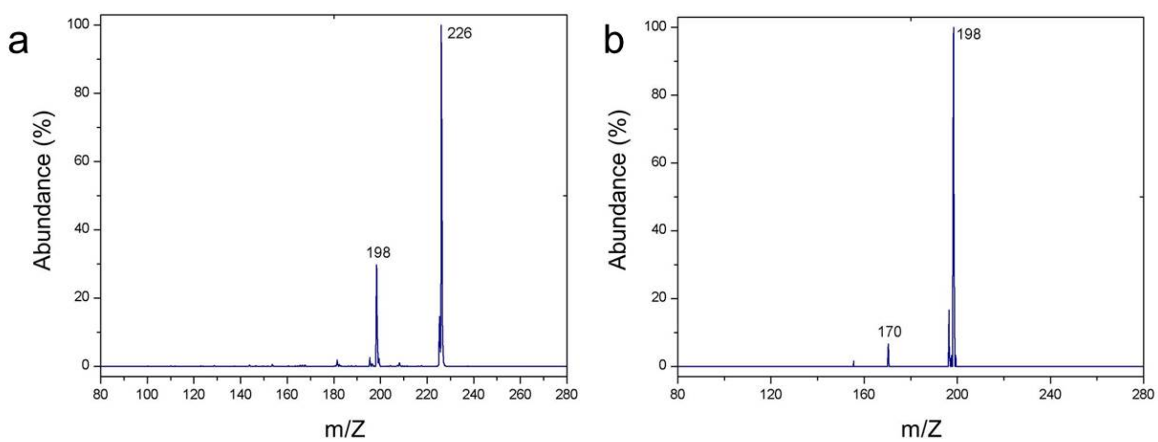

Figure S3. a) Ion fragmentation m/z 226. b) Ion fragmentation m/z 198 from m/z 226.

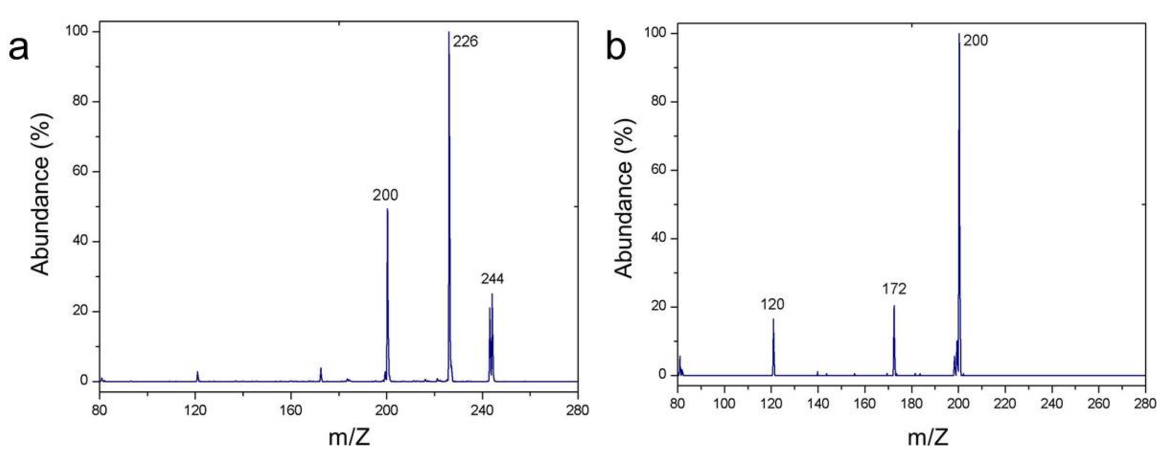

Figure S4. a) Ion fragmentation m/z 244. b) Ion fragmentation m/z 200 from m/z 244.

