



# Composting

*with Castle Mountain Zeolites®*

Composting is an aerobic (in air) process in which wastes of plant and animal origin are transformed into a soil conditioner which has the following benefits:

- Increases soil carbon
- Improves soil structure
- Contributes microorganisms back into the soil, both bacteria and fungi
- May reduce number and effects from pathogenic microorganisms
- Increases soil fertility
- Increases biological activity in the soil
- Improves soil aeration, particularly important in the plant root zone and supports soil organisms and micro-organisms
- Increases moisture retention in the soil
- Provides available nutrients for plant growth including trace minerals
- Reduces need for chemical fertilisers
- Reduces washout of soil nutrients, so affects leachate and run-off, and
- Provides an opportunity to correct soil nutritional problems and reduce (trace) mineral deficiencies

There are many and varied claims made about the benefits of composts and the processes which underpin manufacture and uses.

The adage of “garbage in – garbage out” is apt. The best inputs make the best compost. More inputs with different physical and chemical properties make better compost. Inputs that are delivered to site before compost rows are started should be protected from leaching liquids and/or from volatilisation of gases, especially ammonia.

Physically, compost should reflect its components with a range of particle sizes and textures, dark colours and a clean, sweet, earthy smell. Incorporation of waste fats, oils and greases is not advised as they putrify composts and require additional inputs e.g. high nitrogen containing fertilisers or supplements for microbial growth.

Chemically, composts provide carbon (C) from “green waste” in the form of complex breakdown products (e.g. humic and fulvic acids) of lignin – the hard cross-linked polymers in bark, wood, stems and branches, these latter only able to be transformed by fungi. C is also found in cellulose, the C polymer that provides structural integrity to pasture grasses and is partly digested in animal manures. Composts also contain mineral nutrients, particularly potassium (K), calcium (Ca), magnesium (Mg), and trace minerals (including iron (Fe), copper (Cu), manganese (Mn), nickel (Ni), Cobalt (Co), Molybdenum (Mo), vanadium (V) and boron (B) etc) as well as nitrogen (N), phosphorous (P) and sulphur (S). There is a need for appropriate ratios of C:N:P:S for optimal microbial growth.



Microbiologically both bacteria and fungi are involved as described earlier.

Zeolites provide the following benefits to composting:

- Very high surface area (> 100m<sup>2</sup>/g) for water and nutrient take up, hold and controlled release
- Good cation exchange capacity
- Very hydrophilic (water-loving)
- Hardness which will not break down over time/ and,
- A unique honeycomb “structure”

Castle Mountain Zeolites® provide additional specific advantages in composting:

- Crystallinity (>99%) of the deposit, so best water-loving
- Purity (>85%) of the deposit, so highest zeolite functionality
- Cation exchange capacity of derived zeolite of 147 meq/g the highest commercially available Australian zeolites
- Hardness (mho’s index >5) of the deposit the highest commercially available Australian zeolites
- Method of manufacture ensuring minimal batch-to-batch variation

Commercially, care is required with the integrity of “waste” inputs ensuring retention of water, other volatiles and nutrients. High moisture green waste and/or animal manure should be banded to ensure liquids escaping from these piles are contained.

Castle Mountain Zeolites® broadcast on the top sides and around the pile will assist in the capture of liquids and volatiles. Recommended usage rates to dust piles in ~1kg/ m<sup>2</sup>, and depending on the moisture in the pile 1-5kg/linear metre around the pile and within the bund. It is recommended that these piles also be covered. Alternatively a low moisture input (e.g. bark or woodchips) should be placed under the high moisture pile and possibly on top as well.

Compost rows should be banded and a layer of zeolite powder broadcast at ~ 1kg/m<sup>2</sup> under where the pile is to be made. When the row is completely made zeolite should be broadcast on the surface of the pile at the same rate. This is recommended to be repeated at least for the first 3-5 turnings of the compost row. Alternatively zeolite can be mixed in water and sprayed onto the compost surface in the row. A small amount of guar gum (Agricultural grade) will facilitate keeping the zeolite in suspension (0.01-0.1% of zeolite mass).

Compost rows produce heat, so, in the cooler months, make an ideal bedding for cattle and sheep. Their urine and faeces also add to the nutritive nature of the compost.

Silage can be treated in a like manner with Castle Mountain Zeolites® to produce the same benefits i.e. picking up and binding liquid underneath ensiled product in pits as well as reducing the losses of volatiles (mainly ammonia) from the top surface of the pile before covering and sealing the silage.

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