Acid rain does not interfere with calcium uptake of plants in loamy soils.

BACKGROUND:
The damage done to plant life after exposure to acid deposition, due to anthropogenic impacts, is a growing issue for the international environmental and agricultural community. Damage occurs in plant tissues and soil via the loss of calcium. Acid rain leaches necessary nutrients like calcium from soil preventing plants from using these missing nutrients for development. The global scale of this issue requires a low impact and low cost remediation technique. Both organic and low cost, used coffee grounds have been explored as remediators of contaminated waste waters with reported success. Coffee grounds have the ability to adsorb positively charged ions due to the negatively charged nature of the organic material.

METHODS:
1. Prepared 4 triplicate groups of potted experimental plants for sampling.
   - Coffee Ground Acid Rain Group (CGAR): received coffee grounds and simulated acid rain treatment (SAR).
   - Coffee Ground Group (CG): received no simulated acid rain treatment but received coffee ground treatment.
   - Acid Rain Group (AR): received simulated acid rain treatment but no coffee ground treatment
   - Control group: received no treatments
2. Designated soil was homogenized with coffee grounds. Over the course of 28 days, the designated acid rain groups received SAR every other day.
3. Plant tissue, drainage water, and soil samples were taken every 13 days on 3 Sampling Days over the course of the 28 day observation period.
4. The soil, water, and plant samples were digested using EPA prescribed methods. The samples were then analyzed for calcium and aluminum content on a Microwave Plasma Atomic Emission Spectrometer apparatus at 616.217 nm and 396.152 nm wavelengths respectively.

RESULTS:

DISCUSSION:
- There was no clear indication that the coffee grounds were the direct cause of calcium concentrations found in the plant tissues, nor that the coffee grounds prevented calcium leaching.
- This may result from the extremely low aluminum content in the soil. With no aluminum there is no interference with calcium uptake therefore the coffee grounds ability to prevent calcium leaching and promote uptake cannot be definitively stated.

ADDITIONAL INFORMATION:

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