

# **SUPPLEMENTARY MATERIAL**

## **Influence of phosphate dosing on biofilms development on lead in chlorinated drinking water bioreactors**

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**Supplementary Table 1: Statistical differences between Diversity Indices of each group based on non-parametric test Mann-Whitney U. In green significant differences according to the p-value ( $\leq 0,05$ ).**

|                           | Material | Treatment | Dominance | Shannon Index | Chao-1 |
|---------------------------|----------|-----------|-----------|---------------|--------|
| <b>Bacteria</b>           | Lead     | HP-CP     | 0.05      | 0.05          | 0.05   |
|                           |          | HP-LP     | 0.05      | 0.046         | 0.05   |
|                           |          | CP-LP     | 0.05      | 0.046         | 0.05   |
|                           | PVC      | HP-CP     | 0.827     | 0.827         | 0.827  |
|                           |          | HP-LP     | 0.275     | 0.275         | 0.275  |
|                           |          | CP-LP     | 0.275     | 0.75          | 0.275  |
|                           | Lead-PVC | HP-HP     | 0.05      | 0.05          | 0.05   |
|                           |          | CP-CP     | 0.05      | 0.05          | 0.05   |
|                           |          | LP-LP     | 0.05      | 0.046         | 0.05   |
| <b>Fungi</b>              | Lead     | HP-CP     | 0.046     | 0.05          | 0.827  |
|                           |          | HP-LP     | 0.05      | 0.05          | 0.275  |
|                           |          | CP-LP     | 0.046     | 0.05          | 0.275  |
|                           | PVC      | HP-CP     | 0.275     | 0.127         | 0.827  |
|                           |          | HP-LP     | 0.05      | 0.05          | 0.658  |
|                           |          | CP-LP     | 0.513     | 0.513         | 0.827  |
|                           | Lead-PVC | HP-HP     | 0.827     | 0.513         | 0.513  |
|                           |          | CP-CP     | 0.046     | 0.05          | 0.513  |
|                           |          | LP-LP     | 0.127     | 0.05          | 0.275  |
| <b>Bacteria and Fungi</b> | Lead     | HP        | 0.05      | 0.05          | 0.127  |
|                           |          | CP        | 0.05      | 0.05          | 0.05   |
|                           |          | LP        | 0.05      | 0.05          | 0.05   |
|                           | PVC      | HP        | 0.05      | 0.05          | 0.05   |
|                           |          | CP        | 0.046     | 0.05          | 0.05   |
|                           |          | LP        | 0.513     | 0.513         | 0.127  |

**Supplementary Table 2: Spearman's rank non-parametric correlations of physicochemical and microbiological parameters.**

