

# Supplementary Material

## Reduction of hexavalent chromium by compost-derived dissolved organic matter

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### 6 Figures and 3 Tables

**Fig. S1** FTIR spectra of DOM<sub>C</sub> fractions (HA<sub>C</sub> and FA<sub>C</sub>) and soil humic matter fractions (HA<sub>B</sub>, HA<sub>R</sub>, FA<sub>B</sub>, and FA<sub>R</sub>)

**Fig. S2** UV-Vis absorbance spectra of (a) HA<sub>C</sub>, (b) HA<sub>B</sub>, (c) HA<sub>R</sub>, (d) FA<sub>C</sub>, (e) FA<sub>B</sub>, and (f) FA<sub>R</sub> upon the addition of Cr(VI).

**Fig. S3** Differential log-transformed UV-Vis absorbance spectra of (a) HA<sub>C</sub>, (b) HA<sub>B</sub>, (c) HA<sub>R</sub>, (d) FA<sub>C</sub>, (e) FA<sub>B</sub>, and (f) FA<sub>R</sub> upon the addition of Cr(VI).

**Fig. S4** Synchronous maps of (a) HA<sub>C</sub>, (b) HA<sub>B</sub>, (c) HA<sub>R</sub>, (d) FA<sub>C</sub>, (e) FA<sub>B</sub>, and (f) FA<sub>R</sub> upon the addition of Cr(VI). The  $x_1$  or  $x_2$  axis represents the wavelength of the UV-Vis absorbance spectra.

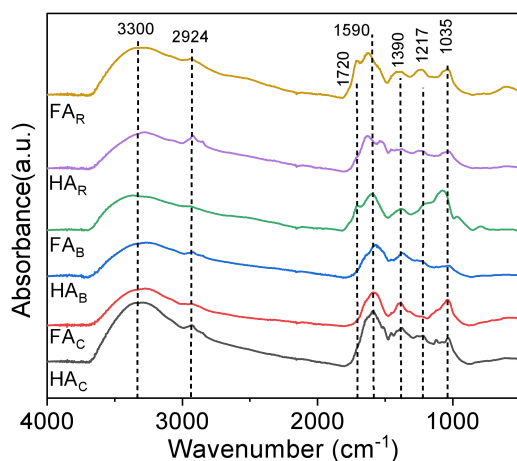
**Fig. S5** Asynchronous maps for (a) HA<sub>C</sub>, (b) HA<sub>B</sub>, (c) HA<sub>R</sub>, (d) FA<sub>C</sub>, (e) FA<sub>B</sub>, and (f) FA<sub>R</sub> upon the addition of Cr(VI). The  $x_1$  or  $x_2$  axis represents the wavelength of the UV-Vis absorbance spectra.

**Fig. S6** Synchronous 2D-SFS-COS maps of the six organic matter fractions (a, HA<sub>C</sub>; b, HA<sub>B</sub>; c, HA<sub>R</sub>; d, FA<sub>C</sub>; e, FA<sub>B</sub>; f, FA<sub>R</sub>). The  $x_1$  or  $x_2$  was the excitation wavelength (nm) of the SFS.

**Fig. S7** Asynchronous 2D-SFS-COS maps of the six organic matter fractions (a, HA<sub>C</sub>; b, HA<sub>B</sub>; c, HA<sub>R</sub>; d, FA<sub>C</sub>; e, FA<sub>B</sub>; f, FA<sub>R</sub>). The  $x_1$  or  $x_2$  was the excitation wavelength (nm) of the SFS.

