

Supporting information

Biofilm carrier washing method:

Before use, the CFN and GAC were rinsed twice with tap water, immersed in deionized water and placed in an ultrasonic cleaner (40 kHz; cleaning for 15 min; KQ2200DB, Dongguan Keqiao Ultrasonic Equipment Co., Ltd. China). In addition, GAC must to be cleaned twice with an ultrasonic cleaner containing a 20% HCl solution to remove impurities on the surface, thereby enhancing the adsorption capacity of the activated carbon. Finally, deionized water was used for ultrasonic cleaning at a frequency of 40 kHz for 20 min, which was repeated several times until the wastewater was clear after washing.



Fig. S1 The formation of aerobic (A) and anaerobic biofilm (B).

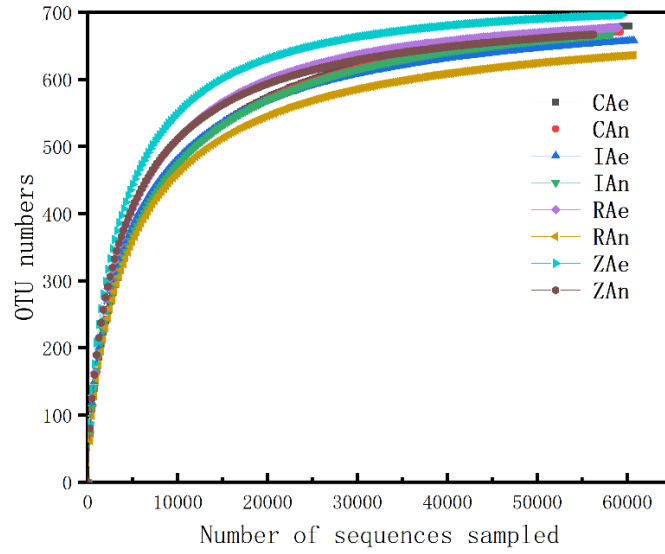


Fig. S2 Eight samples rarefaction curves.

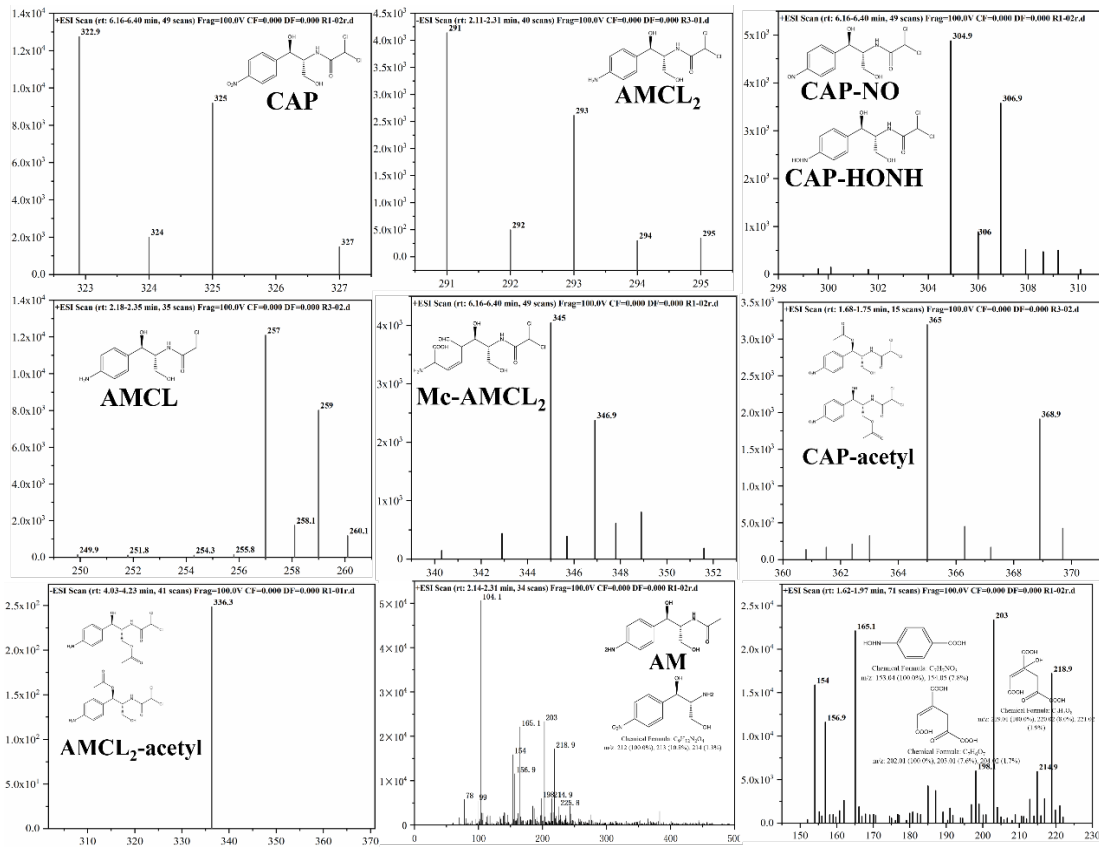


Fig. S3 Mass spectra of CAP and its metabolites.

