

Information Sheet No. 7-7-1

Aqueous compost extract (compost tea)

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Definition

Aqueous compost extracts are liquid extracts derived from mature composts, and are suitable for application to soil and/or as a foliar spray. Also known as compost teas, aqueous compost extracts contain organic and inorganic soluble nutrients, and a large number of organisms including bacteria, fungi, protozoa and nematodes (Recycled Organics Unit, 2002).

Quality

At present, no Australian Standard, international standard, or industry standard exists for aqueous compost extracts.

Many of the documented pathogen suppression benefits associated with aqueous compost extracts have only been shown to arise from extracts produced from well cured, mature composts (Hoitink, 1996).

The concentration of nutrients and particle size of solids within these products will vary, due to non-standardised compost feedstocks and methods of manufacture.

Because of the presence of organic particles in aqueous compost extracts, filters may be required in irrigation and spraying equipment. The size/type of filter used is dependent upon the specifications of the irrigation/spraying system (e.g. nozzle size) and the level of particulate matter in the extract.

Uses

Aqueous extracts can be applied to soil around growing plants (Ingham, 1999), or can be applied as foliar sprays directly to the leaves of plants (Weltzien, 1992).

Aqueous extracts can provide nutrients, and some products have been documented to stimulate root development, and to suppress a range of foliar and root plant pathogens (Hoitink, 1996; Weltzien, 1992).

Aqueous extracts may have various applications at small and large scales. They can be applied to garden beds, potted plants or to soils/plants at a larger horticultural/agricultural scale.

Plate 1. Spray irrigation system used in a horticultural situation. Vermiculture liquids can be added to irrigation water to help improve soil and plant health.



These products can be used as either:

- Soil drench for supplying nutrients to the root zone of plants, or
- Foliar spray for providing nutrients to plants.

Benefits

Compost teas supply nutrients and organic matter to soil. If applied to plant foliage, these products may alter the composition of organisms on the leaf surface by introducing competitive good organisms to a system (Weltzien, 1992). Some research indicates that this alteration helps suppress foliar pathogens (Hoitink, 1986).

Nutrient levels in aqueous compost extracts are dependent upon the nutrient levels of the compost and the length of time the compost remains in water. The longer the soaking time, the higher the nutrient content of the extract (Ingham, 1999). Similarly, the microbial content of extracts increases significantly with longer soaking times (Weltzien, 1992).

Unfortunately, pathogen suppression varies with different composts used, with microbial composition of composts, with different crops, and with the plant disease under question.

Risks

As there are no standard guidelines for the manufacture of these products, variability in product quality and attributes may be significant.

Aqueous extracts should be manufactured from effectively pasteurised compost products (Hoitink, 1996). Effective *pasteurisation* via an aerobic and *thermophilic* (55°C) *composting* or equivalent process, destroys weeds, seeds and plant pathogens that may

have been present in the original plant and other organic materials.

Use of pasteurised products removes the risk of spreading plant pathogens from compost extracts.

Pasteurisation should occur in the initial thermophilic phase of the aerobic composting cycle. Products should then be cured to make a mature compost.

Should pasteurisation or sterilisation take place after this curing phase, then the beneficial microorganisms will be destroyed, and potential pathogen suppression benefits of the compost extracts will not occur.

Note that compost teas are considered to be “live” products with a defined shelf life. As they contain active microorganisms, excessive storage time may result in a decrease in microbial activity, and perhaps a decrease in their effectiveness (i.e. in terms of plant disease suppression). Thus these products should be used shortly after their preparation.

Additives

Aqueous compost extracts may be inoculated with different microorganisms in some instances to enhance their disease suppressive characteristics.

In the USA, aqueous extracts applied as foliar spray are often mixed with a small amount of molasses to help the spray stick to the leaf surface, and to provide a food source for the beneficial microorganisms.