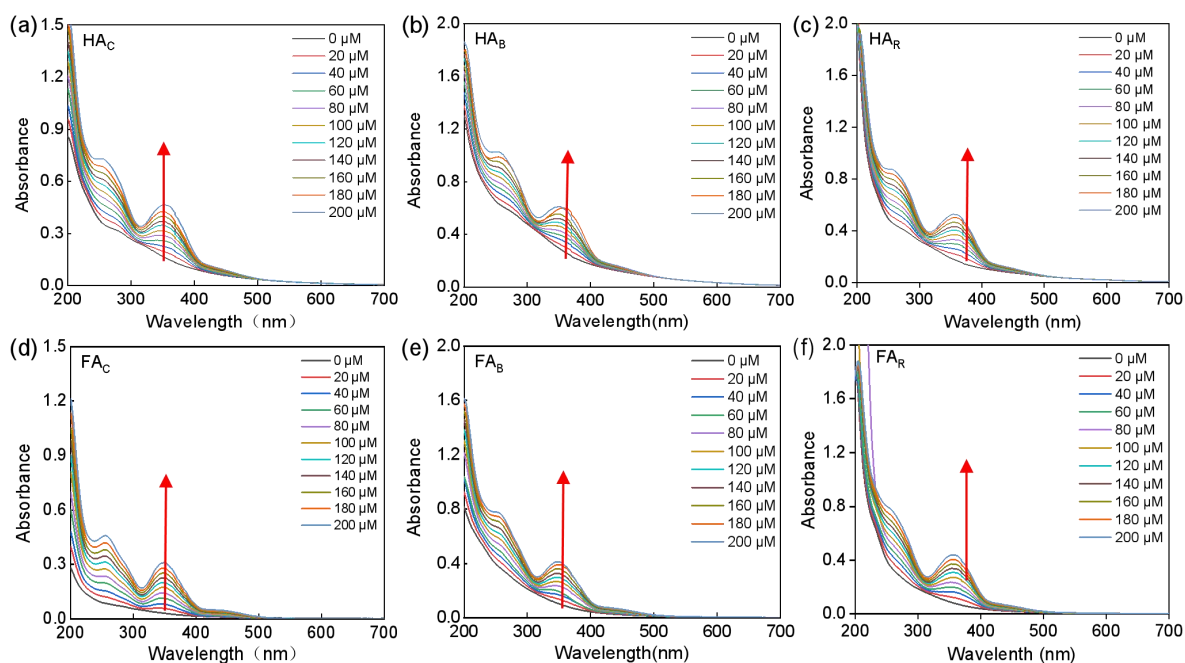
**Table S1** The content of HA and FA in the six organic matter fractions

**Table S2** The relative abundance of the integration of the three synchronous fluorescence regions of the six organic matter fractions

