

1 **Characterizing the free ammonia exposure to the nutrients removal in activated**  
2 **sludge systems**

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Table S1 Variations of  $\text{NH}_4^+\text{-N}$  concentration in the liquor wastewater

Time	September	October	November	December-May
$\text{NH}_4^+\text{-N}$ (mg/L)	250~400	180~250	90~110	80

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Table S2 Fluorescence spectral parameters of sludge in cycle1 and 27

FA	Cycle 1				Cycle 27			
	Peak	Ex/Em	Intensity	Component	Peak	Ex/Em	Intensity	Component
2.8mg/L	A	270/37	1660	Tryptophan	A	265/37	2680	Tryptophan
	/	/	/	/	B	230/30	2606	Tyrosine
					C	205/30	1805	Aromatic
5.6mg/L	A	270/37	1867	Tryptophan	A	265/37	2462	Tryptophan
	B	230/30	1818	Tyrosine	B	230/30	3196	Tyrosine
	/	/	/	/	C	205/30	4364	Aromatic
11.1mg/L	A	265/37	1703	Tryptophan	A	265/37	3619	Tryptophan
	B	230/30	1552	Tyrosine	B	225/30	4512	Tyrosine
	/	/	/	/	C	215/30	4536	Aromatic
19.5mg/L	A	265/37	2053	Tryptophan	A	270/37	3243	Tryptophan
	B	225/30	1954	Tyrosine	B	225/30	3892	Tyrosine
	/	/	/	/	C	205/30	5778	Aromatic

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Table S3 Overviews of high-throughput sequencing results and microbial community diversities

Sample	Sequence number	OTUs	Coverage	Simpson	Chao1
R0	44292	3639	0.95	0.015	10508
R1	42143	2343	0.96	0.025	10610
R3	37006	2016	0.96	0.081	8896

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