

How to measure salinity in the soil samples

Step 2: How to measure salinity in the soil samples

Below is a step by step instruction for measuring soil salinity. The saturated paste method is a little bit more complicated since it requires either a vacuum pump or a laboratory grade centrifuge. If you don't have access to this type of equipment then you can use the 1:2 method.

Both methods require an EC meter to determine the salinity. Be aware that the results acquired by both methods are not equivalent to each other. Please contact us upon obtaining the results.

Steps for using 1:2 Method

First, obtain the moisture content of the samples as this is an important parameter to know and the 1:2 method uses dry soil.

1. Weigh the trays where the soil samples will be dried. Record their weight using the same code that was used on the saturated pasted.
2. Add about 100 grams of "wet" soil to the tray. Record the weight including the tray.
3. Use a stove on 70 °C and dry the samples for 72 hours or, dry the samples in the sun until all the moisture has evaporated.
4. Record dry weight of the sample.
5. To obtain the moisture content:
$$[(\text{wet soil} - \text{dry soil}) / \text{dry}] * 100 = \text{moisture content (\%)}$$
6. Record the moisture content.

To obtain the electrical conductivity (EC, salinity measurement) from the soil sample:

7. Remove large big particles from the soil sample (>2mm).
8. Add 15 ml of soil to a centrifuged tube (size 50 ml)
9. Add 30 ml of mineral water and shake for 10 seconds.
10. After 30 minutes, shake it again.
11. After 10 minutes, determine electrical conductivity, inserting a EC meter in the water.
12. Record the result and the location and time from where you took the sample.

Steps for using saturated paste method (alternative method)

A saturated paste should be made using dry, fine soil. Dry the soil in a stove at 70 °C until the weight is constant. Use a sieve (< 2 mm mesh size) to remove any large particles.

1. Slowly add demi water to the dry soil while stirring the soil until a saturated paste is made. Properties of a saturated paste include:
 - a. No freestanding water is present on the surface of the paste
 - b. The soils slides freely off a spatula
 - c. The soil flows slightly when the container is tipped to a 45-degree angle
 - d. The soil glistens as it reflects light
 - e. When a trench is drawn, using a spatula, this trench should stay. However, the trench should close when the side of the container is tapped with the spatula. This is the best indicator for a saturated paste.
2. When a saturated paste is made, the salinity can be measured in the water extract. Extract the water using either a centrifuge or a vacuum pump and determine the EC of the extract using an EC meter. This extract can also be used to measure the pH.

If the results of step 1 and 2 show you have a salinity problem, we need to see what crops could grow on your soil. That depends on the exact salinity level.

Which crops could you grow?

Step 3: Reference table – which crops could you grow

The below tables give a general classification of different crops and their suitability for saline agriculture. Keep in mind that of many crops there are very salt tolerant varieties, even under strongly saline conditions yields of for example 75% of the maximum yield is still achievable.

If you used the 1:2 method:

Value (dS/m)	Salinity	Crops and varieties
< 1	Low Salinity	All crops
1-3	Moderate Salinity	Many common crops such as potatoes, tomatoes, carrots, cabbages, olives, sugar cane, millet.
> 3	Strong Salinity	More specialized crops for salinity such as sugar beet, cotton, barley, quinoa or halophytes.

If you used the Saturated Paste Method (ECe):

Saturated Paste Method (EC_e)		
Value (dS/m)	Salinity	Crops and varieties
0-2	Non-Saline	All crops can be grown
2-4	Slightly Saline	Only some of the most sensitive species such as chickpea (<i>Cicer arietinum</i>) will be affected
4-8	Moderately Saline	Suitable for tolerant varieties of: potatoes, tomatoes, carrots, cabbages, olives, sugar cane, millet and certain fodder species such as certain legumes and grasses
8-16	Strongly Saline	Suitable for tolerant varieties of: sugar beet, cotton, barley and quinoa
> 16	Very Strongly Saline	Suitable for halophytes such as <i>Salicornia spec.</i> , <i>Aster tripolium</i> etc.

Please fill our questionnaire with the values obtained from the above test, in the step 4 of the link below.

Link: <https://www.salineagricultureworldwide.com/questionnaire>