|                    | Material | Water Temperature | Total Chlorine | Free Chlorine | Turbidity | pH       | Orthophosphate | Phosphorus | Iron     | Lead     | TOC      | Bacteria dominance | Bacteria diversity | Bacteria richness | Fungi dominance | Fungi diversity | Fungi richness | Acidovorax | Alfipia  | Aquabacterium | Chitinophaga | Mycobacterium | Sphingomonas | Aspergillus | Exophiala | Fusarium | Penicillium | Rhodotorula |  |
|--------------------|----------|-------------------|----------------|---------------|-----------|----------|----------------|------------|----------|----------|----------|--------------------|--------------------|-------------------|-----------------|-----------------|----------------|------------|----------|---------------|--------------|---------------|--------------|-------------|-----------|----------|-------------|-------------|--|
| Material           | 1.000    |                   |                |               |           |          |                |            |          |          |          |                    |                    |                   |                 |                 |                |            |          |               |              |               |              |             |           |          |             |             |  |
| Water Temperature  | 0.000    | 1.000             |                |               |           |          |                |            |          |          |          |                    |                    |                   |                 |                 |                |            |          |               |              |               |              |             |           |          |             |             |  |
| Total Chlorine     | 0.000    | -0.866**          | 1.000          |               |           |          |                |            |          |          |          |                    |                    |                   |                 |                 |                |            |          |               |              |               |              |             |           |          |             |             |  |
| Free Chlorine      | 0.000    | -0.500*           | 0.866**        | 1.000         |           |          |                |            |          |          |          |                    |                    |                   |                 |                 |                |            |          |               |              |               |              |             |           |          |             |             |  |
| Turbidity          | 0.000    | 1.000**           | -0.866**       | -0.500*       | 1.000     |          |                |            |          |          |          |                    |                    |                   |                 |                 |                |            |          |               |              |               |              |             |           |          |             |             |  |
| pH                 | 0.000    | -0.500*           | 0.866**        | 1.000**       | -0.500*   | 1.000    |                |            |          |          |          |                    |                    |                   |                 |                 |                |            |          |               |              |               |              |             |           |          |             |             |  |
| Orthophosphate     | 0.000    | -1.000**          | 0.866**        | 0.500*        | -1.000**  | 0.500*   | 1.000          |            |          |          |          |                    |                    |                   |                 |                 |                |            |          |               |              |               |              |             |           |          |             |             |  |
| Phosphorus         | 0.000    | -1.000**          | 0.866**        | 0.500*        | -1.000**  | 0.500*   | 1.000**        | 1.000      |          |          |          |                    |                    |                   |                 |                 |                |            |          |               |              |               |              |             |           |          |             |             |  |
| Iron               | 0.000    | 1.000**           | -0.866**       | -0.500*       | 1.000**   | -0.500*  | -1.000**       | -1.000**   | 1.000    |          |          |                    |                    |                   |                 |                 |                |            |          |               |              |               |              |             |           |          |             |             |  |
| Lead               | 0.000    | 1.000**           | -0.866**       | -0.500*       | 1.000**   | -0.500*  | -1.000**       | -1.000**   | 1.000**  | 1.000    |          |                    |                    |                   |                 |                 |                |            |          |               |              |               |              |             |           |          |             |             |  |
| TOC                | 0.000    | -0.500*           | 0.866**        | 1.000**       | -0.500*   | 1.000**  | 0.500*         | 0.500*     | -0.500*  | -0.500*  | 1.000    |                    |                    |                   |                 |                 |                |            |          |               |              |               |              |             |           |          |             |             |  |
| Bacteria dominance | 0.867**  | -0.341            | 0.318          | 0.210         | -0.341    | 0.210    | 0.341          | 0.341      | -0.341   | -0.341   | 0.210    | 1.000              |                    |                   |                 |                 |                |            |          |               |              |               |              |             |           |          |             |             |  |
| Bacteria diversity | -0.867** | 0.341             | -0.318         | -0.210        | 0.341     | -0.210   | -0.341         | -0.341     | 0.341    | 0.341    | -0.210   | -0.996**           | 1.000              |                   |                 |                 |                |            |          |               |              |               |              |             |           |          |             |             |  |
