

Vegetable ~~Matters-of~~ Facts

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Vegetables

Salinity unit converter For those who find salinity units confusing

- Salinity refers to the presence of soluble salts in soil or water.
- There is a range of field and laboratory analyses that can be used to assess salinity.
- A range of different units can be quoted for salinity and this is often very confusing.

Salinity is usually measured as electrical conductivity (EC) of water or soil solution, which is a good indicator of total dissolved salts (TDS). Most Australian laboratories use a 1-part soil: 5-part water suspension method to determine soil EC_{1:5}. Other methods determine the amount of TDS directly.

Salinity units: International standard for salinity unit based on electrical conductivity is deci Siemen per metre (dS/m).

The salinity unit converter provides easy conversion from one salinity unit to others. This tool is very easy to use. For example, your soil test results just came back from the lab, and you read that your Salinity (Electrical Conductivity (EC)) is 1.2dS/m.

Use this disc to convert your salinity levels to the desired units. In this example you rotate the disc until 1.2dS/m appears in the window and then read the corresponding values. In this case they are EC of 1200 μ S/cm and TDS of 768 ppm (or mg/L).

Other common EC based units are:

- μ S/cm - micro Siemen per centimetre
- EC unit* - numerically same as μ S/cm (=1 μ S/cm)
- μ mho/cm - micro mho(mhos) per cm (= μ S/cm)
- mmho/cm - milli mho(mhos) per cm (= dS/m)
- mS/cm - milli Siemen per cm (= dS/m)

The units based on the direct measurement of TDS are:

- mg/L - milligram per litre of (TDS)
- ppm - parts per million of TDS (= mg/L)



How does salinity affect crop production?

Soil salinity generally affects plant growth by increasing osmotic tension in the soil making it more difficult for the plants to absorb water from the soil. Excessive uptake of salts by plants from the soil may also have a direct toxic effect on the plants. Saline water, depending on the concentration of salts, applied through sprinkler irrigation can also cause direct damage to the leaves.

Crops vary considerably in their capacity to withstand adverse effects of salinity. A reckoner has been developed that shows the relative tolerance of common vegetable crops to soil salinity based on published literature.

Salt tolerance of vegetable crops

Salt tolerance information presented in the reckoner is based on a scheme originally proposed by Maas and Hoffman (1977)¹. According to this scheme vegetable crops can tolerate a certain level of soil salinity before a decline in production is recorded. For example, turnip and carrot are among the most sensitive crops and can only tolerate soil salinities of about 1 dS/m before a yield decline may be experienced. Zucchini on the other hand, can tolerate soil salinity of up to 4.7 dS/m before a reduction in yield is recorded.

The soil salinity values used in the reckoner are based on EC_e (electrical conductivity of saturated soil extract). The following guide may be used to convert EC_{1:5} to EC_e for different types of soil²:

Soil type	Multiply EC _{1:5} by the number below to get EC _e
Sand	23
Sandy loam	14
Loam	10
Clay loam	9
Medium clay	8
Heavy clay	6

The above conversions are intended as an approximate guide only - in practice, a range of site-specific conditions will influence these values.

¹EV Maas and GJ Hoffman (1977) Journal of Irrigation and Drainage Division ASCE:103, 115-134.

²PG Slavich and GH Petterson (1993) Australian Journal of Soil Research: 31, 73-81.

How to use salt tolerance disc for vegetables

To determine the relative tolerance simply rotate disc till the crop of interest is revealed. Crops included are: Artichoke, Asparagus, Beans, Broccoli, Cabbage, Carrot, Cauliflower, Celery, Cucumber, Eggplant, Beet, Garlic, Lettuce, Onion, Pea, Pepper, Potato, Radish, Spinach, Sweet potato, Tomato, Turnip and Zucchini.

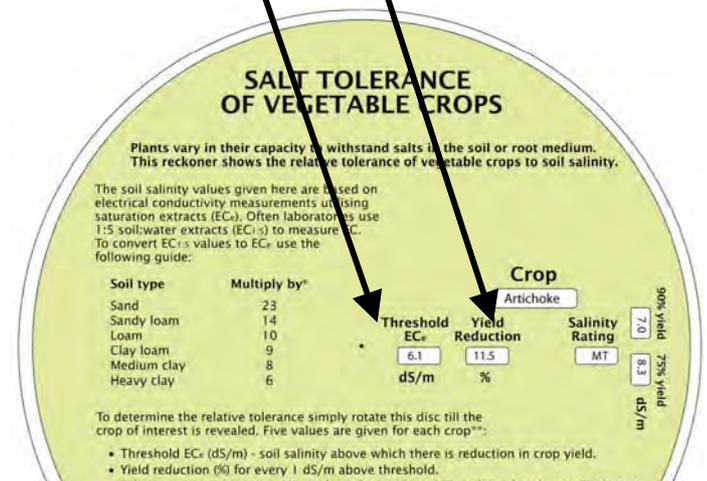
For more information or copy of salinity unit converter please contact:

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How Does it Work?

The following information[#] is given in the reckoner for every crop:

- **Threshold EC_e** = Level of soil salinity below which there is no reduction in crop yield.
- **Yield reduction** = yield reduction percentage for every 1 dS/m above threshold.
- Level of soil salinity where there will be a reduction to 90% or 75% of yield.
- Salinity rating; S - sensitive, MS - moderately sensitive, MT - moderately tolerant, T - tolerant



e.g If the result for EC_{1:5} was 0.7 dS/M for a loam soil the EC_e value would be
 $10 * 0.7 = 7.0$ dS/M
 This would result in an 10% yield reduction for artichoke and nearly a 25% yield reduction for zucchini.

[#]Note that the values are relative and indicative only and assume that there are no other factors limiting crop growth. Actual tolerance will depend on a range of factors such as cultivar, stage of crop growth, climate and cultural practices.

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