



# Agrisolutions

N A T U R A L A N S W E R S

## Compost – and why it is useful in Agriculture

### What is compost?



Compost is an enhanced organic material comprising various raw components (feedstocks) resulting from a transformation process which makes it much better than the sum of its parts. The process is performed under thermophilic (heat) or mesophilic (ambient) conditions, can be aerobic or anaerobic or digestion by compost worms. When properly finished, none of the individual feedstocks are easily identifiable. Instead a unique enlivened material is the result, which can be used to economically help build soil health, function and productivity – and farm profitability!

### How does compost compare to fertilisers?

Compost is often wrongly compared to fertilisers by nutrient analysis alone, and usually does not measure up favourably on this basis. What is too often overlooked is that the raw feedstocks not only each contribute to make up a naturally balanced nutrient mix, they also determine the potential for microbiology formation during the composting process and provide a physical benefit in plant growing media. Unlike salt-based fertilisers, composts work in all three dimensions of soil health, function and productivity needs – **Nutrient, Physical and Key biology**. This is the new **NPK!**

### Why make the effort to compost?

Composting is a way of recovering various resources (often referred to as 'wastes') reducing these raw feedstocks into a very valuable asset teeming with life. The mere action of composting provides the perfect opportunity for these microorganisms to build numbers and diversity which then perform this work in various ways in the field. **High Quality Mature Compost (HQMC)** is used to enhance your growing system more than any nutrients alone can ever achieve.

### What types of composting processes can be used and what are their differences?

Composting is performed using a number of different methods, each with their own benefits and shortcomings.

**1. Thermophilic (heat) composting**, made in batches of mixed materials including green matter and woody stuff of various sizing comprising total C:N of 25-30:1 with an evenly distributed moisture content of 40-60% throughout. The temperature and moisture must be managed by turning 5-8 times, and water added each time to makeup that driven off by the heating process. Thorough turning dissipates core heat and also introduces oxygen for aerobic decomposition to continue.



This pasteurisation process deals with pathogens and plant propagules (seeds, weeds, roots, etc), and if properly managed makes the best overall compost once it has matured post heating. The cooling down phase involves secondary metabolites from the heating phase to be consumed by mesophilic (ambient) organisms. They convert the raw compost into complex HQMC that hosts a much wider diversity of bacteria, fungi, protozoa and nematodes ideally suited to soils. The whole process takes 10-12 weeks (the thermophilic stage 4-6 weeks) and requires some knowledge of composting, dedicated labour and equipment to be successfully completed.

**2. Static composting** is ideal for dealing with animals that have perished on farm. The compost pile is designed to allow oxygen to enter around the base as the process of decomposition continues undisturbed for 6-12 months. Whole bodies including major bones can be broken down in this time, and the nutrients kept on and applied across the farm for regenerative growth. Books and instructions, including by the DPI have been written to explain the design of successfully making these piles. Unlike the thermophilic method, the outside 'crust' of this finished compost may contain plant propagules and is unlikely to have been properly pasteurised.

**3. Vermi or worm composting** can't deal with any plant seeds or parts which will carry through to the paddock. Vermi composting is ideally suited to continual flow of vegetative and cold-manure based materials (not batched) with the worms eating the new foods that are spread across the top of the pile. The worms have the unique ability of killing off pathogens when they are contacted by the worm mucous, but they don't eat plant seed or propagating parts. Worm castings are one of the best plant foods known.

### How difficult is it to make High Quality Mature Compost?



It is not difficult to make high quality mature compost, but it takes dedicated time and effort, and therefore each farm enterprise should assess how to use its resources the best way to convert their raw materials such as straw, hay, silage, lucerne, manures and effluent into quality compost. For high quality mature compost, it takes just a bit more attention to detail and longer for the process to fully mature and complete than ordinary compost – and the field results are far superior!

### Is it worth making my own compost?

This can only be answered on the basis of the importance of the value that the farm and farmer will derive from this additional task. In the first instance, a farm trial using contract made or brought in compost would help make the assessment of the worth to the farm business of establishing a composting facility on farm for its own use. If raw materials are readily at hand, converting them to mature compost will help reduce overall farm costs, remove wastes and build fertility, soil structure, water holding capacity, year round plant production and resilience. Most farm businesses find their fertiliser costs are cut in half in the first year when compost is used as part of the soil fertility management program.

