

1 **Supplementary materials for:**

2 **Evaluating the performance of integrated membrane-aerated biofilm**

3 **reactor (MABR) system for high-strength brewery wastewater treatment**

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5 **Table S1** The effect of coagulation/flocculation process at different PAC dosages along with constant 6

6 mL PAM (2 g L^{-1}) dosage in each flask experiment (500 mL wastewater).

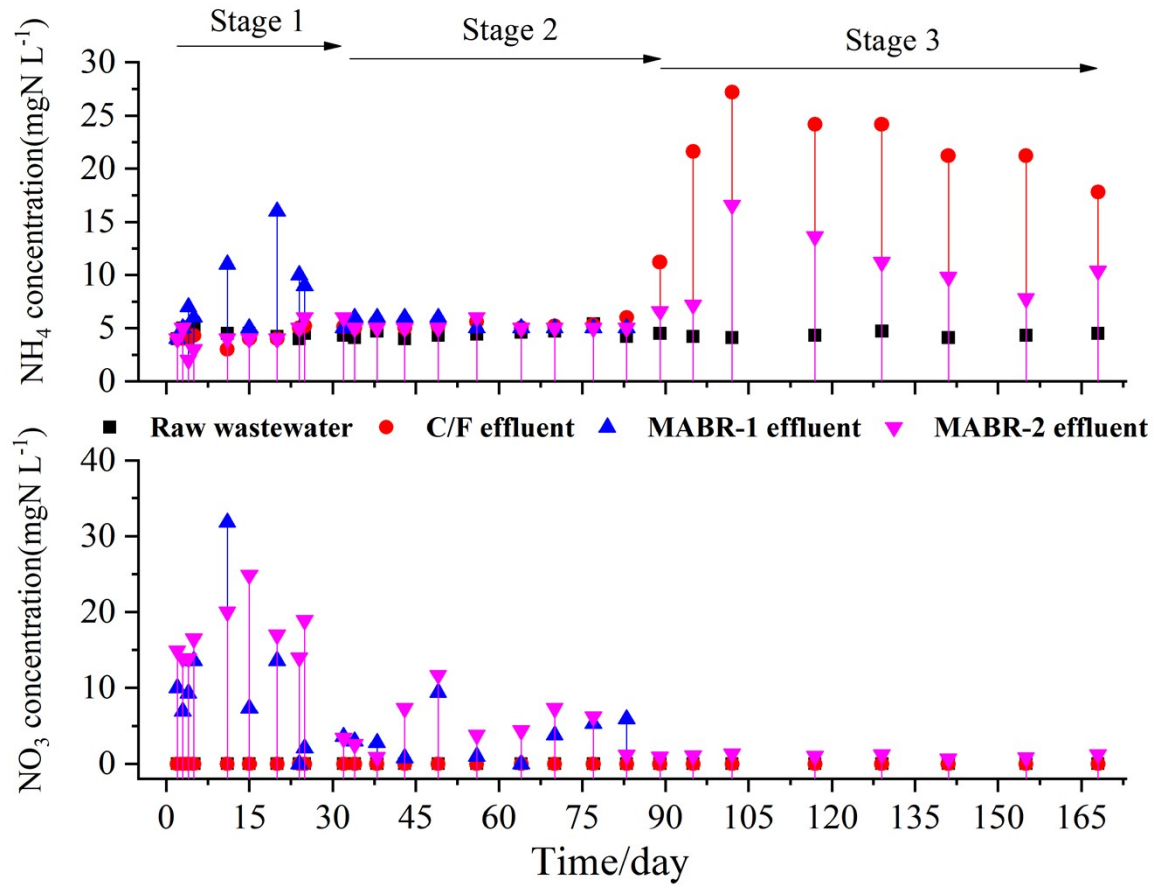
PAC/50 g L^{-1}	COD concentration	Removal efficiency	Turbidity
(mL)	(mg L^{-1})	(%)	(NTU)
0	8100	0	42.4
2	7000	13.6	1.5
5	6600	18.5	0.5
7	5700	29.6	0.25
10	6000	25.9	0.17
15	6000	25.9	0.73

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9 **Table S2** The effect of coagulation/flocculation process at different PAM dosages along with constant 7
 10 mL PAC (5%) dosage in each flask experiment (500 mL wastewater).

PAM/2 g L⁻¹	COD concentration	Removal efficiency	Turbidity
(mL)	(mg L⁻¹)	(%)	(NTU)
0	8100	0	42.4
2	6100	24.7	0.04
4	5900	27.2	0.05
6	5700	29.5	0.04
8	6400	21.0	0.23
10	6600	18.5	0.07

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14 **Fig. S1** (a) Ammonia (NH₄⁺-N) and (b) nitrate (NO₃⁻-N) concentrations in influent and effluent at different
 15 units throughout the operational period.

