

Inoculo Laboratories

saturated Paste

Soil pH

Test Kit

CSIRO Developed
&
Australian Made

What is Soil pH?

Soil pH is a measurement of its relative acidity or alkalinity, providing a guide to the overall balance of the soil. Soil pH is a measure of the acidity of the water in the soil. The pH refers to the concentration of hydrogen ions in the medium. The pH scale is divided into 14 points. Thus a pH of 7 is neutral, above 7 alkaline and below 7 acidic.

Why is knowing the Soil pH so important?

The availability of certain nutrients to plants is controlled by the pH changes in the growing medium. Generally most nutrients are available to plants in the pH range 6.0 ~ 7.5. Therefore knowing the pH of the soils allows you to make sensible decisions about what to grow most successfully.

We must remember that the capacity of plants to take up nutrients from soils varies greatly. Over ages plants have developed and adapted. Different plants prefer different pH ranges in soils - some indicative ranges are attached, consult your nursery for confirmation.

Soil pH is important because it influences soil mechanical properties, that directly affects growth of plants. Soil pH affects soil microbes, bacteria, nutrient leaching and availability.

Finding the pH of your soil

For best results take a number of soil samples from the area concerned and mix thoroughly before testing. Each sample should be taken from a depth of 5-10cm. For accuracy, perform at least five different tests.

1. Mix soil sample (1/2 teaspoon size) with a couple of drops of indicator to make a paste.
2. Dust paste with barium sulphate powder
3. Compare colour of the powder with colour chart provided to determine pH (colour of powder should appear almost instantaneously)

If sub-soils are to be tested they should be kept separate from top soils. Gardeners or landscapers purchasing soils, potting mixes or composts, should check the pH before buying.

Potting mixes

Wide and careful sampling is essential when checking the pH of potting mixes. An ideal pH range for potting mixes is between 5.3 - 6.5, although acid loving plants prefer a range of 4.5 - 5.5. A potting mix that has supported a potted plant for some time should have the pH level checked frequently.

Accuracy of kit test

Check whether the Inoculo soil pH kit is accurately measuring the pH of your soil by:

- Mixing a few drops of the indicator with a small amount of powder
- Colour of paste should match the colour of pH 7 on the colour chart

How to change the pH of your soil Raising the pH (more alkaline)

To raise the soil pH apply ground limestone (calcium carbonate) or dolomite (calcium and magnesium carbonate). The recommended rate of application depends on whether the soil is sand, loam or clay. (See table)

Approx amounts of lime needed to raise the pH of the top 10cm of soils of different texture (g/m²) by one pH unit.

Soil Texture	pH 5.5 - 6.5	pH 4.5 - 5.5
Sand/loamy sand	110	85
Sandy loam	195	130
Loam	240	195
Silty loam	320	280
Clay loam	410	320
Organic soil	790	680

NB: If you wish to convert above figures to tonnes/ha divide by 100.

E.g. 85g/m² = .85 tonnes/ha (All figures are given as a guide only)

If you have only a pH value and an approximate texture to go by, it would be wise to start off with no more than half the amounts of calcium carbonate in this table

Lowering the pH (more acidic)

It is economically unwise to attempt to reduce the pH of soil that is very alkaline. However, for soils that are neutral or slightly alkaline (e.g. 7.5), add 25 - 100g of sulphur per square metre. Apply 25g/m² to sandy soils and 100g/m² to clays. Add an in between amount for loams. This application should reduce the top 10cm of soil between 6.0 - 6.5.

NB: Gypsum has virtually no effect on soil pH. It is used to change the structure of some clay soils, allowing easier cultivation and better drainage.

