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Definitions

A water based liquid extracted from *vermicast* that may be suitable for adding to soil surfaces and/or onto plants as a foliar spray. *Vermiculture* liquids generally come in two forms, worm-bed leachate and aqueous vermicast extracts.

Worm-bed leachate is leachate from the base of a worm bed that is collected as a "product".

Aqueous vermicast extracts are matured vermicast products that have been soaked/steeped in water and have had their solids strained off to produce a liquid product.

Vermiculture liquids usually contain a solution of organic and inorganic nutrients and a large number of organisms including bacteria and fungi.

Vermiculture liquids are also known as vermi-liquids, vermiculture liquid extracts, liquid vermicasts, liquefied vermicast, vermicast liquid teas and a number of other commercial brand names.

Quality

At present, no Australian Standard, international standard, or industry standard exists for vermiculture liquids.

Due to non-standardised methods of manufacture, the concentration of nutrients, live organisms and particle size of solids within vermiculture liquids is variable. This variability in particle size can impact upon spray equipment (e.g. cause blockages).

Because of the presence of organic particles in vermiculture liquids, filtration systems may be required in irrigation and spraying equipment. The size/type of filter used is dependent upon the specifications of the irrigation or spraying system (e.g. nozzle size) and the level of particulate matter in the vermicast liquid.

Uses

These products may have various applications at small and large scales. They can be added to garden beds, potted plants and to soils at a broader horticultural/agricultural scale.

Plate 1. Large scale vermiculture beds in the United States of America. Aqueous vermicast extracts are produced by soaking matured vermicasts in water and then straining the solids off to produce a liquid product.



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

The benefits of using vermiculture liquids are unpredictable, due to the use of non-standard vermiculture systems, feedstocks and methods during manufacture. However, these products may provide nutrients to soil and plants.

Some research indicates that vermiculture liquids can potentially reduce aluminium toxicity in acidic soils (Alter and Mitchell, 1992; Mitchell and Alter, 1993). This in turn contributes to improved plant health and growth.

Although there is no direct research indicating that vermiculture liquids have disease suppression effects, it is possible that they will have similar benefits to those of vermicast products.

It has also been suggested that growth hormones in these products may enhance plant growth.

Risks

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

Matured aqueous vermicast extracts carry the least amount of risk, while leachate from worm beds presents the greatest risk, for reasons outlined below:

Worm bed leachate: Vermiculture liquids originating from worm bed leachate may carry pathogens and have a range of nutrient levels. Pathogen levels and product variance are related to the time in which the

leachate is removed from the worm beds. Younger material carries the greatest levels of risk, contributing to a number of problems including plant and animal pathogens and *phytotoxic* compounds (e.g. volatile fatty acids).

Aqueous vermicast extracts: Soaking times and the proportion of vermicasts to water will impact upon the nutrient content of extracts manufactured from these mixes. Therefore, the amount of nutrients added to soil or to plant foliage may vary considerably between different products. This variance may have detrimental effects on plant health.

If the original feedstock material is not pasteurised, then aqueous vermicast extracts may carry similar risks to worm-bed leachate.

Note that vermiculture liquids 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

These products are usually diluted with water prior to application to plants or soil.

Vermicast liquids may be inoculated with different microorganisms in some instances to enhance their disease suppressive characteristics.

Application rates

Application rates are difficult to specify due to variability in vermiculture liquid product quality and due to the absence of product standards. However, in most cases, these products need to be diluted with water before they are applied to soils and/or plants.

Definitions*

Vermicast

Any organic material which has been subjected to worm activity under *aerobic* and *mesophilic* conditions. Vermicast products manufactured from non-pasteurised feedstocks may contain weed seeds and pathogenic microorganisms, as the product is not subjected to a pasteurisation process.

Vermiculture

System of stabilising organic materials under controlled conditions by specific worm species and microorganisms under mesophilic temperatures. Commercial vermiculture systems include: windrows or beds; stackable trays; batch-flow containers, and continuous flow containers.

Aerobic

In the presence of, or requiring, oxygen.

Mesophilic

A temperature range of 20-45°C. Mesophilic microorganisms grow well at these temperatures and are also important for decomposition during the cool-down or maturation stage of composting. Most pathogenic microorganisms grow in this temperature range, and are thus destroyed under high temperature (thermophilic) conditions during composting.

Phytotoxic

Toxic to plants. Partially decomposed organic materials or immature composts are often phytotoxic, but this usually decreases with time. Such products may be phytotoxic due to a number of factors, including: low nutrient content; high oxygen consumption; presence of fatty acid or alcohol metabolites formed by microorganisms under anaerobic conditions; or due to excessive concentrations of salts, heavy metals and other organic compounds.

* Recycled Organics Unit (2002).