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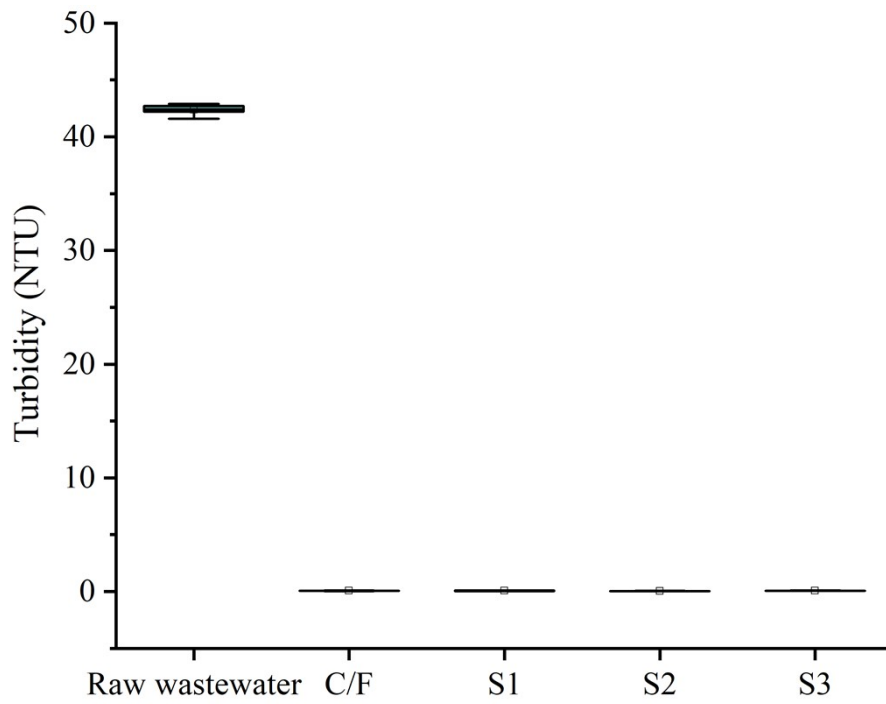
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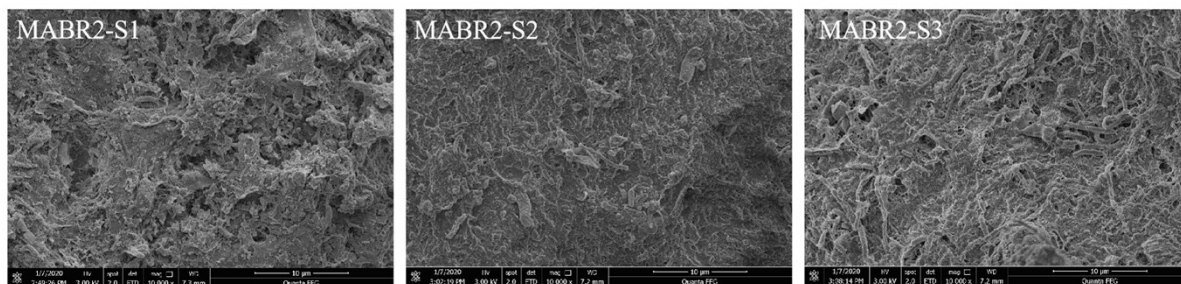
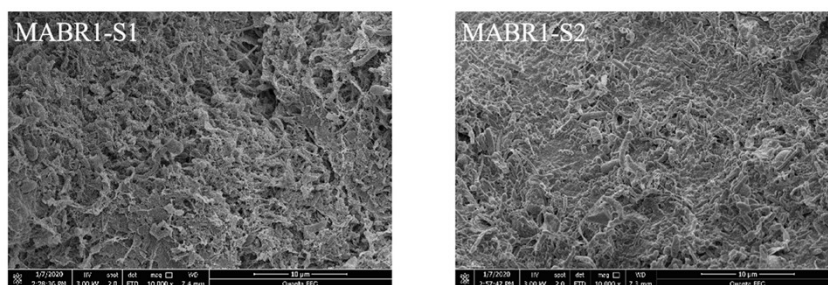


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36 **Fig. S2** Turbidity in raw wastewater, C/F effluent (C/F), effluent at Stage 1 (S1), effluent at Stage 2 (S2)
37 and effluent at Stage 3 (S3).

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45 **Fig. S3** Scanning electron microscopy (SEM) images of biofilm at different bioreactor units and
46 operational periods.

