

**Energy-efficient single-stage nitrite shunt denitrification with saline sewage through concise dissolved oxygen (DO) supply: Process performance and microbial communities**

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Table S1. Synthetic stock solution

| Substrate                           | Concentration |
|-------------------------------------|---------------|
| Glucose                             | 19.57 g/L     |
| Sodium acetate                      | 26.1 g/L      |
| Yeast extract                       | 9.786 g/L     |
| NH <sub>4</sub> Cl                  | 18.37 g/L     |
| K <sub>2</sub> HPO <sub>4</sub>     | 1.92 g/L      |
| KH <sub>2</sub> PO <sub>4</sub>     | 0.72 g/L      |
| MgCl <sub>2</sub> 6H <sub>2</sub> O | 8.32 g/L      |
| CaCl <sub>2</sub>                   | 5.2 g/L       |
| Trace solution                      | 2.50 mL/L     |

Table S2. Summary of reactor performance in average.

| Time (day) | DO level (mg/L) | Temp. (°C) | MLSS (mg/L) | MLVSS (mg/L) | N-NO <sub>2</sub> <sup>-</sup> (mg N/L) | N-NO <sub>3</sub> <sup>-</sup> (mg N/L) | N-NH <sub>4</sub> <sup>+</sup> (mg N/L) | TN (mg/L) | COD (mg/L) |
|------------|-----------------|------------|-------------|--------------|-----------------------------------------|-----------------------------------------|-----------------------------------------|-----------|------------|
| 0-40       | 0.5             | 20         | 2465 ± 409  | 2025 ± 335   | 5.0±1.3                                 | 14.9±5.7                                | 1.3±1.1                                 | 25.5±2.2  | 35.6±6.8   |
| 41-55      | 0.3             | 20         | 2293 ± 346  | 1827 ± 120   | 12.8±1.7                                | 4.7±1.4                                 | 0.6±1.0                                 | 14.8±0.6  | 16.1±2.2   |
| 56-78      | 0.2             | 20         | 2193 ± 175  | 1893 ± 98    | 13.6±2.9                                | 1.6±1.0                                 | 1.8±1.6                                 | 17.7±6.5  | 13.8±2.1   |
| 79-146     | 0.2             | 30         | 2385 ± 409  | 1930 ± 395   | 8.1±2.1                                 | 8.1±2.4                                 | 0.9±0.7                                 | 17.1±2.8  | 22.0±18.0  |

Table S3. Results of statistical comparison by means of a Student's t-test

|           | Comparison<br>DO = 0.5 VS. DO = 0.3<br>(20°C) | Comparison<br>DO = 0.3 VS. DO = 0.2<br>(20°C) | Comparison<br>DO = 0.5 VS. DO = 0.2<br>(20°C) | Comparison<br>20°C VS. 30°C<br>(DO = 0.2) |
|-----------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|-------------------------------------------|
| Nitrite-N | t = -10.562<br>p = 1.07×10 <sup>-7</sup>      | t = -0.78945<br>p = 4.40×10 <sup>-1</sup>     | t = -9.7253<br>p = 7.41×10 <sup>-9</sup>      | t = 6.0414<br>p = 3.94×10 <sup>-6</sup>   |
| Nitrate-N | t = 5.4557<br>p = 2.48×10 <sup>-4</sup>       | t = 5.4891<br>p = 1.95×10 <sup>-4</sup>       | t = 7.287<br>p = 3.74×10 <sup>-5</sup>        | t = -10.517<br>p = 1.15×10 <sup>-10</sup> |
| Ammonia-N | t = 1.3643<br>p = 1.92×10 <sup>-1</sup>       | t = -2.0998<br>p = 4.87×10 <sup>-2</sup>      | t = -0.89226<br>p = 3.82×10 <sup>-1</sup>     | t = 1.8988<br>p = 7.48×10 <sup>-2</sup>   |
| TN        | t = 14.787<br>p = 2.76×10 <sup>-8</sup>       | t = -1.6671<br>p = 1.19×10 <sup>-1</sup>      | t = 4.2148<br>p = 5.85×10 <sup>-4</sup>       | t = 0.32396<br>p = 7.50×10 <sup>-1</sup>  |
| COD       | t = 8.5<br>p = 3.00×10 <sup>-6</sup>          | t = 2.4226<br>p = 2.97×10 <sup>-2</sup>       | t = 9.8184<br>p = 1.60×10 <sup>-6</sup>       | t = -1.9619<br>p = 6.49×10 <sup>-2</sup>  |

In Student's t-test, t = t-value, p = p-value (statistically significant difference if p < 0.05)

