

Supplied Materials

Molecular characteristics of refractory organic matter in anaerobic and aerobic digestion of sewage sludge

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Table S1 Characteristics of wastewater treatment plants (WWTPs) investigated

Parameter	Treatment capacity (10 ⁴ t · d ⁻¹)	Drainage system	Servicing population (10 ⁴)	Servicing area (km ²)	Proportion of industrial wastewater in influent (%)	Secondary biological treatment process ^a	Discharge Standard of WWTP effluent ^b
WWTP	30	NK	54	27.5	NK	Phase I, A ² /O; phase II, oxidation ditch	First level A

Table S2 Organic matter contents of raw sludge (RS), mesophilic anaerobic digestate (AnD) and aerobic digestate (AoD)

Organic content	RS	AnD	AoD
VS (mg/g dry weight)	634.3±0.7	478.3±0.2	501.2±7.4
C (mg/g dry weight)	321.3±1.6	226.8±4.0	245.9±45.7
N (mg/g dry weight)	47.8±0.2	35.5±0.09	39.8±9.2
H (mg/g dry weight)	55.3±0.3	43.3±0.9	47.2±8.7
S (mg/g dry weight)	9.4±0.1	15.2±0.3	13.3±2.6
C/N ratio	7.84	7.45	7.21
C/H ratio	0.48	0.44	0.43

Table S3 Main absorption bands of the region and corresponding assignments of FTIR

Main absorption bands (cm ⁻¹)	corresponding assignments
1610-1700	aromatic C=C, C=O stretching of amide groups (amide I band), quinonic C=O and/or C=O of H-bonded conjugated ketones
1530-1590	N-H deformation and C=N stretching of amides (amide II band)
1370-1420	O-H deformation and C-O stretching of phenolic OH, antisymmetric stretching of COO ⁻ groups, and/or C-H bending
1000-1170	C-O stretching of polysaccharide-like substances

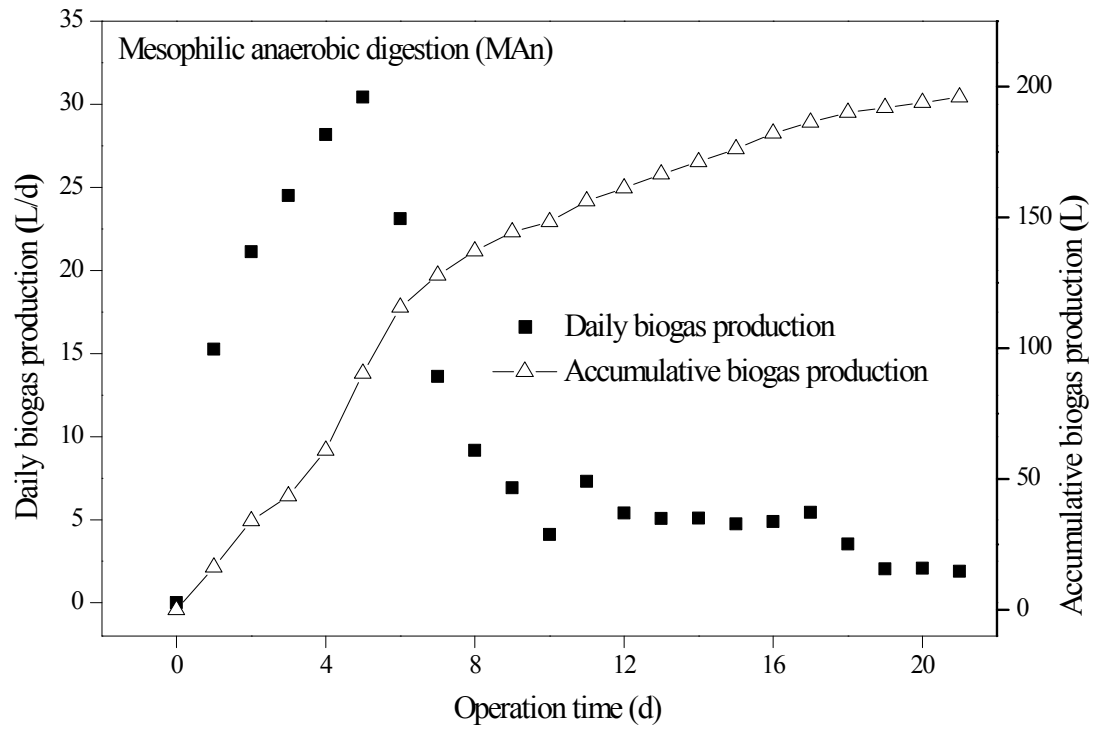


Figure S1 Biogas production during mesophilic anaerobic digestion of dewatered sewage sludge