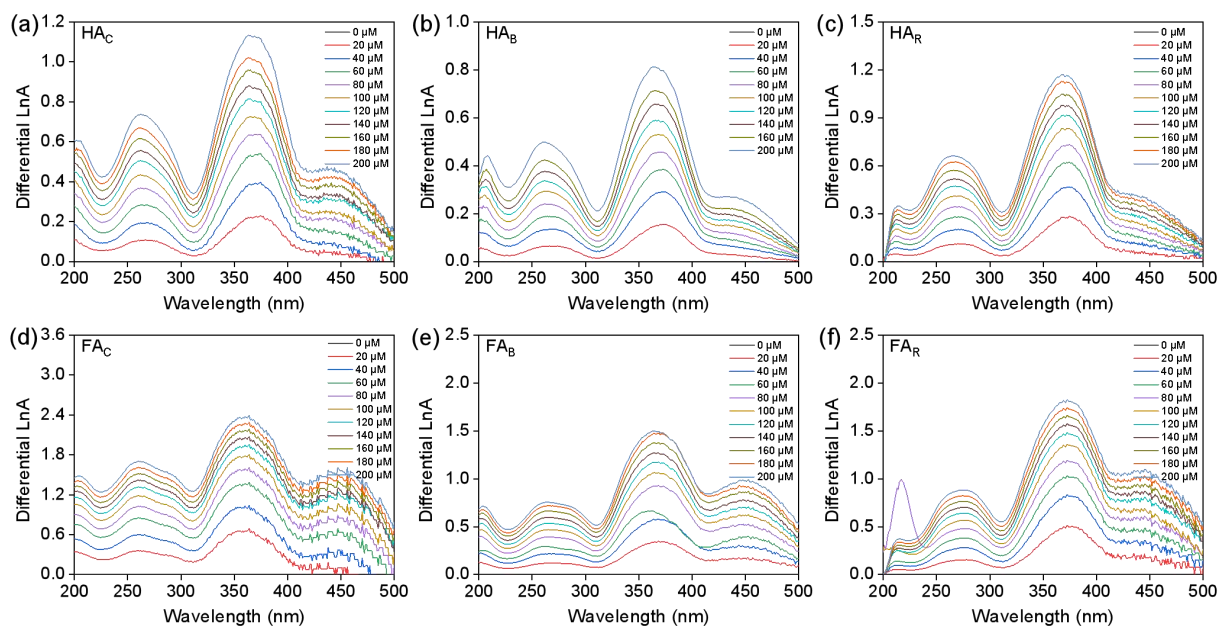


27  
 28 **Fig. S1** FTIR spectra of DOM<sub>C</sub> fractions (HAc and FAc) and soil humic matter fractions (HAB, HAR, FAB,  
 29 and FAR)

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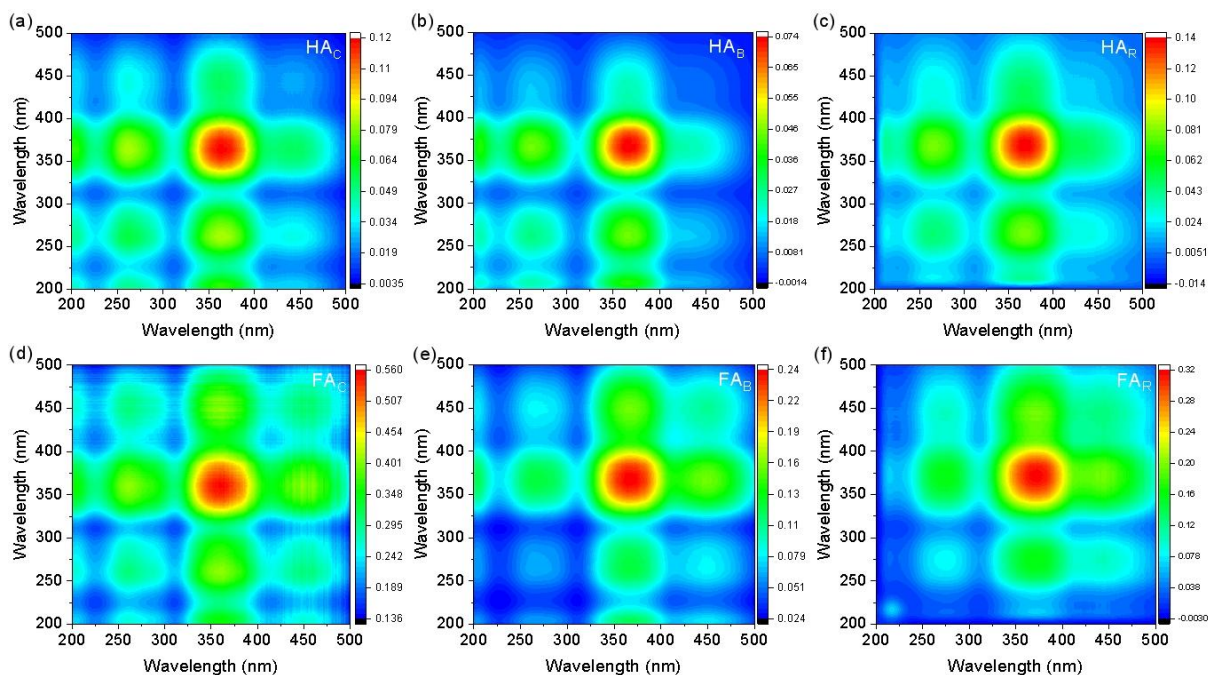


31  
 32 **Fig. S2** UV-Vis absorbance spectra of (a) HAc, (b) HAB, (c) HAR, (d) FAc, (e) FAB, and (f) FAR upon the  
 33 addition of Cr(VI).