Table S4. Data statistics of the 16S rRNA gene amplicon sequencing

| Sample name | Total reads | Minimum length (bp) | Maximum length (bp) | Average length (bp) | classified reads | assigned sequences |
|-------------|-------------|---------------------|---------------------|---------------------|------------------|--------------------|
| Inoculum    | 54,736      | 240                 | 377                 | 253                 | 54,716           | 54,691             |
| Day 7       | 55,244      | 239                 | 369                 | 253                 | 55,215           | 55,171             |
| Day 53      | 57,641      | 240                 | 340                 | 253                 | 57,546           | 57,524             |
| Day 74      | 69,810      | 158                 | 390                 | 253                 | 69,783           | 69,729             |
| Day 82      | 63,987      | 226                 | 388                 | 253                 | 63,928           | 63,878             |
| Day 121     | 55,491      | 152                 | 390                 | 253                 | 55,476           | 55,425             |

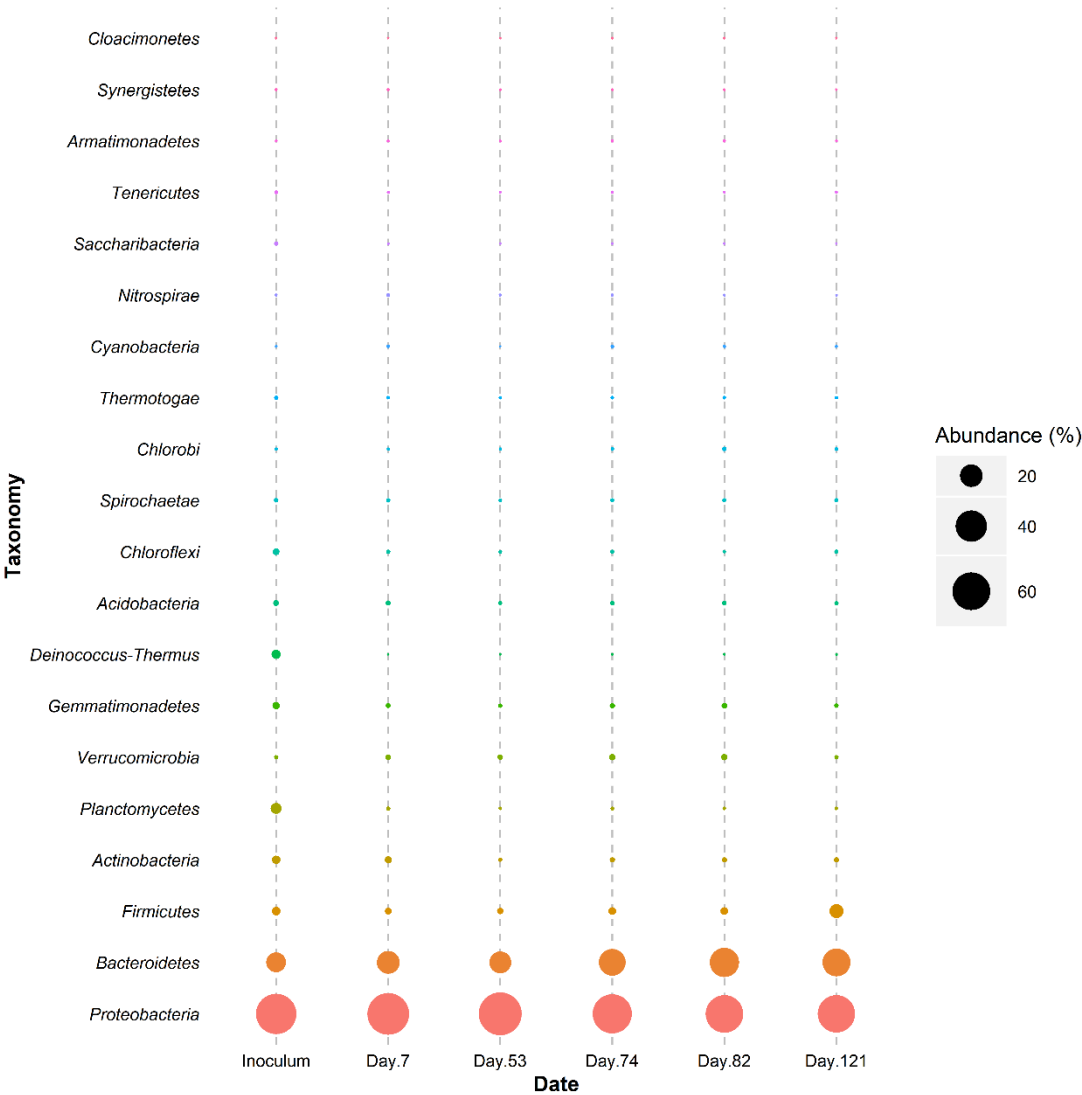


Figure S1 Microbial communities at various conditions at phylum level