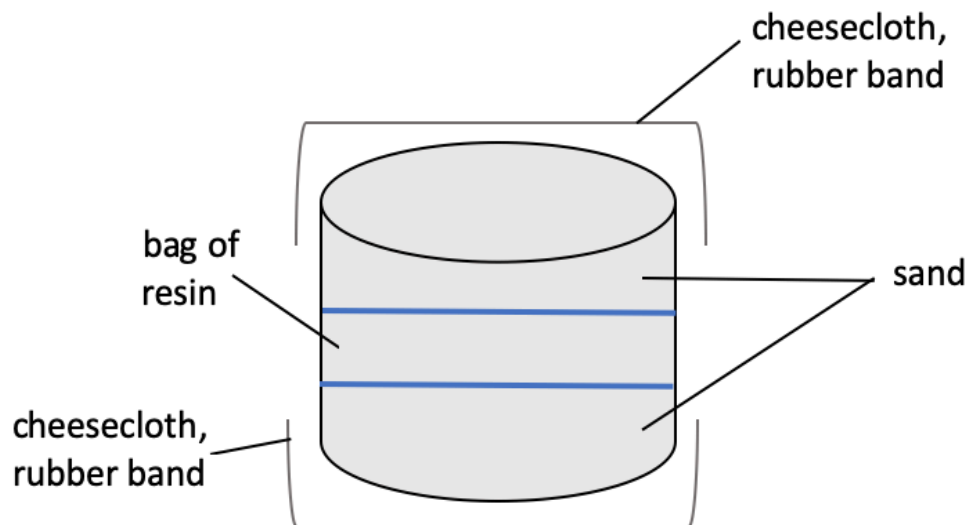
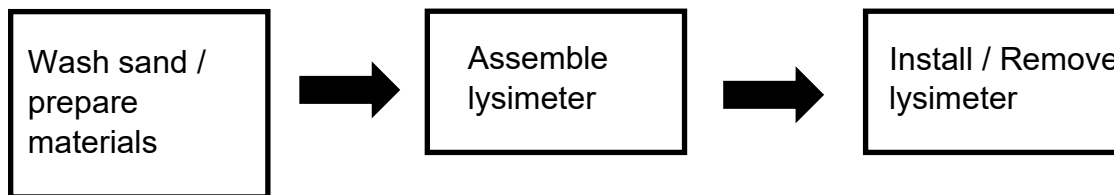


SOP: Resin Lysimeter Assembly

Overview:

This standard operating procedure (SOP) describes a protocol for assembling resin lysimeters to be installed underground in-field in order to trap nutrients leaching through soil profile. This method was originally reported by R. B. Susfalk & D. W. Johnson (2002) and modified by UIUC Soils Lab in 2020. Key instruments include ion-exchange resin (IER), PVC couplings, washed sand, rubber bands, cheesecloth, scissors, plastic mesh bags, and twist-ties.



Safety:

All standard safety protocols and online safety training via UIUC [Division of Research Safety \(DRS\)](#) are required.

Personal protection equipment (PPE) for this procedure are not required, but using nitrile gloves to avoid skin exposure when handling ion-exchange resin is recommended.

Instrumentation & Consumables:

Assembly Preparation

- Washed sand
- Scissors
- 2 pieces of cheesecloth cut into 3x3 inch squares
- 2 ≤150-micron nylon mesh bags
- 30 grams ion-exchange resin (IER)
- 2 twist-ties
- 2 #64 size rubber bands
- 2 inch diameter PVC coupling

Detailed Procedure:

I. Preparation Before Assembly

1. Wash sand with distilled or RO water and dry before use. Use 5-gallon bucket with holes in the bottom and place a catch pan under bucket. Cover holes with filter paper, pour desired amount of sand into bucket on top of filter paper. Using a 1:1 sand to water ratio, pour nano-pure water over sand. Let water run through sand completely, then dry sand in oven at 80 °C. After drying, let sand cool before use.
2. Use scissors to cut cheesecloth into 3x3 inch squares.
3. Fill each of the two plastic mesh bags with 15 grams IER and close with a twist-tie.

II. Assembly

1. Attach one piece of cheesecloth to one open end of the PVC coupling and secure tightly with a rubber band. This will be the bottom side of the lysimeter while assembling.
2. With the secured cheesecloth on the bottom, fill about one-third of the PVC coupling with washed sand.
3. On top of the layer of sand, place both bags of IER, patting down to fill the area. To ensure that all water that runs through the lysimeter comes in contact with IER, it is important that the bags cover the entire area of the PVC coupling; the layer of sand below the bags of IER should not be visible.
4. Top the bags of IER with another layer of sand, filling the PVC coupling completely.
5. Tap the full resin lysimeter on your work surface a few times to help the sand settle, then add more sand if necessary.
6. Place another piece of cheesecloth on top of the filled PVC coupling and secure tightly with a rubber band.

III. Clean up

1. Small amounts of ion-exchange resin beads that are dropped while handling can be safely disposed in a regular waste bin.
2. All other materials that may need to be disposed of including sand and cheesecloth can be disposed of in a regular waste bin.

References:

R. B. Susfalk & D. W. Johnson (2002) Ion exchange resin based soil solution lysimeters and snowmelt solution collectors, Communications in Soil Science and Plant Analysis, 33:7-8, 1261-1275, DOI: 10.1081/CSS-120003886

Link to article: <https://doi.org/10.1081/CSS-120003886>

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<https://margenot.cropsciences.illinois.edu/methods-sops/>

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