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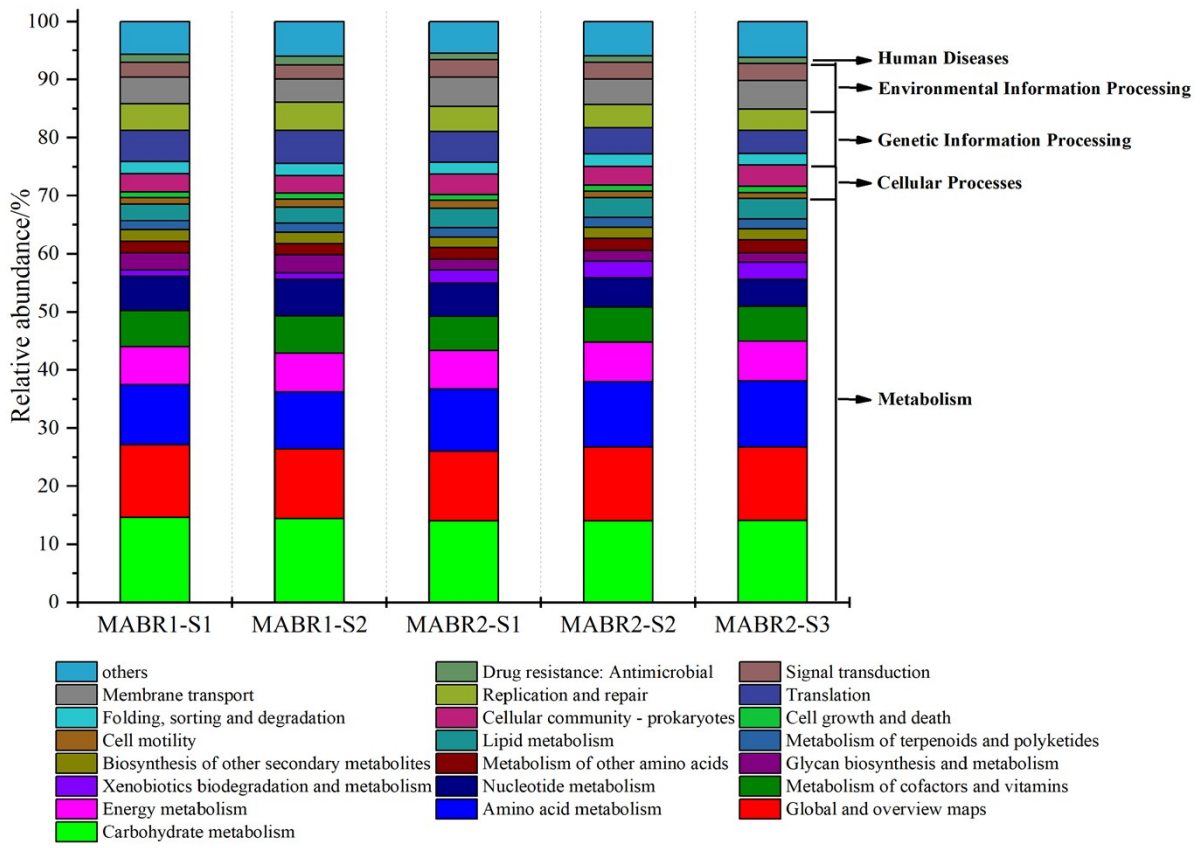
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66 **Fig. S4** Relative abundances of KEGG pathway level2 in different MABR biofilms.

68 **Section S1- Initial biofilm formation and fast start-up**

69 The seeding sludge, originated from the oxidation ditch of activated sludge stream at
70 Wulongkou wastewater treatment plant (WWTPs) (Zhengzhou, China), was inoculated into
71 the membrane surface. A thin and compact biofilm was formed on the membranes after ten
72 days. During the period, glucose (300–500 mg/L, as readily biodegradable carbon source for
73 faster growth of microorganisms) and ammonium chloride (NH_4Cl) (45-50 mg N/L) together
74 with low concentration of sodium nitrate (NaNO_3) (3.1–5.8 mg N/L) were supplied as the
75 organic carbon and inorganic nitrogen source, respectively. Subsequently, the biofilms were
76 suffered from the effluent wastewater from C/F unit for the fast start-up and acclimation
77 during the first two weeks (Stage 1) in the long-term process.

78 **Section S2- Results of C/F optimization experiment**

79 It can be seen that the COD removal efficiency was highest under the following C/F
80 conditions: 7 mL PAC (50 g L^{-1}) dosage, 6 mL PAM (2 g L^{-1}) dosage for each 500 mL raw
81 wastewater based on Fig.S1 and Fig.S2. Meanwhile, TN, TP and turbidity also decreased
82 substantially (TN: from 42.2 mg L^{-1} to 27.8 mg L^{-1} , TP: from 32.8 mg L^{-1} to 9.2 mg L^{-1} ,
83 turbidity: 42.4 NTU to 0.04 NTU). Thus, the ultimate concentrations of PAC and PAM in
84 raw brewery wastewater were defined as $700 \text{ mg PAC L}^{-1}$ and 25 mg PAM L^{-1} , respectively.

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