



**Figure. S1.** (a) initial contents of TOC and TN in PS, BS and FS, respectively; (b) initial contents of HS and HA in PS, BS and FS, respectively

**Table S1** Main characteristics of the Fourier transform infrared (FTIR) spectra of HAs during different composting process

Band (cm <sup>-1</sup> )	Chemical structures (assignment)	
3397–3411 (cm <sup>-1</sup> )	O–H stretch <sup>7</sup>	alcohols and phenols
2915–2961 cm <sup>-1</sup>	C–H stretch <sup>5</sup>	CH <sub>3</sub> and CH <sub>2</sub>
2522–2644 cm <sup>-1</sup>	O–H stretch <sup>6</sup>	hydrogen–bonded carboxylic group
1716–1728 cm <sup>-1</sup>	C=O stretch	ketone, carboxylic acids
1616–1631 cm <sup>-1</sup>	C=C stretch	alkenes and aromatic rings
1506–1545 cm <sup>-1</sup>	N–H bend	N–H structures, Amine
1452–1459 cm <sup>-1</sup>	C–H bend <sup>5</sup>	CH <sub>3</sub> and CH <sub>2</sub>
1410 cm <sup>-1</sup>	O–H bend	carboxylic groups
1375 cm <sup>-1</sup>	C–H bend <sup>4</sup>	CH <sub>3</sub>
1260–1240 cm <sup>-1</sup>	C–O stretch <sup>3</sup>	aromatic/unsaturated ethers, Amide III
1095/1030 cm <sup>-1</sup>	C–O stretch <sup>2</sup>	alcohols, aliphatic ethers
805 cm <sup>-1</sup>	C–H bend <sup>1</sup>	tri– and tetra–substituted aromatic rings