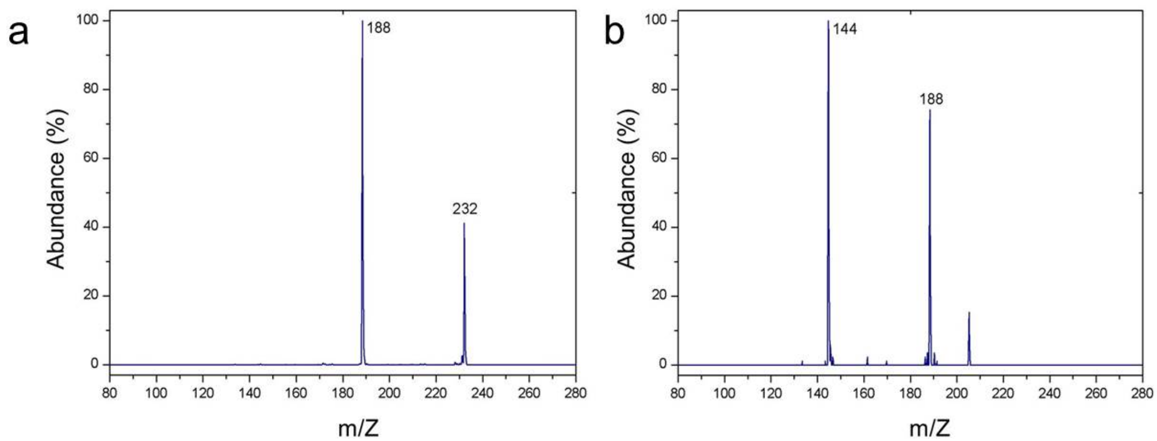

Figure S5. a) Ion fragmentation m/z 232. b) Ion fragmentation m/z 188 from m/z 232.

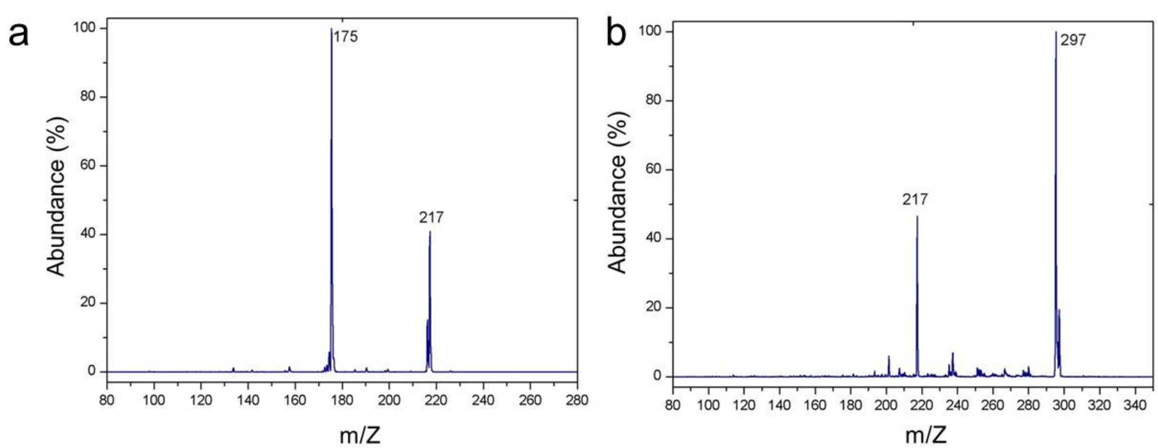

Figure S6. a) Ion fragmentation m/z 217. b) Ion fragmentation m/z 297.