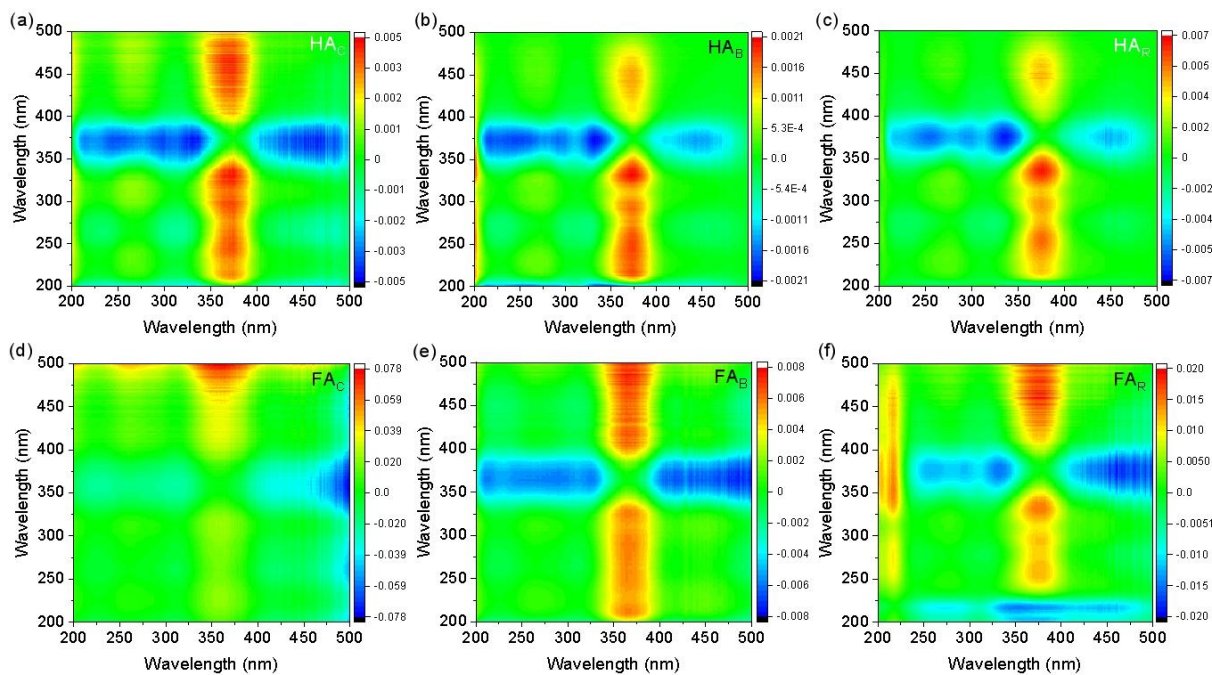


34  
 35 **Fig. S3** Differential log-transformed UV-Vis absorbance spectra of (a) HA<sub>C</sub>, (b) HA<sub>B</sub>, (c) HA<sub>R</sub>, (d) FA<sub>C</sub>, (e) FA<sub>B</sub>,  
 36 and (f) FA<sub>R</sub> upon the addition of Cr(VI).

