Plan Overview

A Data Management Plan created using DMPonline

Title: Struvite associated with an organic matrix and silicon in phosphorus availability for maize and phosphorus fractionation of the rhizospheric soil

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Project abstract:

Struvite is a promising source of phosphorus (P) with gradual release in acidic environments, whose availability may be influenced by rhizosphere conditions and plant genotypic characteristics. However, its release may be limited in short-cycle crops, requiring strategies to enhance its efficiency, such as association with organic compounds or silicon. It is hypothesized that these combinations promote P uptake by increasing its availability in the rhizosphere and reducing soil fixation. The objective of this study is to evaluate the efficiency of struvite, applied alone or associated with an organic matrix and silicon, in supplying P to two maize genotypes, in comparison with a conventional phosphate source. The experiment will be conducted in pots using a medium-textured Oxisol, under a randomized complete block design (RCBD) in a 2 × 6 factorial arrangement, consisting of two distinct maize genotypes and six phosphate fertilizer treatments: (1) struvite; (2) struvite combined with organic compost (digestate); (3) struvite combined with silicon; (4) struvite combined with organic compost and silicon; (5) triple superphosphate; and (6) control (no P application). Leaf area, stem diameter, shoot dry matter, shoot P concentration, resin-extractable P in non-rhizospheric soil, and P fractionation in the rhizosphere will be evaluated. The data will be subjected to tests of normality and homogeneity of variances, followed by analysis of variance and mean comparisons.

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Copyright information:

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Data Collection

What data will you collect or create?

- Stem diameter
- Leaf area
- Shoot dry matter
- Phosphorus and other nutrient concentrations in the shoot
- Resin-extractable P content in non-rhizospheric soil
- Phosphorus fractionation in the rhizosphere

How will the data be collected or created?

- **Stem diameter:** digital caliper
- **Leaf area:** LI-COR LI-3100C benchtop leaf area meter
- **Shoot dry matter:** analytical balance (high precision)
- **Phosphorus and other nutrient concentrations in the shoot:** Malavolta et al. (1989) and Malavolta et al. (1997)
- **Resin-extractable P in non-rhizospheric soil:** Raij et al. (1986)
- **Phosphorus fractionation in the rhizosphere:** Gatiboni and Condron (2021)

Documentation and Metadata

What documentation and metadata will accompany the data?

Together with the storage and backup procedures, all information related to the equipment model and the experimental setup will be maintained in a repository. The management of this information will be carried out using project management software, adopting a digital laboratory notebook structure.

Ethics and Legal Compliance

How will you manage any ethical issues?

It will follow the general guidelines of FAPESP.

How will you manage copyright and Intellectual Property Rights (IPR) issues?

Basic IT systems for secure IP, including all input and output devices responsible for document storage, will be used. These systems are generally network-connected and integrated with remote management solutions. In addition, cloud-based applications and file-sharing services are employed.

Storage and Backup

How will the data be stored and backed up during the research?

All data produced will be stored in a Data Repository based on digital servers provided by the Project Coordination and allocated within UNESP’s IT Support infrastructure. For data organization, a project management software will be made available to all users, in which information such as acquisition date, equipment used, and measurement conditions will be recorded.

Alternative software options may be evaluated by the Project Coordination, provided that all information remains encrypted and stored on a physical server, ensuring data reliability and confidentiality. The management software will include a digital Laboratory Notebook, which will be used by all project members. Raw data generated by the equipment will be linked to this digital notebook, and physical (paper-based) versions will be digitized and likewise stored in digital format.

The Project Coordination will retain the physical laboratory notebooks after the completion of each subproject for a minimum of one year following the conclusion of the Project.

How will you manage access and security?

All data will be recorded in a standard Laboratory Notebook, to be provided by the Project Coordination to all project members. This notebook, in both physical and digital formats, aims to ensure that all information is protected and easily accessible to the Coordinators for verification and validation purposes.

Selection and Preservation

Which data are of long-term value and should be retained, shared, and/or preserved?

Many of the experiments proposed in this project involve destructive analyses and, in some cases, show instability for long-term storage. Therefore, the methods for sample preparation and characterization will be preserved in a digital server in detailed format, ensuring their reproducibility. Whenever possible, representative samples will be stored and classified by the Project Coordination for purposes of data cross-checking and validation, when necessary. As previously described, the data

and methods will be preserved in the Repository for a minimum of three years.

What is the long-term preservation plan for the dataset?

It will be made available in cloud storage with regular backups, access control, and continuous maintenance, ensuring the long-term preservation, traceability, and reuse of the data.

Data Sharing

How will you share the data?

The data will be made available through publications in scientific journals and at scientific events. In cases of restricted data access, the Project Coordination will consult FAPESP whenever necessary. Raw data may be made available upon formal request to the Project Coordination via the provided contact email. Knowledge dissemination among researchers will be carried out through meetings.

Are any restrictions on data sharing required?

Access to the data will be restricted to Project members until the publication of articles or the completion of any other form of information dissemination (patents, meetings, among others). After publication, raw data may be made available to any interested party upon formal request to the Project Coordination. The raw data will be stored in digital format for at least three years after the conclusion of the Project.

Responsibilities and Resources

Who will be responsible for data management?

Data management will be the responsibility of the project members.

What resources will you require to deliver your plan?

The Scientific Initiation scholarship, funded by FAPESP, will already be sufficient.