Treatment of hospital wastewater using aerobic granular sludge technology: removal performance and microbial dynamics.

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Gráfico, Gráfico de dispersión

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Figure S1. Removal efficiency ratio of COD (%), BOD5(%) and nutrients removal (%).

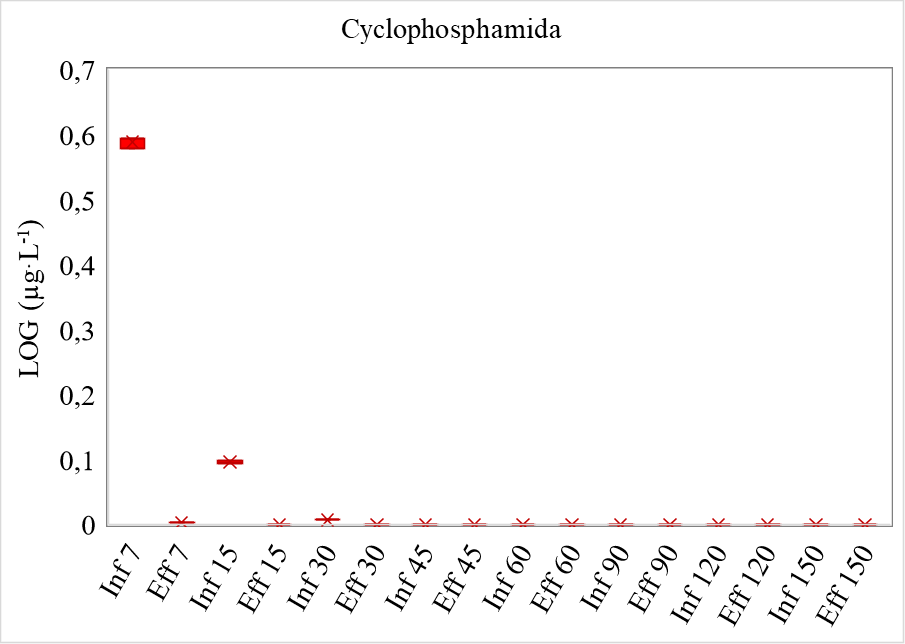


Figure S2. Cyclophosphamide analysis measured by UHPLC detected only in three influent samples at Day 7, Day 15, and Day 30.

Calendario

Descripción generada automáticamente con confianza media

Figure S3. Heat of map of bacterial dynamics expressed as a taxonomic operational unit (OTU) with phylogenetic similarity of 97% with more than 1.50% of relative abundance.

Gráfico, Gráfico de rectángulos

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Figure S4. The heat of map of fungal dynamics expressed as a taxonomic operational unit (OTU) with phylogenetic similarity of 95% with more than 1.50% of relative abundance.

Gráfico, Gráfico de rectángulos

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Figure S5. β-diversity measured by Whittaker index between pairs of samples for *Archaea*, *Bacteria* and *Fungi* communities.

Diagrama, Esquemático, Gráfico de dispersión

Descripción generada automáticamente

Figure S6. Principal Component Analysis (PCA) calculated with compositional statistical of duplicate samples from next-generation sequencing for *Archaea* (a), *Bacteria* (b) and *Fungi* (c).

Interfaz de usuario gráfica

Descripción generada automáticamente con confianza media

Figure S7. Similarity percent analysis (SIMPER) calculated to elucidate the contribution of genera (<1.5%) to dissimilarities between start-up and steady-state phases for *Archaea*, *Bacteria* and *Fungi.*

Interfaz de usuario gráfica, Gráfico de dispersión

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Figure S8- RDA analysis of archaeal (a), bacterial (b), and fungal (c) dominant OTUs with the performance of the reactor (PhACs, COD, BOD5, Nitrogen, ammonium, and phosphate removal), and granular properties.

