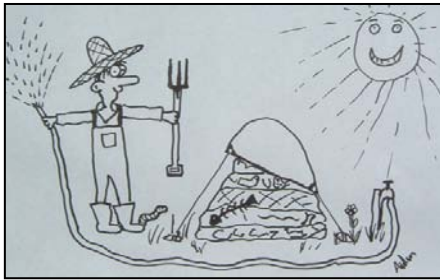


Compost

What is Compost?

Compost is humanity's version of the humus found in nature, and the compost heap is a 'digester' – our tool used to produce it. Humus is made of broken down vegetation which releases nutrients back into the soil for healthy plant growth. Similarly, under the direction of the careful gardener, the composting process breaks down a rich mixture of ingredients to produce a potent humus which will regenerate soil and foster vigorous plant growth. Virtually anything which has once lived can be composted



– although selecting the most appropriate mixture of ingredients from what is available can be seen at first as something of a

'dark art'. Time spent in quiet observation of the natural processes of your garden will never be wasted. This includes experimenting with composting materials and methods, adapting 'expert' advice to local conditions, and learning from your own successes and failures along the way.

Why make Compost?

Strong and healthy plants have their own natural resistance to pests and diseases and compost is the natural, home grown, method of achieving this. Good compost added regularly to your garden will support healthy and rich soil - your plants in turn will thrive in this soil to produce healthy and nutritious food for you. Chemical fertilisers bypass

Humus is the real black gold. Humus has a beautiful scent; the scent of humus is more sacred and nearer to God than the scent of incense. He who walks through the woods after rain knows this scent.

Hundertwasser

many of the natural processes used to build healthy plants and thus healthy food. This can create an imbalance in which weeds, pests and diseases are encouraged – which in turn then demands more chemical responses in the form of herbicides, insecticides, fungicides etc. Composting is also the natural way of disposing of garden waste and turning it into something useful (and not into an environmental problem at your local landfill). Any garden which can increase its own fertility year after year while producing nutritious food for its owners is helping to save the planet – compost can help you do this!

How to make Compost

Many guides to composting recommend this or that material as being good for making compost. In most backyard situations, you will have to make do with whatever you have around, or if you want to, to buy in materials (eg bales of straw, bags of manure). However, the mix of ingredients is important for a good compost process and end product. If you only have weeds and kitchen scraps, make sure you balance them up with shredded paper or cardboard. Too much nitrogen material and the heap will stink, too much carbon and the decomposition process slows down

There are a number of different techniques used to make compost. The one which works best for me is the 'hot' process (also known as the Berkely method) described below. Others

include the Indore method (as first described by Sir Albert Howard in Indore, India in 1913) and

composting bins – everyone is entitled to experiment and find the one that suits them best!

Ingredients for the compost heap (no matter what method is used) are :

➔ **Organic materials** – anything that has been alive can be composted! – but like making a cake, there needs to be some balance in the ingredients. The two broad categories of compost materials are high-Carbon (woody, brown, dry) to high-Nitrogen (fresh, wet, green). The microbes that work in the compost digester need a starting

ratio of approximately 30 Carbon to 1 Nitrogen to make protein (ie their body mass) – thus as good heap designers, this is what we should be aiming for as an overall ratio. If you want to start getting really technical, you can analyse the compost ingredients. As

Did you know that many modern agricultural practices are killing soil through salinity and erosion? In some cases, soil humus has taken hundreds if not thousands of years to accumulate today's levels, but is now being consumed in a few tens of years. By what criteria should we assess sustainable agriculture? Are we paying the true cost of producing our food in this way?

each have their own balance of C/N, the overall ratio of the assembled heap needs to be adjusted accordingly (see table).

Material	C/N ratio
Sawdust	450
Paper	150
Straw	100
Leaves	60
Fruit wastes	35
Lawn clippings	20
Food wastes	15
Weeds	19
Chicken litter (typical)	10
Cow manure	12
Chicked manure (no straw)	7

It also helps to have the materials in small pieces – this increases surface area and makes it easier to get an even mix. A mulcher will chop woody materials up nicely – a lawn mower can do almost the same job on small pieces of twigs and cardboard. You may also have to ‘stockpile’ materials until you have enough to make a heap.

