# Supporting information

## Improvement of activated sludge dewatering properties using green conditioners: chitosan hydrochloride and lysozyme

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**Table S1** Characteristics of the activated sludge

| Parameter | Value |
|---|---|
| Water content (%) | 97.3±0.3 |
| pH | 6.6±0.2 |
| SRF (m/kg) | $10.04\pm0.12\times10^{12}$ |
| CST (s) | 47.3±2.1 |
| Zeta potential (mV) | -14.3±0.3 |
| Dv [50] (μm) | 49.1±1.05 |
| PN (mg/g DS) | 3.15±0.05 |
| PS (mg/g DS) | 9.36±0.18 |

**Table S2** Type and dosage level of the conditioners

| Dosage / Conditioner | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 | Level 6 | Level 7 |
|---|---|---|---|---|---|---|---|
| CPAM (mg/g DS) | 0 | 1 | 1.5 | 2 | 2.5 | 3 | 4 |
| CTSCL (mg/g DS) | 0 | 2.5 | 5 | 10 | 15 | 20 | 30 |
| LZM ($\times10^6$ U/g DS) | 0 | 1.6 | 2.4 | 3.2 | 4.8 | 6.4 | 8 |

**Text S1**

A volume of 100 mL sludge suspension was poured into the Buchner funnel, and a constant pressure of 0.1 MPa was applied by a vacuum pump. The volume of filtrate under pressure was continuously recorded every 10 s until the sludge surface cracked. The value of the SRF was calculated as follows:

$$r = \frac{2PA^2b}{\mu\omega}$$

Where $P$ (kg/m$^2$) is the applied pressure, $A$ (m$^2$) is the filter area, $\mu$ (kg*s/m$^2$) is the kinetic viscosity (KV), $\omega$ (kg/m$^3$) denotes the dry solid weight per unit volume sludge on the filtrate media, and $b$ is the slope of the curve that is obtained by plotting the ratio of the time of filtration to the volume of filtrate (t/V) versus the filtrate volume (V).

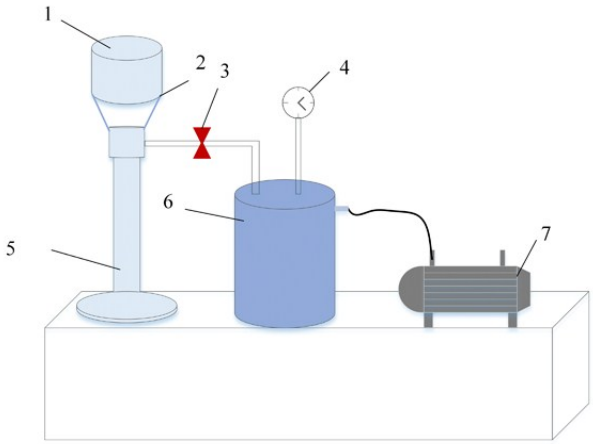


**Fig. S1** The experimental apparatus for SRF determination

(1) Buchner funnel; (2) filter paper; (3) control valve; (4) vacuum pressure gauge; (5) metering cylinder; (6) surge tank; (7) vacuum pump

**Text S2**

Firstly, 300 mL sludge sample was placed into centrifuge tubes, followed by 5 min centrifugation at 3000 rpm to discard the supernatant. Subsequently, the residual precipitate in the centrifugal tube was covered with the filtering cloth and transferred into the container before operating the pressure filtration system. The squeezing pressure was adjusted to approximately 5-6 MPa, and the filter-pressing time was controlled for 5 min. Finally, the water content of the dewatered sludge was examined by a Halogen Moisture Analyzer (HX204, Mettler Toledo, UK).

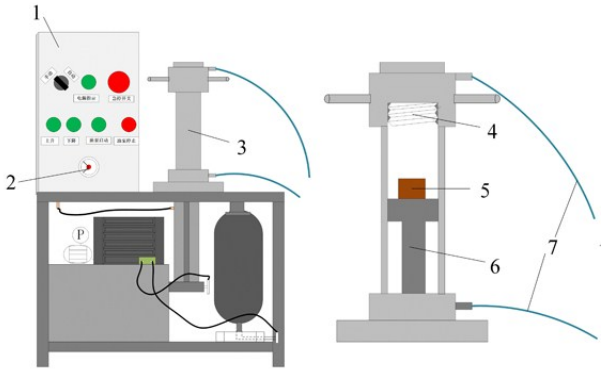


**Fig. S2** The lab-scale dewatering system

(1) control panel; (2) pressure controller; (3) sample room; (4) filter cloth; (5) sludge sample; (6) piston; (7) drainage exit

**Text S3**

Approximately 45 mL of the sludge suspension was placed in a 50 mL centrifuge tube and centrifuged at 3000 rpm for 15 min. Then, the supernatant was collected as S-EPS. The remaining deposit in the tube was then resuspended in a buffer solution, which was mixed with 2 mmol $Na_3PO_4$, 4 mmol $NaH_2PO_4$, 9 mmol NaCl and 1 mmol KCl. The resulting mixture was centrifuged at 7400 rpm for 15 min to separate the solid and liquid phase. The collected organic matter was called the LB-EPS. Afterward, the residual sludge pellet in the centrifuge tube was suspended again in a buffer solution, sonicated for 5 min, then heated at 80°C for 30 min, and subsequently centrifuged to collect TB-EPS at 12000 rpm for 10 min. Finally, all the fractions

of the EPS were filtered through acetate cellulose membranes (0.22 μm) and subsequently analyzed.