**Indirect photodegradation of ofloxacin in simulated seawater: important roles of DOM and environmental factors**

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**Table S1**

Optimized parameters of HPLC

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Compounds | Mobile phase  composition (v: v) | Detection wavelength (nm) | Flow rate (mL/min) | Injection volume (μL) |
| OFX | Acetonitrile: 0.1% H3PO4 (40.:60) | 290 nm | 1.0 | 20.0 |
| FFA | Acetonitrile: 0.08% H3PO4 (10:90) | 216 nm | 1.0 | 20.0 |
| TA | Methanol: 0.08% H3PO4 (50:50) | 254 nm | 1.0 | 20.0 |
| HOTA | Methanol: 0.08% H3PO4 (50:50) | λex=315 nm λem=425 nm | 1.0 | 20.0 |
| SA | Sodium acetate buffer (pH 4.75): Acetonitrile (85:15) | 254 nm | 1.0 | 20.0 |

**Table S2**

The proportion of indirect photodegradation in DOM solutions (10 mg C L-1)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | concentration  (mg C L-1) | *f* | *k*obs | k(non-DOM)\*ƒ | *k*ind | IP% |
| SRHA | 2 | 0.901 | 0.012 | 0.009 | 0.004 | 0.305 |
|  | 5 | 0.770 | 0.022 | 0.007 | 0.015 | 0.668 |
|  | 10 | 0.522 | 0.025 | 0.005 | 0.020 | 0.801 |
| SRFA | 2 | 0.924 | 0.014 | 0.009 | 0.005 | 0.356 |
|  | 5 | 0.842 | 0.014 | 0.008 | 0.006 | 0.429 |
|  | 10 | 0.624 | 0.016 | 0.006 | 0.010 | 0.627 |
| JKHA | 2 | 0.754 | 0.015 | 0.007 | 0.008 | 0.525 |
|  | 5 | 0.526 | 0.037 | 0.005 | 0.032 | 0.865 |
|  | 10 | 0.292 | 0.060 | 0.003 | 0.058 | 0.954 |

**Table S3**

The contribution rate of RIs on indirect photodegradation of OFX

|  |  |  |  |
| --- | --- | --- | --- |
| RIs | 1O2 | ∙OH | 3DOM\* |
| OFX | 34.7% | 11.5% | 44.8% |

**Table S4**

Characteristics of the four components identified in the present study compared with those previously identified.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Ex/Em/nm | Description and probable source | Comparison with other studies |
| C1 | 420/500 | terrestrial humic-like materials | (Yamashita et al., 2015)  (Cawley et al., 2012) |
| C2 | 370/460 | terrestrial humic-like materials | (Zhang et al., 2009) |
| C3 | 460/520 | soil fulvic acid | (Lochmueller and Saavedra, 1986) |
| C4 | 320/440 | visible humic-like | (Chen et al., 2017)  (Coble et al., 1998) |

**Table S5**

The fluorescence intensities of PARAFAC-identified components.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DOM | Concentration (mg C/L) | C1 fluorescence intensity (QSU) | |  | C2 fluorescence intensity (QSU) | |  | C3 fluorescence intensity (QSU) | |  | C4 fluorescence intensity (QSU) | |  | Total fluorescence intensity (QSU) | |  | HIX |  | SUVA254 |
|  |  | before | after |  | before | after |  | before | after |  | before | after |  | before | after |  |
| SAHA | 2 | 0.50 | 0.44 |  | 0.69 | 0.64 |  | 0.37 | 0.34 |  | 0.45 | 0.67 |  | 2.01 | 2.09 |  | 8.45 |  | 6.73 |
|  | 5 | 1.12 | 0.86 |  | 1.49 | 1.27 |  | 0.85 | 0.64 |  | 0.83 | 1.03 |  | 4.29 | 3.80 |  | 14.09 |  | 6.86 |
|  | 10 | 2.12 | 1.45 |  | 2.65 | 2.23 |  | 1.62 | 0.97 |  | 1.17 | 1.46 |  | 7.56 | 6.11 |  | 23.94 |  | 10.70 |
| SRFA | 2 | 0.74 | 0.40 |  | 1.50 | 0.74 |  | 0.31 | 0.26 |  | 1.06 | 0.80 |  | 3.60 | 2.20 |  | 9.64 |  | 5.63 |
|  | 5 | 1.47 | 0.73 |  | 2.80 | 1.36 |  | 0.67 | 0.44 |  | 1.85 | 1.33 |  | 6.80 | 3.87 |  | 17.72 |  | 5.50 |
|  | 10 | 2.74 | 1.30 |  | 4.97 | 2.51 |  | 1.30 | 0.75 |  | 2.88 | 2.08 |  | 11.89 | 6.64 |  | 27.18 |  | 9.40 |
| JKHA | 2 | 3.38 | 2.12 |  | 2.34 | 1.33 |  | 3.57 | 2.23 |  | 1.92 | 2.13 |  | 11.21 | 7.81 |  | 22.06 |  | 14.56 |
|  | 5 | 6.81 | 4.21 |  | 4.71 | 2.82 |  | 7.24 | 3.85 |  | 3.53 | 3.53 |  | 22.28 | 14.41 |  | 49.94 |  | 14.39 |
|  | 10 | 10.99 | 8.13 |  | 7.53 | 5.28 |  | 11.96 | 8.14 |  | 5.02 | 4.26 |  | 35.50 | 25.81 |  | 96.12 |  | 18.09 |

**Table S6**

Steady-state concentrations of ∙OH, 1O2, and 3DOM\* in different DOM solutions.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Type of DOM | | DOC (mg C/L) | | [∙OH]ss (10-17 M) | | [1O2]ss (10-13 M) |  | [3DOM\*]ss (10-14 M) |
| SRHA | 2 | | 0.66±0.03 | | 0.97±0.05 | |  | 0.46±0.02 |
|  | 5 | | 1.01±0.02 | | 1.60±0.03 | |  | 0.98±0.01 |
|  | 10 | | 1.49±0.04 | | 3.2±0.03 | |  | 1.57±0.01 |
| SAFA | 2 | | 0.54±0.02 | | 0.95±0.03 | |  | 0.52±0.01 |
|  | 5 | | 0.97±0.01 | | 1.56±0.03 | |  | 1.02±0.01 |
|  | 10 | | 1.47±0.02 | | 2.44±0.04 | |  | 1.86±0.02 |
| JKHA | 2 | | 3.08±0.11 | | 1.60±0.08 | |  | 2.42±0.01 |
|  | 5 | | 5.87±0.17 | | 2.37±0.11 | |  | 4.89±0.01 |
|  | 10 | | 7.56±0.23 | | 4.42±0.18 | |  | 6.78±0.03 |



b

a

**Figure. S1.** (a)The concentrations of OFX under light and dark conditions; (b) UV–Vis absorption spectra of OFX



**Figure. S2.** RDA of fluorescence components, FI, HIX, SUVA254 and HIX with RIs, *kind*.