
Large-Scale Photocatalytic Degradation of Pharmaceuticals in Continuous Flow Real Wastewater Effluent using Natural Solar Illumination: An Experimental and Numerical Approach

A Data Management Plan created using DMPTool

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Roles and responsibilities

The PI, Dr. Nnanna, is responsible for overall management of the project. He is specifically responsible for the design and fabrication of the experimental facility as well as conducting all the experimental tests. Furthermore, he will coordinate water sample collections from participating wastewater treatment plants and coordinate meetings and teleconferences.

Co-PI, Dr. Vargo, is responsible for analytical tests to measure the concentration of pharmaceutical contaminants.

Co-PI, Dr. Kim, is responsible for the numerical simulations.

Justus Ndukaife (Ph.D. student) will provide support to both Drs. Nnanna and Kim.

Mr. Bob Theodorou of Gary Sanitary District will provide assistance with sample collections.

All data generated will be stored in an R-drive within Purdue university Water Institute. Access to the data will be available to all PIs.

Expected data

The data expected will include the degradation rate based on changes in carbon dioxide before and after the reactors, and changes in pharmaceutical concentrations; effects of pH, flow rate, exposure time, natural organic matter, influent concentration, solar intensity and photocatalyst particle size on degradation efficiency.

Period of data retention

There is no time limit for keeping the data. The data will be shared with wastewater treatment plants to enable them optimize photocatalytic reactor. It will be presented in conferences, and published in journals. The data will also be made available to relevant departments such as environmental engineering and biology that have interest in photocatalysis.

Data formats and metadata

The experimental data will be available in EXCEL spreadsheet format and also graphically. The numerical codes is based Density Function Theory (DFT), Molecular Dynamics (MD), and Finite Element Method (FEM).

Data dissemination and policies for public access, sharing and publication delays

The data will be disseminated in the following forms:

- a. Wastewater Treatment Plant through workshops
- b. Conference presentations and journal publications
- c. Engineering Summer Program for High School students
- d. Teachers Camp - each summer, high school teachers are invited for one-week to take remedial lectures on emerging topics in engineering
- e. Posted on the Purdue Water Institute website, <http://centers.pnw.edu/water-institute/>

Data storage and preservation of access

The department of mechanical engineering at Purdue University Northwest and Purdue Water Institute both have an R-drive that is accessible to the university over an unlimited time. The strategy for storing the data in longer-term is to work with the Purdue Northwest Information Technology department to create a directory for storing the data in the R-drive.

All the PIs from Purdue will be responsible for managing the data in the R-drive.

Co-PI, Dr. Vargo of the University of Iowa also have a similar data management capability at his institution.