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Useful References:

<http://www.ciw.csiro.au/publications> - CSIRO & publications

<http://www.homeharvest.com>

<http://www.plantideas.com>

For Further Information:

- CSIRO's "Discovering Soils" booklets.
- "Whats Wrong with my Soils" and "Potting Mixes"
- Gardening Down-under (K. Handreck / CSIRO)
- Growing Media for Ornamental Plants & Turf (Handreck and Black - NSW Uni Press) 2010
- Australian Vegetable Garden (C. Blazey - New Holland 1999)
- Yates Garden Guide 43rd Ed 2011
- Soil Chemical Methods (Australiasia) Rayment & Lyons CSIRO 2011

CSIRO Enquiries - Australia (All States)

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Inoculo

Inoculo - treating soils with respect

Recommended pH Ranges for Commonly Grown Plants

Flowers and Ornamental Shrubs

Abelia	5.0-7.5	Grape Hyacinth	6.0-8.0
Ageratum	6.0-7.0	Grevillea	4.5-7.5
Alyssum	6.0-7.0	Hibiscus	6.0-7.0
Amaranthus	6.0-8.0	Hyacinth	6.0-8.0
Amaryllis	5.0-6.0	Hydrangea	4.5-7.5
Anemone	5.5-7.0	Iris	5.5-7.0
Antirrhinum	6.0-7.0	Larkspur	6.5-7.5
Aquilegia	5.5-7.0	Lilac	5.5-6.5
Aster	6.0-7.0	Liliums	5.5-7.0
Azalea	4.5-5.5	Lily of the Valley	5.5-7.0
Balsam	6.0-7.5	Lobelia	6.0-7.5
Begonia	5.5-6.5	Lupin	5.0-6.0
Boronia	5.5-6.5	Magnolia	5.0-6.0
Bottlebrush	6.0-7.5	Mignonette	5.0-8.0
Cactus	7.0-8.0	Morning Glory	6.0-7.5
Calceolaria	6.0-7.0	Narcissus	6.5-7.0
Calendula	6.0-7.5	Nasturtium	5.5-7.5
Calla	5.5-6.5	Nemesia	6.0-7.5
Camelia	4.5-5.5	Oleander	6.0-7.5
Canna	6.0-8.0	Orchids	5.0-6.0
Campanula	6.0-7.0	Pansy	5.5-6.5
Carnation	6.0-7.5	Passion Flower	6.0-8.0
Centaurea	6.0-7.5	Pelargonium	4.5-7.0
Chrysanthemum	6.0-7.0	Peony	6.0-7.5
Cineraria	5.0-6.0	Petunia	6.0-7.5
Clematis	5.0-6.0	Phlox	5.5-7.5
Coleus	6.0-7.0	Poppy	6.0-7.5
Cosmos	6.0-7.0	Portulaca	5.5-7.5
Cotoneaster	6.0-7.0	Primula	6.5-7.5
Crepe Myrtle	5.0-6.0	Panunculus	6.0-8.0
Crocus	6.0-8.0	Rhododendron	4.5-5.5
Cyclamen	5.0-6.0	Rose	6.0-7.0
Daffodil	6.0-6.5	Salvia	6.5-7.5
Dahlia	6.0-7.0	Saxiphrage	6.0-7.5
Daisy	6.0-7.0	Stock	6.5-7.5
Daphne	5.5-6.5	Sweet Pea	7.0-8.0
Delphinium	6.0-7.0	Sweet William	6.0-7.5
Dianthus	5.5-6.0	Syringa	6.5-7.5
Diosma	5.5-7.0	Tee Tree	5.5-7.0
Erica	4.5-5.5	Tuberose	6.0-7.0
Fern	5.0-6.0	Tulip	6.0-7.0
Foxglove	6.0-7.5	Veronica	5.0-6.0
Freesia	5.5-7.5	Viburnum	5.5-7.0
Fuchsia	5.5-6.5	Viola	6.0-7.5
Gardenia	4.5-5.5	Violet	6.0-8.0
Gentian	6.0-8.0	Wallflower	6.0-7.5
Geraldton Wax	5.5-6.5	Weigelia	6.0-7.0
Gladiolus	6.0-8.0	Wisteria	6.0-7.5
Gloxinia	5.5-6.5	Zinnia	6.0-7.5
Gordonia	5.0-6.5		