Table S1 Adding nutrients in the process of biofilm pre-acclimation

Time (day)	$C_{11}H_{12}Cl_2N_2O_5$ (mg/L)	$C_6H_{12}O_6$ (mg/L)	NH_4Cl (mg/L)	$K_2HPO_4 \cdot 3H_2O$ (mg/L)	Trace element solution
0	0	700	67.5	18.6	
1–7	0.5	700	0.675	0.186	
8–14	1	700	0.675	0.186	Standard
15–21	2	700	0.675	0.186	concentration*
22–28	5	700	0.675	0.186	
28–35	10	700	0.675	0.186	

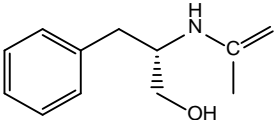
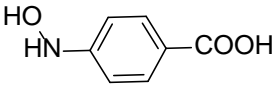
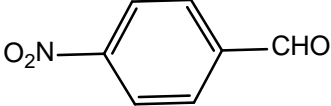
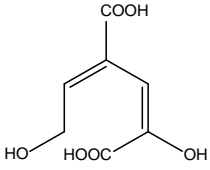
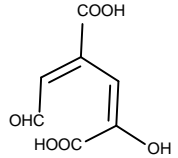
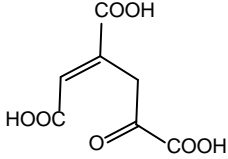
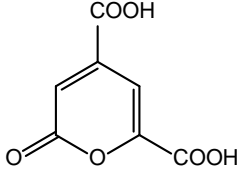
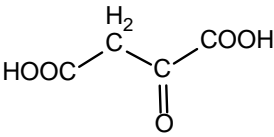
Notes: * $FeSO_4 \cdot 7H_2O$, 0.1; $CuSO_4 \cdot 5H_2O$, 0.015; $ZnSO_4 \cdot 7H_2O$, 0.161; $MnSO_4 \cdot 7H_2O$, 0.008 (% w/v).

Table S2 The Coverage values of samples.

Sample ID	Sample site		Coverage
	Voltage application mode	Zones	
IAn	Intermittent voltage applied (R1)	cathode	0.9990
IAe		anode	0.9991
CAn	Continuous voltage applied (R2)	cathode	0.9991
CAe		anode	0.9990
ZAn	Without voltage applied (R3)	anaerobic	0.9990
ZAe		aerobic	0.9995
RAn	Seed sludge	anaerobic	0.9990
RAe		aerobic	0.9993

Table S3 Extrapolation of the degradation pathway of chloramphenicol in AO-UBER.

Substitute name	Molecular formulas	MS particles	M/Z	Structural formula
CAP	$C_{11}H_{12}Cl_2N_2O$ 5	$[CAP+H]^+$	323.0 1	
CAP-(C ₂ H ₂ Cl ₂ NO)	$C_9H_{12}N_2O_4$	$[CAP-(C_2H_2Cl_2NO)+H]^+$	213.0 8	
CAP-Acetyl	$C_{13}H_{14}Cl_2N_2O$ 6	$[CAP-Acetyl+H]^+$	365.0 2	
AMCl ₂	$C_{11}H_{14}Cl_2N_2O$ 3	$[AMCl_2+H]^+$	292.0 4	
AMCl	$C_{11}H_{15}ClN_2O_3$	$[AMCl+H]^+$	259.0 8	
AM	$C_{11}H_{16}N_2O_3$	$[AM+H]^+$	225.1 2	
AMCl ₂ -Acetyl	$C_{13}H_{16}Cl_2N_2O$ 4	$[AMCl_2-Acetyl+H]^+$	335.0 5	
AM-OH	$C_9H_{14}N_2O_2$	$[AM-OH+H]^+$	183.1 1	
Mc-AMCl ₂	$C_{11}H_{16}Cl_2N_2O$ 4	$[Mc-AMCl_2+H]^+$	243.0 4	

3-phenyl-2-(prop-1-en-2-ylamino)propan-1-ol	$C_{12}H_{17}NO$	$[C_{12}H_{17}NO+H]^+$	192.1 3	
4-(hydroxyamino)benzoic acid	$C_7H_7NO_3$	$[C_7H_7NO_3-H]^-$	152.0 4	
p-Nitrobenzyl alcohol	$C_7H_5NO_3$	$[C_7H_5NO_3-H]^-$	150.0 3	
(2E,4E)-2-hydroxy-4-(2-hydroxyethylidene)pent-2-enedioic acid	$C_7H_8O_6$	$[C_7H_8O_6-H]^-$	188.0 3	
(2E,4E)-2-hydroxy-4-(2-oxoethylidene)pent-2-enedioic acid	$C_7H_6O_6$	$[C_7H_6O_6-H]^-$	185.0 2	
(E)-4-oxobut-1-ene-1,2,4-tricarboxylic acid	$C_7H_6O_7$	$[C_7H_6O_7-H]^-$	202.0 1	
2-oxo-2H-pyran-4,6-dicarboxylic acid	$C_7H_4O_6$	$[C_7H_4O_6-H]^-$	183.0 0	
2-oxosuccinic acid	$C_4H_4O_5$	$[C_4H_4O_5-H]^-$	132.0 1	
2-oxopropanoic acid	$C_3H_4O_3$	$[C_4H_4O_5-H]^-$	89.02	