

## Growing food at home series

# Potting mix

## Pack E Notes 3

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Many edible plants can be successfully grown in pots and containers, with a factor in this success being the medium plants are grown in: often purchased as 'potting mix'.

### Why do I need potting mix and not soil from the garden?

Our natural soils vary in their fertility, drainage, pH and organic matter content. In City of Salisbury depending on where you live your soil could be clay with poor drainage and high mineral content, in contrast to the poor sandy soils which drain too well. Neither have available a complete essential nutrient range and these soils' pH are often too alkaline for many food plants preference. Whilst plants grow in the ground, this is partially due to their ability to extend their roots to obtain nutrients and water from where it is located, and interact between soil micro-organisms (above and below soil). When placed in pots and containers plants circumstances change significantly: roots and soil microbe interaction is reduced; their ability to source nutrients and water from afar are restricted. The soil in containers and pots needs to provide a suitable environment for healthy plant growth: structure to hold the plant and allow root movement; capacity to hold and allow movement of water; air spaces; suitable pH; and available nutrient supply of macronutrients, micronutrients and trace elements in a small space.

Filling a pot with garden soil results in soil with:

- little and unknown (which and their percentage) nutrients, which means it's hard to work out a fertiliser regime
- varying water absorbing and holding abilities –either too wet (root rot) or non-wetting (plant stress)
- poorly aerated structure leading to reduced root and microbe movement, poor nutrient uptake
- an undernourished, stressed plant that will not flourish and be hard to predict fertiliser requirements

Planting in good quality potting mix will result in healthy plant growth as some of the essentials for growth are provided such as regulated fertiliser in available form (there is variation with potting mixes); both aeration and water holding capacity that allow root movement; suitable pH; and a good structure to hold plant in place for a while (no slumping).

Coco peat or coir is coconut husk, and an ecological sound alternative to sphagnum moss with more water retaining ability than it. With a pH between 5.7-6.8. It's suitable for most vegetables. It's water holding abilities can be a problem in self watering pots and pots in winter if too much is included. It's sold in compressed bricks that are easily hydrated.

## What is potting mix?

This is the medium that the roots grow and interact in to extract water and nutrients for plant growth, and provide support for. In Australia potting mix is made from organic materials from commercial operations and contains pine bark, sawdust and other wood residues (low nutrient), green organic compost (slow release nutrients) and air spaces (for root and water movement). It contains micro-organisms (similar to the ones in composts) who continue to breakdown the organic materials, which can be part of the cause of potting mixes becoming non wetting, and the reason wetting agents are added. Some of the more expensive ones have coco peat which increases water holding ability as well.

## Difference in qualities

The best is a potting mix that is uniformly fine and drains well. The worst is a cheap potting mix with chunky bits in it, clay or heavy soil, or wet soggy compost.

Numerous potting mixes are available, varying in price and quality. With specific mixes that target particular circumstances such as growing seeds, striking cuttings, growing bushes and trees long term in containers, for acidic pH preferring plants, and general mixes.

It's recommended to use potting mixes with the Australian Standard Mark on them to get the best results. Though this is a voluntary system mixes with Australia Standards certification logo on them have been through a testing, will conform in content and quality, and have been manufactured:

- to ensure it has suitable drainage and structure
- with a suitable pH range
- to be able to rewet it if it dries out in the first few months of use
- with some regulated nutrients (though this a different between Premium and Standard grade)
- in clean conditions which reduce disease causing organisms in them

There are two grades with the Australian Standard Mark on them: Premium and Standard. One of the differences is in the fertilisers already in the mix.

- Premium mixes (red ticks logo) is made from quality raw materials, will have enough of all nutrients for plants to be planted straight into and grow for at least 1 month before needing to apply more fertiliser
- Regular mixes (black ticks logo) are basically the same as Premium, have adequate trace elements and secondary nutrients, but macro-nutrient fertiliser will need to be applied when you first plant into them. Do this by either mixing in some controlled release fertilisers or organic fertilisers before planting or use liquid fertilisers from the onset, and continue weekly.



It's really a difference of convenience, at a cost. Buy the best quality you can afford. The best value for dollar is to buy the Regular mix and add a small amount of control-release fertiliser 3-6grams per litre of potting mix at planting.

On the cheaper end are non-standard mixes, which may be fine, but vary a lot and more likely need more fertiliser than with the other mixes. These are not recommended as they are not regulated. Disadvantages include: poor structure so it compacts and reduces air spaces; no wetting agent making it hard to re-wet if it dries out; difficult to work out how much fertiliser to add; and they can be very acidic.

## Which potting mix to use

When starting plants out the potting medium needs to be finer to ensure contact between the soil and the seed/cutting, and needs to be able to be kept moist. For most vegetable growing a general mix is adequate, but when we want plants to grow in the same pots for years without much management then another type of potting mix is recommended.

- When raising seeds use a 'seed-raising mix' to ensure good seed to soil contact for success, as these mixes are made from finer grade of composted pine bark.
- Similar for cuttings, use a cutting mix'.
- For annual vegetables and herbs a general purpose mix is adequate.
- For perennial such as fruit trees, bushy herbs like rosemary, sage, thyme that will live in the pot for a long time use a 'terracotta and tub mix' or a mix made from hard wood and include sand and gravel as it will keep its structure for a longer time.
- For situations where weight is a consideration mixes which include perlite or vermiculite will make them lighter, which maintaining air spaces

The material the pot is made from is another factor in deciding the type of potting mix to use. This is to ensure good balance between drainage and adequate moisture for plant's needs.



