Electronic Supplementary Information

Monitoring the stability of aerobic granular sludge using fractal dimension analysis

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Table S1. Statistical analysis of SVI values observed during the different granules' formation stages.

	Formation	Maturation	Steady state	Disintegration
Formation	1	0.0138	0.0221	0.0474
Maturation	0.0138	1	0.3970	0.7139
Steady state	0.0221	0.3970	1	0.6647
Disintegration	0.0474	0.7139	0.6647	1

Bonferroni corrected significance level: 0.0083

Table S2. Statistical analysis of density values observed during the different granules' formation stages.

	Formation	Maturation	Steady state	Disintegration
Formation	1	0.0032	0.0067	0.2791
Maturation	0.0032	1	0.6679	0.5275
Steady state	0.0067	0.6679	1	0.3854
Disintegration	0.2791	0.5275	0.3854	1

Bonferroni corrected significance level: 0.0083

Table S3. Statistical analysis of diameter mean values observed during the different granules' formation stages.

	Formation	Maturation	Steady state	Disintegration
Formation	1	0.5979	0.0331	0.6719
Maturation	0.5979	1	0.0724	0.9600
Steady state	0.0331	0.0724	1	0.1717
Disintegration	0.6719	0.9600	0.1717	1

Bonferroni corrected significance level: 0.0083

Table S4. Statistical analysis of diameter relative standard deviation values observed during the different granules' formation stages.

Comparison	Difference	Standardized difference	Critical value	Pr > Diff	Significant
Formation vs Disintegration	15.0529	3.6390	2.7304	0.0057	Yes
Formation vs Steady state	13.6729	3.5702	2.7304	0.0068	Yes
Formation vs Maturation	10.0847	3.4290	2.7304	0.0097	Yes
Maturation vs Disintegration	4.9681	1.2427	2.7304	0.6058	No
Maturation vs Steady state	3.5881	0.9752	2.7304	0.7645	No
Steady state vs Disintegration	1.3800	0.2942	2.7304	0.9909	No

Tukey's d critical value: 3.8613

Table S5. Statistical analysis of fractal dimension mean values observed during the different granules' formation stages.

	Formation	Maturation	Steady state	Disintegration
Formation	1	< 0.0001	0.0046	0.5108
Maturation	< 0.0001	1	0.9475	0.0447
Steady state	0.0046	0.9475	1	0.0998
Disintegration	0.5108	0.0447	0.0998	1

Bonferroni corrected significance level: 0.0083

Table S6. Statistical analysis of fractal dimension relative standard deviation values observed during the different granules' formation stages.

	Formation	Maturation	Steady state	Disintegration
Formation	1	< 0.0001	< 0.0001	0.9166
Maturation	< 0.0001	1	0.3863	0.0039
Steady state	< 0.0001	0.3863	1	0.0019
Disintegration	0.9166	0.0039	0.0019	1

