



Benefits of Compost in Agriculture

Use of Compost in Agriculture

Process Review

Composting animal manures and agricultural waste is not a new process, but is one which has regained focus around the world. This is because environmental issues are forcing the reduction of use of raw manure and we have rediscovered that there are good scientific reasons why compost is a better form of nutrients for our agricultural crops. The use of composted manures in sustainable agricultural systems results in good yields and equivalent or improved quality produce.

The compost process is the combination of materials (manures, straw, green waste etc) that are then digested by naturally occurring microbes into a material that is available to plants for use as a nutrient source. The process relies on the right combination of carbon (wood, straw) and nitrogen (pig, poultry manure), the right moisture content and an ability to blend and aerate the materials.

By closely managing the composting process, we develop high levels of humus and consequently the compost has an ability to hold nutrients and water reducing the leaching of nutrients, particularly nitrogen, during the growing of crops.

Types of Compost

There are three basic types of compost defined by the way we use them:

Above Ground - mulch plus nutrients

In ground - horticultural soil amendment

Fine or top dressing material - turf, ovals, etc

Quality Compost

With a number of different companies selling composted materials it becomes important to be able to tell the difference between a good quality and poor quality product.

Using good quality compost in agriculture has the potential benefits of improving nutrient cycling, soil improvement, enhanced crop health and reduced chemical usage. However some composts of inferior quality may actually have a detrimental effect on crops or soils.

Using good quality compost in agriculture has the potential benefits of improving nutrient cycling, soil improvement, enhanced crop health and reduced chemical usage. However some composts of inferior quality may actually have a detrimental effect on crops or soils.

The following list summarises the general requirements for a quality product:

- High degree of biological activity
- pH in the 7 - 7.5 range
- High cation exchange capacity
- High level of humus to total organic matter
- Nutrients fixed stably into humus and microbes
- No toxic anaerobic compounds that are harmful to plant growth
- Low C/N ratio (<17:1)

Australian Standard AS 4454-1999 specifies some basic requirements for composted materials, but is a voluntary code for compost producers. This means that the purchasers should reassure themselves that the product meets their requirements through laboratory analysis for nutrients, AS 4454-1997 and asking for the raw ingredients for the compost in question.

Compliance with the Australian Standard ensures there will be no heavy metals or adverse effect on crop growth from a high C:N ratio (nitrogen draw down).

Compost as a Nutrient Source

If we take a typical analysis of a quality composted manure and straw and compare the cost of purchasing those nutrients in synthetic fertilisers you easily justify the value of \$100 per tonne of compost on a dry weight basis. Allowing for moisture levels of 30 - 35% results in a nutrient value of compost at \$60-70/tonne.

Because the starting materials are derived from plants they tend to contain many of the macro and micronutrients required for plant growth.

It is not possible to look at compost and determine compost quality, the nutrient content or plant performance levels expected. Consequently, laboratory analysis is the only reliable way of determining compost quality.

Systematic Approach

To use compost properly requires a systematic approach to farming of any kind. This means that we should address a range of issues that will affect the health of the soil and the effectiveness of the compost. A biologically active soil is the key to a low chemical input system and this is only possible when you use a composted material to improve biological activity and soil health - it is not possible to improve soil health whilst using chemical fertilisers.

By inoculating the soil with composted organic matter and microbes we are starting on the road back to healthy soil. Healthy soil contains microbes that actively breakdown organic matter into nutrients that can be used by plants. Nature's system feeds plants by cycling these nutrients through the soil. Healthy soils have nutrient cycling through organic matter management.



Organic Farming Systems
PO Box 419, Cottesloe WA 6911
Tel 08 9384 3789; Fax 08 9384 3379
www.organicfarming.com.au
admin@organicfarming.com.au

For the nutrient cycling to occur at the optimum level for plant growth we need to ensure that the soil is balanced in three ways:

- Chemically - nutrients
- Biologically - microbiological
- Physically - structure

The components of an organic nutritional system are:

- Compost as the foundation of the biological system
- Cover cropping - green manure
- Foliar sprays - natural
- Fertiliser - organic

Compost Use

Compost is most commonly used at rates between 5 and 20 tonne per hectare. 20 tonnes per hectare is the maximum rate allowed by NASAA (National Association for Sustainable Agriculture, Australia). Compost is a bulky material and applied in fairly high rates and requires specific equipment to handle the large volumes of material. Manure spreading equipment can be used to spread on open ground, there are contractors that specialise in this, although vine and orchard situations may require specific equipment.

The composts we have been discussing are used as “in ground” materials (not mulches) and need to remain moist to encourage the survival of the microbes. As a result they give most benefit when incorporated into the soil. In situations where tillage is not an option then we need to find some way of keeping the material moist. For example, spreading the compost before mulching or mowing cover crop.