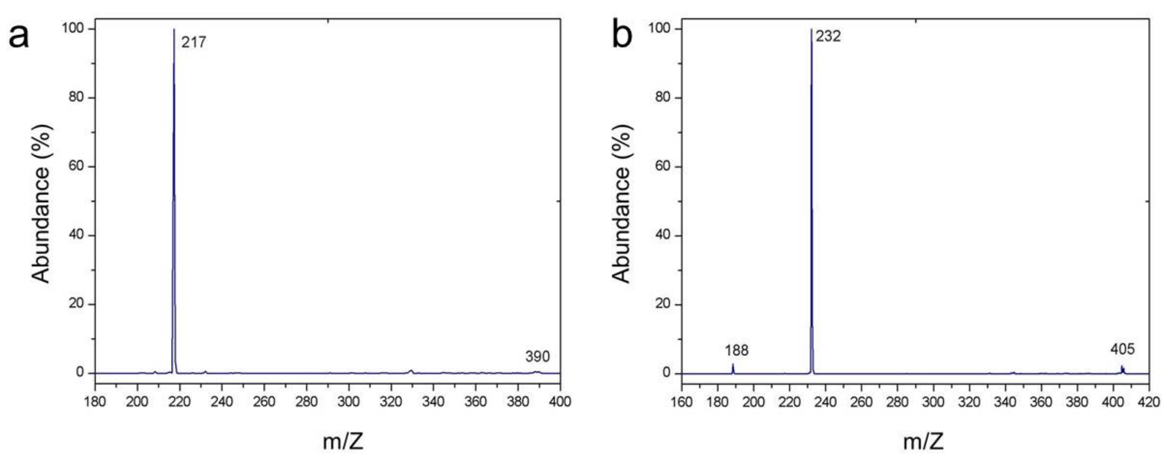

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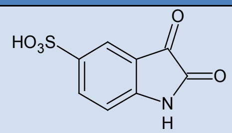
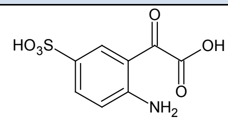
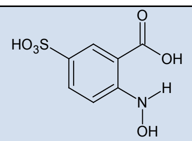
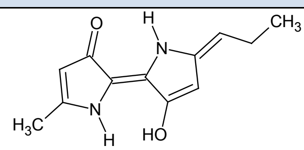
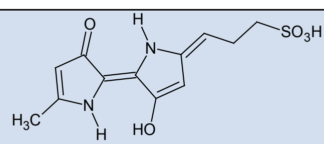
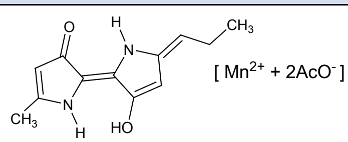
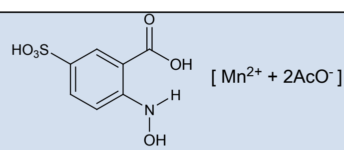
Figure S7. a) Ion fragmentation m/z 390. b) Ion fragmentation m/z 405.

Table S2. Fragment ions from main degradation products of indigo carmine.

Ion structure in mass spectrum	Fragment ions
 227 Da→ [227 – H]$^-$ (m/z=226)	m/z=198 → [226-CO]$^-$ m/z=170 → [198-CO]$^-$
 245 Da → [245-H]$^-$ (m/z=244)	m/z=226 → [244-H_2O]$^-$ m/z=200 → [244-CO_2]$^-$ m/z=172→ [200-CO]- m/z=120→ [200-SO_3]$^-$
 233 Da → [233-H]$^-$ (m/z=232)	m/z=188→[232-CO_2]- m/z=144→[188-H_2CNO]-
 218 Da → [218-H]- (m/z=217)	m/z=175→[217-C_3H_6]-
 298 Da → [298-H]-	m/z=217 →[297-SO_3]-
 391 Da → [391-H]-	m/z=217→[390-Mn^{2+}-2AcO^-]$^-$
 406 Da → [406-H-]-	m/z=232→[405-Mn^{2+}-2AcO^-]$^-$

Electronic Supplementary Material (ESI) for Green Chemistry
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Table S3. Fragment ions from the main degradation products of indigo carmine.

Precursor ions	MS^2 observed fragments
m/z 226: $[1-H]^-$	m/z 198: $[1-H-CO]^-$
m/z 244: $[2-H]^-$	m/z 226: $[2-H-H_2O]^-$ m/z 200: $[2-H-CO_2]^-$ m/z 172: $[2-H-CO_2-CO]^-$ m/z 120: $[2-H-CO_2-SO_3]^-$
m/z 232: $[3-H]^-$	m/z 188: $[3-H-CO_2]^-$ m/z 144: $[3-H-CO_2-CH_2NO]^-$
m/z 297: $[5-H]^-$	m/z 217: $[5-H-SO_3]^-$
m/z 217: $[6-H]^-$	m/z 175: $[6-H-C_3H_6]^-$
m/z 390	m/z 217: $[390-Mn^{2+}-2AcO^-]^-$
m/z 405	m/z 232: $[405 -Mn^{2+}-2AcO^-]^-$