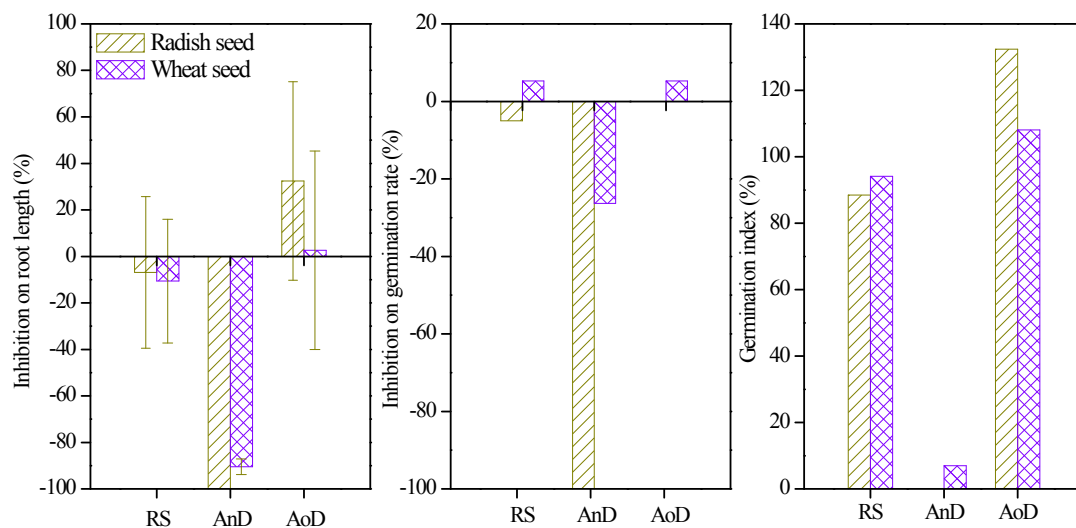


Figure S2 Phytotoxicity test of the RS, AnD and AoD samples using two types of seeds (Radish and wheat). RS, raw sludge; AnD, mesophilic anaerobic digestate; AoD, mesophilic aerobic digestate

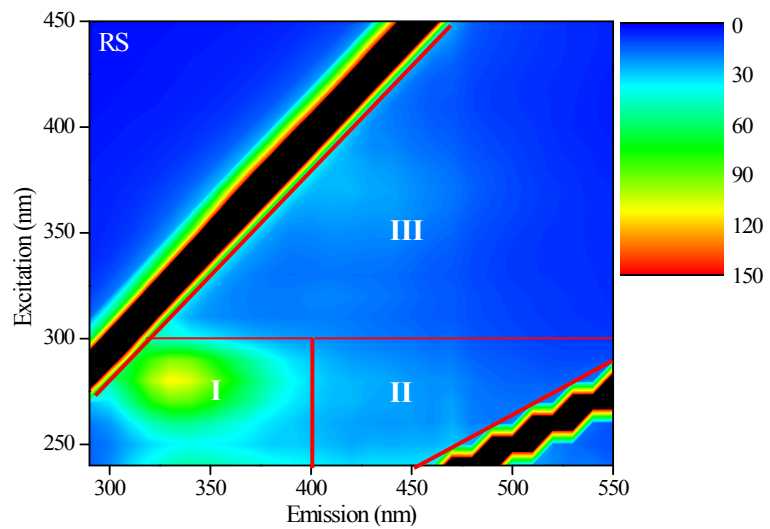


Figure S3 Fluorescence regionalization integration for spectra interpretation and quantification