- Shallower pots, to ensure best drainage the potting mix used needs to be coarser than that used in larger pots.
- Unglazed pots will lose more water through evaporation than glazed pots so use a less open potting mix in these.
- Plastic and glazed terracotta pots use a more open mix

## Importance of watering

Quality potting mixes will have wetting agents in them but these have a time limited and more needs to be replaced. Good potting mix needs to absorb, hold and allow movement of water through it. If soil becomes too dry it will become non-wetting and it will reduce nutrient uptake and therefore growth. Prevent from drying out by:

- Checking pots for moisture content regularly by feeling the weight of the pot. You'll get used to the difference in weight between an empty and full of water pot to judge
- Large pots can be tapped to hear a hollow sound if they are dry
- Scratching the surface of the soil to check for moisture (to 1-2 cm depth), and looking to see if there are obvious signs of water
- When wilting then you should water straight away and shade or cover the plants
- Water thoroughly each time you water: evenly over the whole surface of the container until you see the water coming out of the bottom
- If the water doesn't penetrate the soil right away and runs off the surface or pools, this indicates the surface is a little dry, so water slowly or come back and water again until it does run through nicely
- If the soil has become very dry put the whole pot in a bucket of water and let it sit until there are no more air bubbles rising. Let the water drain properly.

### pH of soil in pots

Generally for home gardeners use the best pH in potting mixes is between 5.3 and 6.5. If the pH is too low or high plants can suffer from nutrient deficiencies or toxicity, both affecting their growth. Commercial mixes pH varies significantly therefore will need to be tested. Also, as the pH of potting mix can change during the time it is in the pot, due to the pH of water used and fertiliser use (most fertilisers contain N in ammonium form which will make potting mix more acid). Therefore check pH every 3-6 months or earlier if growth seems poor and the plant has a dull lack lustre appearance. Other signs of a low pH are that small leaves (sometimes with dead edges or brown spots), and the plant doesn't pick up when fertilised or watered, and new shoots die.

If this plant is stressed due to pH, remove it from the pot, prune off dead material (leaves and roots) and replant in better pH potting mix.

### Fertiliser tips for pots

Fertiliser will need to be added at some time through the growing season when growing in pots regardless of the potting mix. The premium potting mixes will have enough fertiliser to support growth for at least 1 month and maybe longer, it will state on the bag. If potting mix has been left for months lying around, the soluble nitrogen will need replacing at potting even in the best mixes.

There are a few choices for which fertilisers to use, either controlled slow release or liquid fertilizer

which may have some slow release component to it. It is a matter of preference. The controlled release will last for the period stated on the container 1-12 months as it releases its nutrients to trickle over time. It doesn't matter whether it is on top or mixed in. Liquid fertiliser can be purchased in liquid form to dilute and use, or as granules or powders to dissolve in water to use, such as Thrive or Manutec-all purpose plant food. These need to be applied more frequently (even weekly). Liquid fertiliser can be used as a reduce



transplant stress even when using slow release fertiliser. In both these forms there are products where nutrient ratios vary to make them more suited to particular growths e.g. fruiting plants, but generally they are suitable for a broad range of plants.

Organic slow released fertilisers that can be used are blood and bone, reactive phosphate, pulverized animal manures, composts and worm casts. Liquid fertilisers can be helpful too.

If your water contains chlorine it is best not use fertilisers that contain chloride.

Use in amounts as recommended by the manufacturer. Doubling may kill plants due to salinity build up. But you may use a bit less on occasions. How much fertiliser to add is dependent on a number of variables including:

- the potting mix (components of potting mixes vary, and because they are still being broken down by microorganism, and nitrogen is used as part of this process, in some situations you may need to add more nitrogen earlier)
- time of year- different plants put on growth in different seasons so it depends on what you are growing and where it is in its growth cycle. Feed more when it is growing. But don't over feed!
- how many litres of potting mix is in the pot – fertiliser is measured in grams per litre volume
- type of potting mix for control release in Premium potting mix needs approximately 3-4gm/ltr or Standard potting mix approximately 4-6gm/ltr
- type of fertiliser. Soluble is applied more frequently. Slow release ones are granules coated with either oil or plastic, which degrades at different rates at different temperatures
- desired amount of growth. For perennials you only want a little of such as sage, thyme, rosemary you can keep the growth rate low by only fertilising just enough to keep a small amount of new growth. In contrast to ones you want a regular amount of leaf growth such as lemongrass, mints, chives where you will fertilise a bit more in their growth /harvest time, and less in dormant time.

Looking at the plants growth can be helpful to gauge their response. Other environmental influences are affecting plant growth including: pest and diseases, temperature, water supply.

### Repotting and replacing the potting mix

For annual plants the potting mix should last their growing season. As the plants are growing the microorganisms in the soil will be decomposing the organic components which reduces the air spaces, and the potting soil around the roots becomes fine. So before you add more fertilisers and plant the next season crop check the potting mix structure by removing the last season's plants and looking around their roots. If the soil is fine here then



you may be better off mixing in some perlite, vermiculate or sand to open the soil up or replacing the mix altogether. If it still has good structure, allows adequate wetting and drainage, then you could continue to use it for the next season crop, add some fertilisers and plant out

With perennial plants such as herbs because of this compaction replace the potting mix periodically. When you do this prune off any broken and dead roots and roughen the surface of the old root ball to allow movement of the roots

If the plants that grew in it were diseased then don't reuse potting mix.



### Safety warning

Potting mix contains living organisms which are harmful to humans and wearing protecting clothing, gloves and mask is necessary when handling. It may contain harmful bacteria *Legionella* which can cause Legionnaires disease. Transmitted in the air, its particularly risky when opening bags and handling dry material – always wear gloves and dust mask, wash hands afterwards. Clean away and left over potting mix and seal partially empty bags to prevent from drying out, and wet mix before use if they do

*Adapted from Harry Harrison Grow your Own Food workshop series 2015*

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