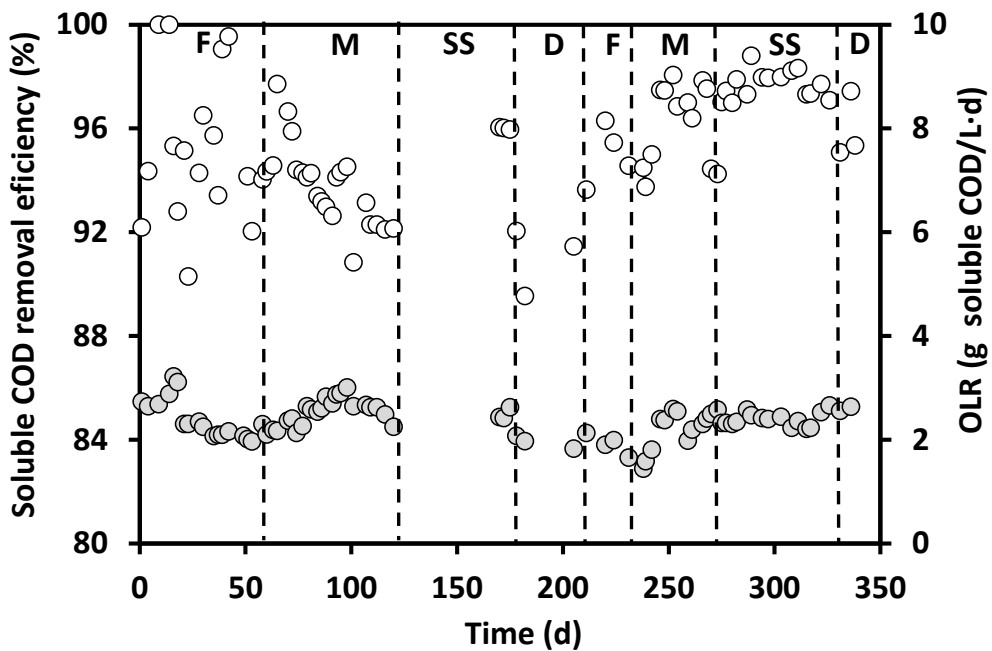Bonferroni corrected significance level: 0.0083

Fig. S1. Soluble COD removal efficiency (○) and organic loading rate (OLR) (●) of SBR1.
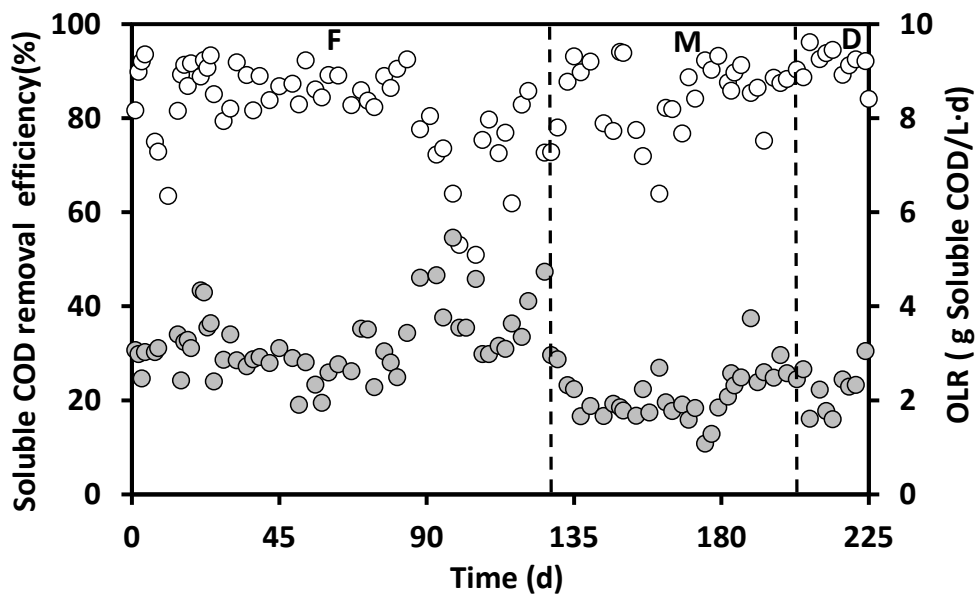