Table S1. PERMANOVA analysis for the evaluation of startup (day 0 to day 38) and steady-stable period (Day 39 to day 150)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| PERMANOVA | Nitrogen | Phosphate | BOD rem | COD rem | Settle | Size |
|  |  |  |  |  |  |  |
| Permutation N: | 9999 | 9999 | 9999 | 9999 | 9999 | 9999 |
| Total sum of squares: | 0.2988 | 1.837 | 0.2542 | 3.15E+04 | 0.3686 | 0.8804 |
| Within-group sum of squares: | 0.1446 | 0.9366 | 0.1982 | 2.16E+04 | 0.1417 | 0.8107 |
| F: | 8.53 | 7.69 | 9.614 | 32.92 | 40.04 | 2.149 |
| *p* (same): | 0.0226 | 0.0063 | 0.0051 | 0.0001 | 0.0001 | 0.1488 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Day 0 | D.S | Day 3 | D.S | Day 7 | D.S | Day 15 | D.S | Day 30 | D.S | Day 60 | D.S | Day 90 | D.S | Day 120 | D.S | Day 140 | D.S | Day 150 | D.S |
| Archaea | Simpson | 0.9 | 0.0 | 0.8 | 0.0 | 0.9 | 0.0 | 0.5 | 0.0 | 0.9 | 0.0 | 0.8 | 0.0 | 0.8 | 0.0 | 0.8 | 0.0 | 0.8 | 0.0 | 0.7 | 0.2 |
| Shannon | 3.0 | 0.0 | 2.4 | 0.1 | 2.8 | 0.1 | 1.5 | 0.1 | 2.8 | 0.0 | 2.6 | 0.0 | 2.2 | 0.0 | 2.3 | 0.0 | 2.6 | 0.1 | 2.4 | 0.8 |
| Evenness | 0.4 | 0.1 | 0.2 | 0.0 | 0.3 | 0.0 | 0.1 | 0.0 | 0.2 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.1 |
| B-Parker | 0.1 | 0.0 | 0.4 | 0.0 | 0.2 | 0.0 | 0.7 | 0.0 | 0.3 | 0.0 | 0.5 | 0.0 | 0.5 | 0.0 | 0.3 | 0.0 | 0.4 | 0.0 | 0.5 | 0.3 |
| Chao | 60.6 | 14.1 | 116.5 | 34.7 | 114.8 | 26.5 | 161.6 | 21.2 | 167.6 | 12.6 | 157.5 | 6.9 | 92.0 | 4.2 | 151.9 | 9.1 | 190.5 | 10.8 | 173.7 | 3.2 |
| Bacteria | Simpson | 0.9 | 0.0 | 1.0 | 0.0 | 1.0 | 0.0 | 0.9 | 0.0 | 1.0 | 0.0 | 1.0 | 0.0 | 1.0 | 0.0 | 1.0 | 0.0 | 1.0 | 0.0 | 0.9 | 0.0 |
| Shannon | 3.6 | 0.1 | 4.4 | 0.0 | 4.5 | 0.2 | 3.4 | 0.0 | 4.5 | 0.1 | 5.0 | 0.0 | 5.0 | 0.2 | 5.0 | 0.1 | 4.8 | 0.1 | 4.4 | 0.0 |
| Evenness | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.3 | 0.1 | 0.1 | 0.0 | 0.2 | 0.1 | 0.1 | 0.0 |
| B-Parker | 0.2 | 0.0 | 0.1 | 0.0 | 0.2 | 0.0 | 0.2 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.2 | 0.0 |
| Chao | 2014.0 | 107.5 | 3643.0 | 135.8 | 4195.5 | 734.7 | 3526.5 | 265.2 | 4163.5 | 71.4 | 4036.5 | 416.5 | 1010.8 | 346.8 | 2208.5 | 135.1 | 1713.2 | 1087.3 | 2258.5 | 75.7 |
| Fungi | Simpson | 0.6 | 0.1 | 0.3 | 0.0 | 0.6 | 0.0 | 0.3 | 0.0 | 0.1 | 0.0 | 0.7 | 0.0 | 0.9 | 0.0 | 0.8 | 0.0 | 0.8 | 0.0 | 0.8 | 0.0 |
| Shannon | 1.6 | 0.3 | 0.8 | 0.0 | 1.4 | 0.0 | 0.8 | 0.0 | 0.3 | 0.0 | 1.4 | 0.0 | 2.5 | 0.2 | 2.2 | 0.1 | 1.9 | 0.2 | 2.2 | 0.2 |
| Evenness | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 |
| B-Parker | 0.5 | 0.1 | 0.8 | 0.0 | 0.5 | 0.0 | 0.8 | 0.0 | 1.0 | 0.0 | 0.5 | 0.0 | 0.2 | 0.0 | 0.3 | 0.0 | 0.3 | 0.0 | 0.3 | 0.0 |
| Chao | 291.8 | 38.5 | 666.5 | 67.9 | 625.1 | 78.1 | 526.2 | 85.5 | 476.8 | 147.9 | 278.9 | 159.5 | 153.4 | 10.4 | 228.8 | 18.0 | 137.7 | 57.1 | 367.4 | 19.6 |

Table S2. Alpha diversity of archaeal. bacterial and fungal communities over operational days

\*D.S: Deviation standard; B-Parker: Berger-Parker; Evenness : Pielou’s evenness.