One recipe by Professor Richard Verville from the University of Maine (Verville pers. comm., 2000) recommends: 4 litres of well cured mature compost, 4 litres of water, 3 tablespoons of molasses, soak for 5 – 7 days, strain and use immediately.

Hoitink, (1996) recommends soaking mature composts in water (equal amounts of compost and water by

Definitions*

Pasteurisation

The process whereby organic materials are treated to kill plant and animal pathogens and weed propagules.

Thermophilic

Temperatures above 45°C. Used to describe a stage of composting in which high temperatures are sustained resulting in high rates of decomposition and pasteurisation of the organic material. Heat tolerant microorganisms survive well in these conditions.

Composting

The process whereby organic materials are pasteurised and microbially transformed under aerobic and thermophilic conditions for a period not less than 6 weeks. By definition, it is a process that must be carried out under controlled conditions yielding mature products that do not contain any weed seeds or pathogens.

* Recycled Organics Unit (2002).

weight) for a period of 7 – 10 days. The compost-water mixes are then filtered and sprayed onto plants.

A standard procedure for the preparation of liquid compost extracts was developed by Weltzien, (1992). In this procedure, tap water was mixed with compost at ratios of 1:5 to 1:10 compost to water (by weight).

Mixtures were usually stirred only once and then left at ambient

temperatures for 5 to 10 days. After filtration, mixtures were applied to plants or parts of plants using standard spraying equipment (Figure 1).

Application rates

Application rates are difficult to specify due to variability in product quality, range of possible product applications and varying nutrient concentrations.

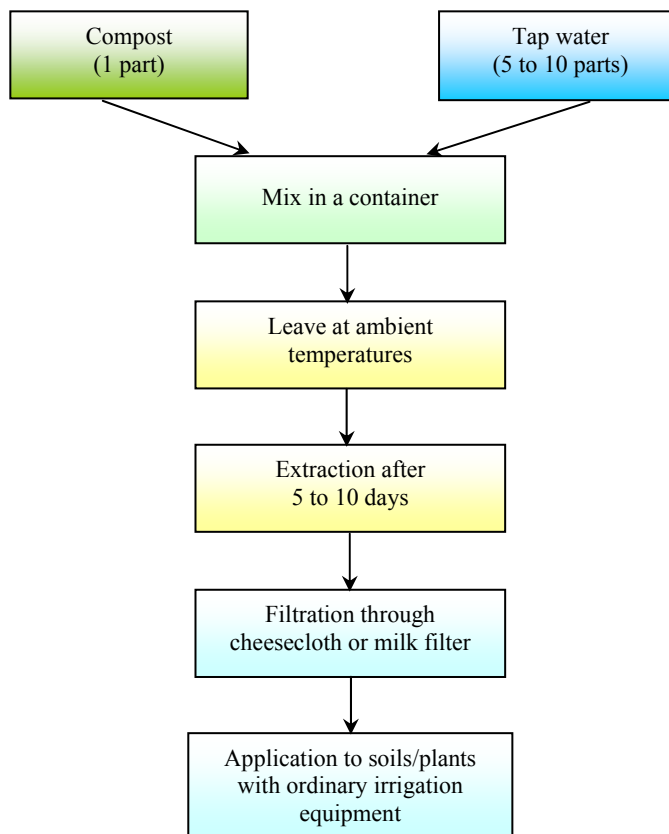
Application methods

For small scale applications, such as domestic gardens, aqueous compost extracts may be applied directly to plants and soil with watering cans or hand held sprays.

For broader applications, they may be added to soil through a spraying system (e.g. a boom spray).

Although aqueous compost extracts are usually filtered prior to application with irrigation/spraying equipment, the particle size of material in aqueous compost extracts may clog irrigation/spraying equipment. The attachment of filters to equipment is therefore recommended to avoid this problem.

Figure 1. A flow diagram for the preparation and use of liquid compost (Modified from Weltzien, 1992).



Important references

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