| Bacteria richness  | -0.696** | 0.459             | -0.341         | -0.131        | 0.459     | -0.131   | -0.459         | -0.459     | 0.459    | 0.459    | -0.131   | -0.876**           | 0.889**            | 1.000             |                 |                 |                |            |          |               |              |               |              |             |           |          |             |             |  |
| Fungi dominance    | 0.311    | -0.590**          | -0.682**       | -0.590**      | -0.590**  | -0.590** | -0.590**       | -0.590**   | -0.590** | -0.590** | -0.590** | 0.115              | -0.107             | -0.094            | 1.000           |                 |                |            |          |               |              |               |              |             |           |          |             |             |  |
| Fungi diversity    | -0.332   | -0.616**          | -0.681**       | -0.564*       | -0.616**  | -0.564*  | -0.616**       | -0.616**   | -0.616** | -0.616** | -0.564*  | -0.143             | 0.135              | 0.146             | -0.977**        | 1.000           |                |            |          |               |              |               |              |             |           |          |             |             |  |
| Fungi richness     | -0.268   | 0.262             | -0.261         | -0.190        | 0.262     | -0.190   | -0.262         | 0.262      | 0.262    | -0.190   | -0.425   | 0.425              | 0.405              | 0.147             | -0.170          | 1.000           |                |            |          |               |              |               |              |             |           |          |             |             |  |
| Acidovorax         | -0.568*  | -0.695**          | -0.591**       | -0.328        | -0.695**  | -0.328   | -0.695**       | -0.695**   | -0.695** | -0.695** | -0.328   | 0.263              | -0.269             | -0.158            | -0.555**        | -0.612**        | -0.027         | 1.000      |          |               |              |               |              |             |           |          |             |             |  |
| Alfipia            | -0.739** | -0.525*           | -0.545*        | 0.420         | -0.525*   | 0.420    | -0.525*        | -0.525*    | -0.525*  | -0.525*  | 0.420    | -0.538*            | -0.534*            | 0.317             | -0.676**        | -0.682**        | 0.187          | -0.734**   | 1.000    |               |              |               |              |             |           |          |             |             |  |
| Aquabacterium      | 0.867**  | 0.131             | -0.091         | -0.026        | 0.131     | -0.026   | -0.131         | -0.131     | 0.131    | 0.131    | -0.026   | -0.767**           | -0.759**           | -0.600**          | 0.341           | -0.358          | -0.256         | -0.587*    | -0.767** | 1.000         |              |               |              |             |           |          |             |             |  |
| Chitinophaga       | -0.867** | 0.315             | -0.204         | -0.039        | 0.315     | -0.039   | -0.315         | -0.315     | 0.315    | 0.315    | -0.039   | -0.926**           | -0.924**           | -0.843**          | -0.103          | 0.141           | 0.448          | -0.321     | -0.515*  | -0.701**      | 1.000        |               |              |             |           |          |             |             |  |
| Mycobacterium      | -0.589*  | -0.013            | -0.295         | -0.525*       | -0.013    | -0.525*  | 0.013          | 0.013      | -0.013   | -0.013   | -0.525*  | -0.598**           | -0.591**           | 0.383             | 0.061           | -0.024          | 0.212          | -0.280     | 0.383    | -0.736**      | 0.424        | 1.000         |              |             |           |          |             |             |  |
| Sphingomonas       | -0.589*  | -0.026            | 0.182          | 0.289         | -0.026    | 0.289    | 0.026          | 0.026      | -0.026   | 0.289    | -0.026   | -0.517*            | -0.525*            | -0.470*           | -0.210          | 0.195           | -0.026         | -0.362     | -0.513*  | -0.775**      | -0.478*      | 0.418         | 1.000        |             |           |          |             |             |  |
| Aspergillus        | 0.246    | -0.184            | -0.023         | -0.223        | -0.184    | -0.223   | 0.184          | 0.184      | -0.184   | -0.184   | -0.223   | 0.414              | -0.428             | -0.455            | 0.064           | -0.123          | -0.341         | 0.098      | -0.344   | 0.257         | -0.470*      | 0.011         | -0.218       | 1.000       |           |          |             |             |  |
| Exophiala          | -0.075   | 0.131             | -0.204         | -0.223        | 0.131     | -0.223   | -0.131         | -0.131     | 0.131    | 0.131    | -0.223   | -0.154             | 0.156              | 0.108             | -0.599**        | -0.521*         | 0.171          | -0.135     | -0.106   | -0.154        | 0.228        | 0.342         | 0.255        | -0.160      | 1.000     |          |             |             |  |
| Fusarium           | -0.096   | 0.131             | -0.250         | -0.302        | 0.131     | -0.302   | -0.131         | -0.131     | 0.131    | 0.131    | -0.302   | -0.040             | 0.057              | 0.038             | 0.026           | 0.003           | -0.388         | 0.154      | -0.187   | 0.236         | 0.049        | -0.028        | -0.356       | 0.416       | -0.282    | 1.000    |             |             |  |
| Penicillium        | -0.118   | -0.236            | 0.409          | -0.472*       | -0.236    | -0.472*  | 0.236          | 0.236      | -0.236   | -0.236   | -0.472*  | -0.108             | 0.096              | 0.152             | -0.362          | 0.317           | 0.110          | -0.164     | 0.439    | -0.412        | 0.065        | 0.098         | -0.546*      | -0.098      | -0.030    | -0.441   | 1.000       |             |  |
| Rhodotorula        | -0.289   | -0.511*           | -0.772**       | -0.826**      | -0.511*   | -0.826** | -0.511*        | -0.511*    | -0.511*  | -0.511*  | -0.826** | -0.077             | 0.059              | 0.057             | -0.812**        | -0.792**        | -0.231         | -0.439     | -0.639** | -0.373        | 0.172        | -0.131        | 0.430        | -0.220      | -0.342    | -0.255   | -0.501*     | 1.000       |  |

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).