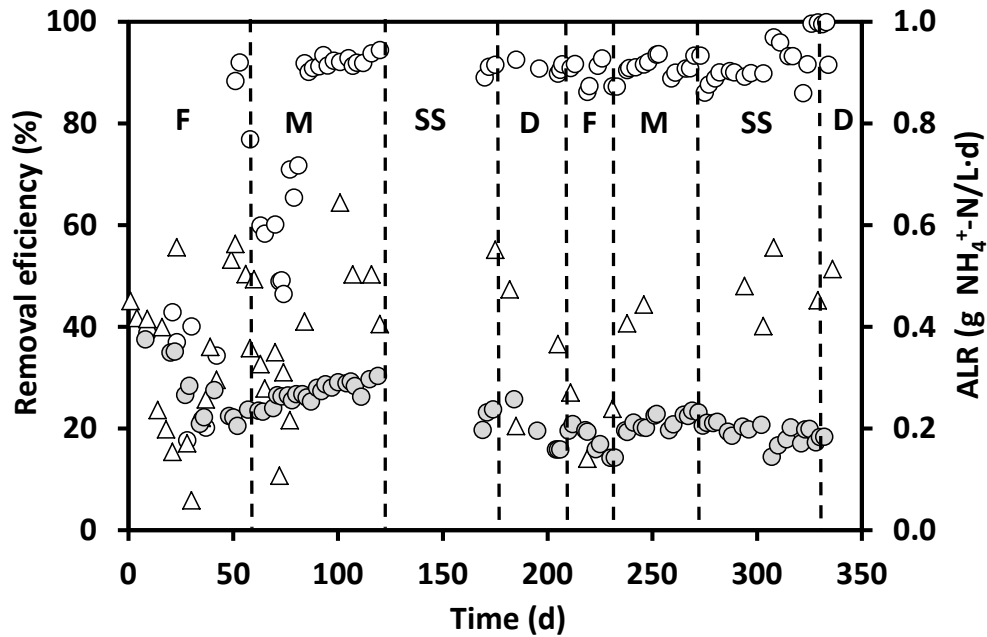Fig. S2. Soluble COD removal efficiency (○) and OLR (●) of SBR2.

Fig. S3. Ammonia (○) and nitrogen (Δ) removal efficiency (○) and ammonia loading rate (ALR) (●) of SBR1.
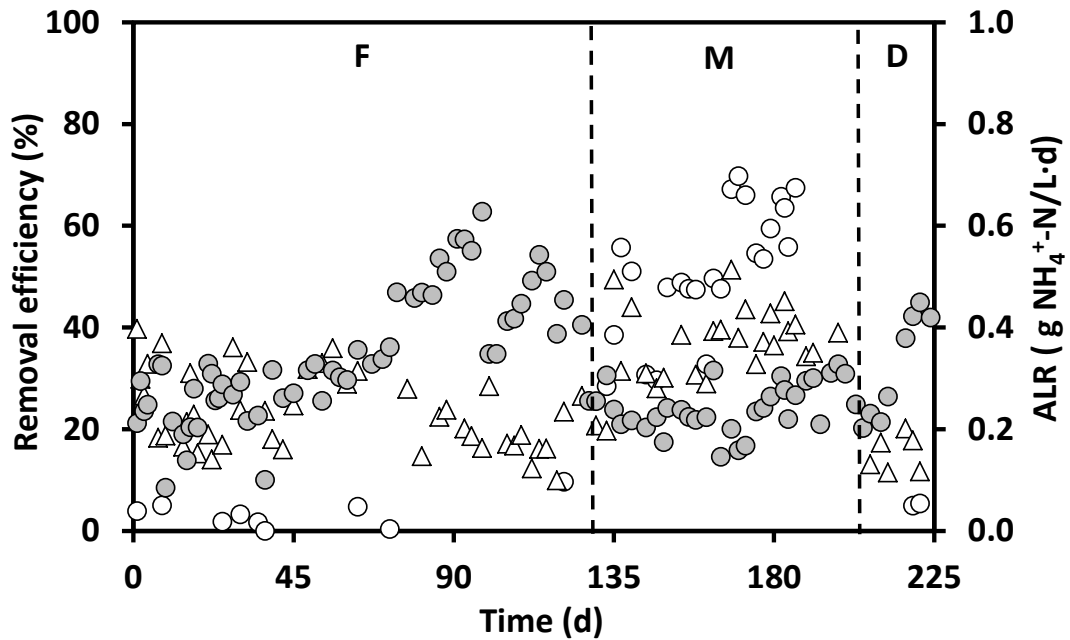

Fig. S4. Ammonia (○) and nitrogen (Δ) removal efficiency (○) and ALR (●) of SBR2.