### Costs? Equipment? Contract turning/making?

Costs and equipment vary, and so do the results! Dedicated purpose-designed equipment reduces the risk of quality inconsistencies in the final product. Windrow turners and forage wagons blend, mix and turn the feedstocks to make a homogenous end product. Whether this is performed by the farmer or under contract (turning can be as little as \$1.50/m/turn) is a farm business decision, but expect to invest upwards of \$45k on specialist turning equipment driven by your tractor.



It is important that a solid free draining base is found on which to make the compost. And anyone employed to actually make the compost must understand what has to be measured and monitored and what to do to keep the process on track. The investment in training staff to do this job correctly is hugely rewarding to your farm business and regular monitoring and measurement are strongly advised.

### How is compost quality assessed?

Quality compost is not assessed by how quickly it can be made. Nor is it about how much the raw materials or feedstocks can be reduced and reused. HQMC is about bringing together as many different feedstocks that can be reasonably sourced to best match the soil and plant needs. There is strength in diversity, so the broadest range of nutrients and microbiology should be applied to the soil and plants. Usually soils are deficient in some nutrients and some microbiology, so one-size compost does not fit all situations. With experience and testing, quality compost can be custom made to suit specific needs.



### What sort of testing should be done when using compost on soils?

Nutrient testing of soils and compost should comprise **total** and **available** elements and any serious deficiencies made up from external sources – preferably in the composting process. Standard practice in pasture or broad-acre crops is to sample only to 10cm and to measure only **available** nutrients when you get a soil test. We know soil is in trouble if the roots are only 10cm down, and there are volumes of parent material lower down that can release nutrients. Most importantly, a paddock Visual Soil Assessment must be done so that you know what is happening in the soil and with plant roots. It provides an appreciation to understand the soil root associations that are linked through the soil biology. Our staff at AgriSolutions can deliver this knowledge and learning should you need to acquire or revisit these skills.

### How to best use compost in agriculture?

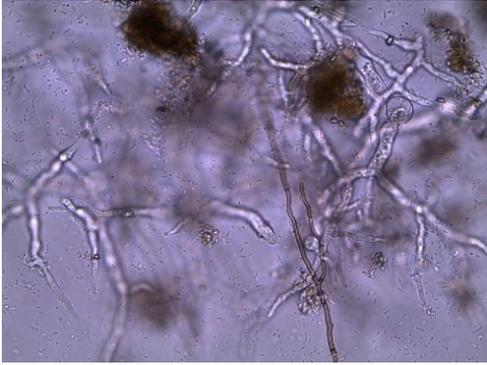


Various forms of compost have been used for centuries in agriculture. Modern knowledge and equipment now enables us to make the best use of this important resource. Matching compost to soil and crop needs for its biological and nutrient makeup is the first step. Then it must be decided how much to use and whether to top-dress or incorporate in the soil and when to apply. This varies according to circumstances, but a few basic rules need to be obeyed to get the best results from your investment and efforts.

### What benefits are known to come from compost use?

A vast range of benefits have proven to come from the calculated use of compost. Increasing nutrient levels directly from compost, increasing soil organic matter with compost, introduction of microbiology to create the mechanism to release and regulate more soil nutrients to the plant and build soil structure over time. Highly fungal soils built with fungally dominant composts contain increased biomass that holds more soil carbon, is better structured with better stability and retains greater amounts of water and nutrients.

## What are they, and is there a place for actively aerated compost tea or compost extract in farming?



Actively Aerated Compost Tea (AACT) and Compost Extract are 2 distinctly different liquid products derived from compost which you can learn to make. Compost Extract is simply a stripping of the microbes from mature compost by mechanical means to then enable easy application over large areas of soil or foliage. Compost Extract can only be as good as the compost it is taken from, whereas AACT is brewed for a nominal 24 hour period using a proven aeration system. Various foods are placed in the brewer to breed specific organism sets. This allows the numbers to grow and be manipulated to suit soil and plant

requirements. Highly fungal AACT is known to be effective as a preventative of fungal pathogens on plants surfaces when thoroughly sprayed over foliage, stimulates soil and plant root associations and acts as a stubble digester when applied on the soil surface.

## Who can I ask for help in making and using High Quality Mature Compost to improve my soil health and farm profitability?

The usual resources such as the DPI and Compost Australia can provide some basic information. If you want to access the latest global science and cutting edge practices, small leading companies such as AgriSolutions can offer specialist services to optimise your farm resources in a cost effective way. AgriSolutions offers training, advisory and consultancy and industry links to ensure that you as soil manager have successful outcomes using HQMC as part of your integrated biological farming system.

**FOR FURTHER INFORMATION CONTACT**

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