Vegetables

Artichoke	6.5-7.5	Brussel Sprouts	6.5-7.5
Asparagus	6.5-7.0	Cabbage	6.0-7.0
Bean	5.5-7.5	Carrot	6.5-7.5
Beetroot	7.0-8.0	Cauliflower	6.0-7.0
Broccoli	6.5-7.5	Celery	6.0-7.0
Brussel Sprouts	6.5-7.5	Chervil	7.0-8.0
Cabbage	6.0-7.0	Chive	6.0-7.0
Carrot	6.5-7.5	Cucumber	5.5-7.0
Cauliflower	6.0-7.0	Endive	6.5-7.5
Celery	6.0-7.0	Garlic	5.5-8.0
Chervil	7.0-8.0	Horse Radish	6.5-7.5
Chive	6.0-7.0	Leak	7.0-8.0
Cucumber	5.5-7.0	Lettuce	6.5-7.5
Endive	6.5-7.5	Marjoram	6.0-8.0
Garlic	5.5-8.0	Mushroom	6.5-7.5
Horse Radish	6.5-7.5	Onion	6.0-7.0
Leak	7.0-8.0	Parsley	6.5-7.5
Lettuce	6.5-7.5	Parsnip	6.5-7.5
Marjoram	6.0-8.0	Peas	6.0-7.5
Mushroom	6.5-7.5	Potato	4.5-6.0
Onion	6.0-7.0	Pumpkin	5.5-7.0
Parsley	6.5-7.5	Radish	6.5-7.5
Parsnip	6.5-7.5	Sage	6.0-7.0
Peas	6.0-7.5	Shallot	6.0-7.0
Potato	4.5-6.0	Spinach	7.0-8.0
Pumpkin	5.5-7.0	Squash	5.5-6.5
Radish	6.5-7.5	Swede	6.0-7.5
Sage	6.0-7.0	Sweet Corn	5.5-7.5
Shallot	6.0-7.0	Thyme	6.0-7.0
Spinach	7.0-8.0	Tomato	6.0-7.0
Squash	5.5-6.5	Turnip	5.5-7.0
Swede	6.0-7.5		
Sweet Corn	5.5-7.5		
Thyme	6.0-7.0		
Tomato	6.0-7.0		
Turnip	5.5-7.0		

Fruit Trees

Almond	6.0-7.0
Apple	6.0-7.0
Apricot	5.5-6.5
Banana	6.5-7.0
Cantalope	6.0-6.5
Cherry	6.5-7.5
Citrus	6.0-7.5
Currants	6.0-7.5
Fig	6.0-7.0
Gooseberry	6.5-7.5
Grape	5.5-6.5
Melon	7.0-8.0
Nectarine	5.5-7.0

Passionfruit	6.0-8.0
Peach	6.0-7.5
Pear	6.5-7.5
Pineapple	5.0-6.0
Plum	6.5-7.5
Raspberry	6.0-6.5
Rhubarb	5.5-7.0
Strawberry	6.5-7.5
Walnut	6.0-8.0
Watermelon	5.0-5.5

Ornamental

Trees

Acacia	6.0-7.0
Alder	5.5-6.5
Ash	6.0-7.5
Beech	5.5-7.0
Birch	5.0-6.0
Cedar	5.0-6.5
Crab Apple	6.0-7.0
Elm	6.0-7.5
Eucalypt	5.5-7.0
Fir	5.0-6.0
Fl. Apple	5.5-7.0
Fl Cherry	5.5-7.0
Fl. Plum	5.5-7.0
Fl. Quince	6.0-7.0
Gleditsia	6.0-7.5
Juniper	5.0-6.0
Larch	6.0-7.0
Maple	5.0-6.5
Oak	5.0-6.5
Pine	5.0-6.5
Plane	6.0-8.0
Poplar	6.0-7.5
Robinia	6.0-7.5
Spruce	5.5-6.5
Sycamore	5.0-6.5
Tulip Tree	6.0-7.0
Wattles	5.5-7.0
Weeping Willow	5.0-6.0
Fine Turf	6.0-6.5

The pH for each species of Australian Plants vary widely making a list of recommended pH ranges too exhaustive for this pamphlet. Please consult your local nursery.