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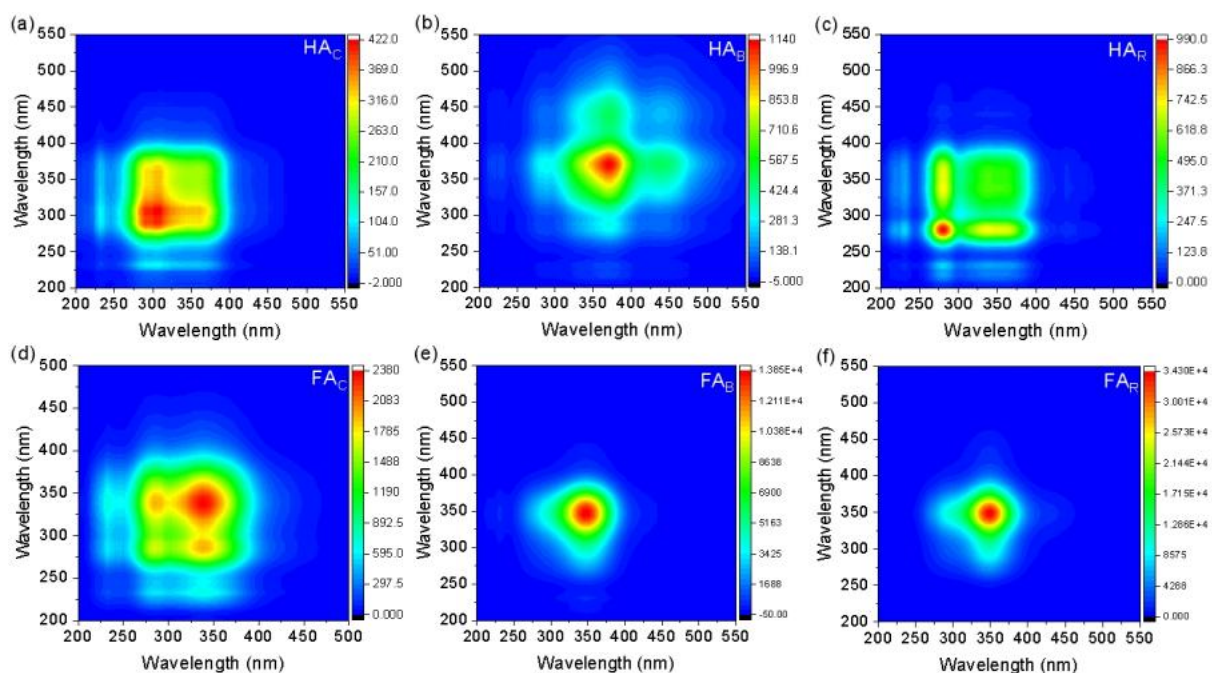


38  
 39 **Fig. S4** Synchronous maps of (a) HA<sub>C</sub>, (b) HA<sub>B</sub>, (c) HA<sub>R</sub>, (d) FA<sub>C</sub>, (e) FA<sub>B</sub>, and (f) FA<sub>R</sub> upon the addition of  
 40 Cr(VI). The  $x_1$  or  $x_2$  axis represents the wavelength of the log-transformed UV-Vis absorbance spectra.