- **Micro-organisms** – hundreds of species of bacteria and fungi are involved in the composting process. But don’t worry about arranging the party invitations – as soon as you assemble your compost heap, all the guests arrive automatically and get to work multiplying up into huge numbers. Its Free!!
- **Moisture** – it is very important to keep the heap at the correct moisture level. Too dry and the decomposition process will stop (you will be able to tell if this has happened as the ingredients will remain unchanged week after week, sometimes with dry powdery white fungi, and sometimes with the invasion of slaters). Too wet and the anaerobic bacteria will flourish leading to a different kind of decomposition, including foul smells. Regular turning and regular watering will help to maintain the correct

balance of moisture throughout the heap. Also, keep the heap protected from heavy rain which can make it too wet and leach compost products away

- **Oxygen** – The bacteria we seek to encourage in the compost heap are aerobic (air/oxygen loving) as opposed to anaerobic (air/oxygen hating). Thus we need to supply a constant supply and resupply of oxygen throughout the heap. This is the primary reason why the heap is turned regularly.

Method (for a ‘hot’ heap)

The optimal shape for a compost heap is approximately 1.5m wide and 1.5m high and at least 1.5m long. Some Biodynamic farmers have heaps 100m long – needless to say they turn them using tractors! The length of the heap will depend on how much space you have in your garden, and how much material you have. Build the heap in thin layers of different materials approximately 5cm thick and water each layer before progressing to the

Specials

- Add volcanic rock dust to the heap to provide your soil with a full complement of minerals
- Comfrey, tansey can be added as they also provide important trace elements. Grow them in your garden for their other benefits too)
- Become a scavenger and hunt out materials others throw away (eg leaves in the street)
- Bring home some seaweed from holiday (if you are allowed by local regs!) and chop it into your heap for more minerals.
- Old clothes too far gone to give to Vinnies? – Compost them !!

next. For example, one layer of leaves, one layer of manure, one layer of weeds, then start again. Adding small amounts of soil into the layers will also help to ‘inoculate’ the heap with soil flora.

How it works

Living (or recently dead!) tissue, whether plant or animal, is made up of large and complex organic molecules containing carbon, hydrogen, oxygen, nitrogen and other elements in smaller quantities. Even before you have finished building the heap, bacteria and fungi have started to feed on the dead plant material and multiply in number. Plants are made of starch, fat, protein, cellulose and lignin and these become food for a huge variety micro-organisms



that live in the soil. These micro-organisms – the soil flora, excrete enzymes which enable chemical reactions to take place, breaking up organic molecules into smaller and simpler pieces that can be used as food. This food is used to build the cell walls and cell contents, in the manufacture of enzymes and other exudates, and in multiplication.

The first group of bacteria to work on the heap are those that work in the normal air temperature range. However, one of the by-products of these chemical reactions is heat, and because of the shape of the compost heap, this heat is retained. As the temperature of the heap rises another group of bacteria take over – the heat loving or thermophilic group – and the heap can heat up to over 60°C within a day or so. This heat is important to human composters as it will kill unwanted seeds and pests. However, as available food is used up, the heat loving bacteria give way to other types of bacteria and fungi. Turning the heap every 2 days or so will re-mix the ingredients and provide more food in the centre of the heap, restarting the process.

Many complex chemical and microbiological reactions take place in the heap - one of the more important reactions is that which cycles nitrogen from organic matter into nitrate which can be used by plants. When the heap finally starts to cool down (and using the 'hot' method, this should be around 3 – 4 weeks) larger soil animals move in to feed on the organic material and on the bacteria and fungi. These include protozoa, nematodes, mites, collembola, worms, ants and others whose effect is to further condition and enhance the structure and content of the humus in readiness for use.

How to use it

Finished compost should be dark, fine and spongy with a pleasant earthy smell. You should not be able to recognise any of the original ingredients in it!

