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Experiment No-3: Determination of EC of saline soils

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Theory:

The electrical conductivity (EC) is a measure of the ionic transport in a solution between the anode and cathode. This means, the EC is normally considered to be a measurement of the dissolved salts in a solution. Like a metallic conductor, they obey Ohm's law. Since the EC depends on the total number of ions in the solution. The EC of a soil is conventionally based on the measurement of the EC in the soil solution extract from a saturated soil paste, as it has been found that the ratio of the soil solution in saturated soil paste is approximately two-thirds times higher than that at field capacity. Generally a 1:2.5 soil/water suspension is used.



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Apparatus

EC meter

Beakers (25 ml)

Conical flask

Filter paper (whatman No.1)

Reagent

0.01M Potassium chloride solution: Dry a small quantity of AR grade potassium chloride at 60⁰C for two hours. Weight 0.7456 g of it and dissolve in freshly prepared distilled water and make the volume to one liter. This solution gives an electrical conductivity of 1411.8×10^{-3} i.e. 1.412 dS/m at 25⁰C. For best result, select a conductivity standard (KCl solution) close to the sample value.



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Procedure

Take 40 g soil into 250 ml conical flask, add 100 ml of distilled water, stopper the flask and shake on reciprocating shaker for one hour. Filter through Whatman No.1 filter paper. The filtrate is ready for measurement of conductivity.

Wash the conductivity electrode with distilled water and rinse with standard KCl solution.

Pour some KCl solution into a 25 ml beaker and dip the electrode in the solution Adjust the conductivity meter to read 1.412 dS/m, corrected to 25⁰C.

Wash the electrode and dip it in the soil extract. Record the digital display corrected to 25⁰C. The reading in dS/m of electrical conductivity is a measure of the soluble salt content in the extract, and an indication of salinity status of this soil (Table 3.1). The conductivity can also be expressed as dS/m.



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Table no 3.1 General interpretation of EC values

Note: 1mS/cm =1dS/m.

Soil	EC (dS/m)	Crop reaction
1. Salt free	0-2	Salinity effect negligible,
2.Negligible salt	2-4	Except for more sensitive crops
2. Slightly saline	4-8	Yield of many crops restricted
3.Moderately saline	8-15	Only tolerant crops yield satisfactorily
4. Highly saline	>15	Only very tolerant crops yield Satisfactorily



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Observation: Students must compare your results with above chart and write proper conclusion. Example, EC at dS/m at 25°C using temperature correction factor.

Sample No	EC (dS/m)	Remark
1.		
2.		
3.		