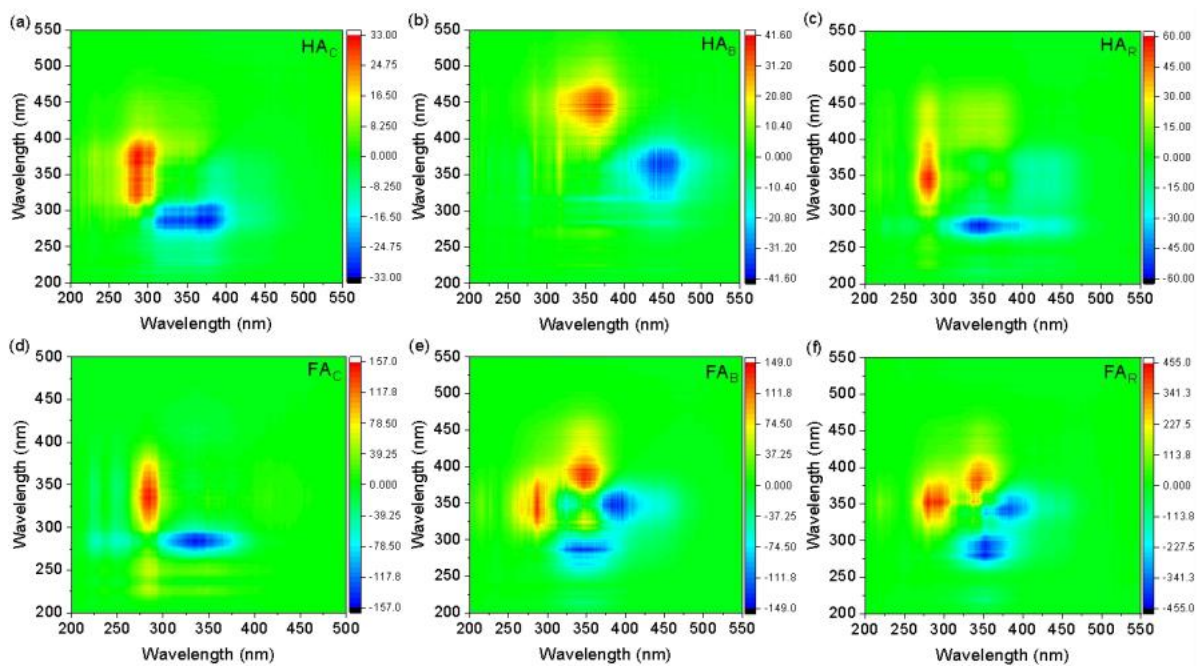


41  
 42 **Fig. S5** Asynchronous maps for (a) HA<sub>C</sub>, (b) HA<sub>B</sub>, (c) HA<sub>R</sub>, (d) FA<sub>C</sub>, (e) FA<sub>B</sub>, (f) FA<sub>R</sub> upon the addition of  
 43 Cr(VI). The  $x_1$  or  $x_2$  axis represents the wavelength of the log-transformed UV-Vis absorbance spectra.

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45  
 46 **Fig. S6** Synchronous 2D-SFS-COS maps of the six organic matter fractions (a, HA<sub>C</sub>; b, HA<sub>B</sub>; c, HA<sub>R</sub>; d,  
 47 FA<sub>C</sub>; e, FA<sub>B</sub>; f, FA<sub>R</sub>). The  $x_1$  or  $x_2$  was the excitation wavelength (nm) of the SFS.



48  
 49 **Fig. S6** Asynchronous 2D-SFS-COS maps of the six organic matter fractions (a,  $HA_C$ ; b,  $HA_B$ ; c,  $HA_R$ ; d.  $FA_C$ ; e,  
 50  $FA_B$ ; f,  $FA_R$ ). The  $x_1$  or  $x_2$  was the excitation wavelength (nm) of the SFS.

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53 **Table S1** The content of HA and FA in the six organic matter fractions

Origin	HA (g C kg <sup>-1</sup> )	FA (g C kg <sup>-1</sup> )	HA/FA	TOC (g kg <sup>-1</sup> )	(HA+FA)/TOC (%)
Black soil	1.24	2.11	0.59	14.91	22.47
Red soil	0.35	1.79	0.20	6.18	34.66
DOM <sub>C</sub>	7.90	12.19	0.64	185.90	10.74

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55 **Table S2** The relative abundance of the integration of the three synchronous fluorescence regions of the six  
56 organic matter fractions

Fractions	HAC	FAC	HAB	FAB	HAR	FAR
Protein-like substances (%)	16.33	16.07	2.81	6.84	14.65	8.56
Fulvic acid-like substances (%)	53.60	65.47	34.21	66.24	44.77	68.95
Humic acid-like substances (%)	30.07	18.46	62.99	26.93	40.58	22.50

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