- The finished material can be applied directly to form a surface layer which conditions, fertilises and suppresses diseases in the soil. You can't harm plants by putting on too much, but to make it go as far as possible, a minimum layer of 5cm is recommended. In Australian conditions, exposed layers of compost on top of the soil will quickly dry out and 'die'. Thus a thick layer of mulch (straw, cardboard etc) should be placed on top immediately to protect it. New plantings can be dug through this protective top layer.
- Also recommended is to make a 'tea' with the compost by soaking it in water, then aerating it to build up the flora volume again. This can be filtered and sprayed onto the garden or onto the leaves of plants
- Sifted and mixed (1 part) with sharp sand (3 parts) and peat or coconut mulch, (3 parts), it becomes seed raising mix

Compost Clinic

"Crikey....something's not quite right here!!" ... Look upon your compost heap as a living organism - to find a cause for any ailment in your garden's digestive organ, go back to the basic ingredients listed above (balance of ingredients, water, oxygen) and diagnose your heap against each one

- "It stinks!!" – this could be the result of a couple of common problems
 - noxious fumes are produced by anaerobic bacteria ie, not enough oxygen is available throughout the heap, or its too wet or has large lumps of wet sludgy material. Or large amounts of unmixed kitchen waste
 - Excessive nitrogen is unbalanced by too little carbon, and the heap is venting as ammonia gas

One remedy which would address both problems could be to turn the heap to aerate it more often and to add in some drier, fibrous, carbon rich material (eg straw)
- "Nothing's happening!" Your heap has done nothing for days and days on end – no heat, no change in structure of the ingredients. This could be
 - Too little water – you heap is dry, effectively stopping any biological activity. Turn the heap, spraying with water constantly.
 - If the ingredients are too rough or large this will also slow things down. Remedy is to remake the heap after chopping up the rougher ingredients (eg run the lawn mower over them!).
 - Not enough nitrogen – turn the heap and add more manure or lawn clippings as you do it.

- "I don't have space for a compost heap", or "I don't have the energy to move all that stuff around around any more".

Don't give way to despair! A worm farm could be just the thing for you. See our notes on setting up a work farm..

Sources and Links

"Composting – making soil improver from rubbish", Handreck, K A, CSIRO 1979. The best little booklet on composting I have found, but probably out of print now.

"Permaculture – a designers manual" Chapter 8 is a classic primer on soil and its role within the context of human survival.

"Grasp the Nettle – making biodynamic farming and gardening work" Proctor P, Cole G, Random House 2000

"Biodynamic gardening" Soper J, Souvenir Press 1996. Both books give a good context for composting within a larger BD view.

www.soilhealth.com Uni of WA group promoting biological farming. Good basic description of soil biology

www.soilfoodweb.com the web site of Dr Elaine Ingham promoting compost teas

www.mastercomposters.com US based self help site with heaps(!) of message board archives to pore over

www.soilassociation.org UK based site devoted to organic farming – good resources section

<http://www.soilandhealth.org/> amazing individual site including on-line library of soil classics!!

Parting Thoughts.....

Composting is one of those things that's too important to put off doing, just because you don't think you can get it right...Remember - If it's worth doing, its worth doing badly!!

"So Long as one feeds on food from unhealthy soil, the spirit will lack the stamina to free itself from the prison of the body" Rudolf Steiner

The Compost Song

(good agri-CULTUR-al practice should take important lessons and embody them in various artistic forms. These can then be taught to inspire us and can be remembered by society as a whole and over time . Our kids learnt this song at school- source unknown but nevertheless acknowledged.)

*We are Compost Makers
We make Compost well
We know how to make it
So it will not stink or smell*

*If you pay attention
You can make it too
So listen to our good advice
And you'll know what to do*

*Take food scraps from the kitchen
To a suitable outside spot
And mix them up
With old lawn clippings
And tea – leaves – from - the tea pot*

*Apple cores, fallen leaves
And next doors old dead cat
Some cow dung, chook poo,
horse manure and an old straw hat*

*Micro-organ-isms
Are living in the soil
They do all the decomposing
Work and all the toil*

*So add a couple of layers
Of good garden earth
And those micro beasts will
Multiply for all their worth*

*Water is essential
Make sure you add it too
but not too much, or it will stink
and your neighbours will be after you!*

*Turn it every coupl'a days
Stand back and feel the heat
Then wack it on yer garden
For veggies ya just can't beat!*