

SPICE Fermentation Compost Inoculant

For use in the Static Pile Inoculated Covered Compost process

This Factsheet provides a simple recipe for making an inoculant for use in no-turn, covered fermentation composting systems. This inoculant can also be used as a conditioner for soils and for odour control in manures, compost sites and intensive animal operations.

What are Inoculants?

Inoculants are products that contain living micro-organisms such as bacteria, yeasts and fungi. Micro-organisms play important roles in the environment including helping to decompose organic matter, cycle nutrients and in plant health. Inoculants can be used to add beneficial micro-organisms to a situation to get a specific biological process. For example a well known inoculant product in agriculture is a bacteria called *Rhizobia*. This product is added to legume seeds to help fix nitrogen into agricultural soils from the air as a legume crop grows.

SPICE Compost Inoculant

The SPICE or Fermentation Compost Inoculant is a biological product that contains micro-organisms that help to decompose and compost organic materials. It can be made and stored easily on the farm. The inoculant is applied to the materials that are to be composted as you are setting up a no-turn compost pile.



Finished SPIC Compost: Far North Queensland

The compost inoculant is a fermentation based product. This means the micro-organisms in them can live in low levels of oxygen. These are the conditions that exist in the SPICE Fermentation Compost system where a cover is used to control the level of air and the pile is not turned. The aim of using the inoculant is to help control the process of composting in the pile and ensure that the right community of micro-organisms are doing the composting process. This results in a quality compost product.

The Recipe has 2 parts

Mixture 1 – Lab Serum - Also known as EM, this is a base mixture which contains a concentration of microbes. You need to make this first.

Adding inoculant to compost feedstock: Armidale Regional Council



Mixture 2 – Compost Inoculant - This mixture is made from Mixture 1 mixed with a range of other ingredients to broaden its effectiveness. Mixture 2 is what you apply to compost.

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Mixture 1 – Lab Serum

Also known as *EM*, this is a basic inoculant that consists mainly of a well known group of fermenting bacteria called *Lactobacillus*. It is used as a base for Mixture 2. It makes a product which is very similar to Effective Microorganisms (EM). It can also be used directly on soils and plants or further fermented with other ingredients to make a wide range of agricultural inoculants and biostimulant products.



Ingredients & Equipment

Clean water (non-chlorinated)

Milk (fresh, UHT or powdered)

Rice (brown or white)

Large jar (plastic or glass 1 litre)

Molasses

Plastic barrel (15 to 20 litres with wide lid)

Preparation

This makes about 6 litres. You can scale this recipe up as needed. See batch recipes at end of document. Make more than you need as it stores well. Always use clean, non-chlorinated water and clean containers...

Step 1: Capture inoculant by putting 1 cup of rice into a large open mouthed container with 1 litre of clean water. Leave for 3-5 days in dark place with a loose fitting lid. The temperature is best over about 20C. The liquid should change and after this time it should smell slightly sour and may have a slightly milky colour in it. Decant the water off and keep it. Throw away the rice. This liquid is a culture mainly of *Lacto-bacillus* species.



Step 2: Feed inoculant by adding the 1 litre of liquid

Lacto-bacillus culture to 2 litres of milk in a large container with a wide mouth. The milk must contain lactose. Lactose free milk should not be used. Cover with loose fitting lid and store for a few days until it curdles and milk solids separate. Remove the solids. Keep the creamy- yellow whey. This is known as the *Base Serum*.

Step 3: Stabilise the product by adding equal parts water to the *Base Serum*

(you should need about 3 litres of water as you should have about 3 litres of *Base Serum*). Add about 250ml of molasses per 3 litres of water. This is your stable *Mixture 1* product (also called *LAB Serum*).

Step 4: Store the product in a cool place with the lid tightly on. It can remain stable for a number of years. It should be a light to mid-brown colour with a slightly sweet-sour smell. Some light to brown yeasts may colonise the surface. This is OK. The pH should about 4.



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Mixture 2 – Compost Inoculant

This is a more complex inoculant that consists of Mixture 1 combined with a range of other ingredients. It is used to inoculate no-turned compost. This Mixture is made in a large container so a 200 litre barrel, 1000 litre shuttle (IBC) or a wheelie bin are ideal to make it in.

Ingredients & Equipment

Clean water (non-chlorinated)	Fresh leafy green plant material
Mixture 1	Clean 200 litre barrel (wheelie bin or shuttle)
Molasses	Hessian sack (potato or coffee sack)
Bone meal (or meat meal)	Sea water (or sea salt)
Rice Bran	String to secure sack
Measuring jug (1 litre)	10 Litre bucket

Preparation

This makes about 200 litres. You can scale this recipe up as needed. See batch recipes at end of this document. This does not have a shelf life longer than around a few months so is best used soon after manufacturing. Always use clean, non-chlorinated water and clean containers...

Step 1: Fill barrel with around 100 litres of water

Step 2: Prepare hessian ‘tea bag’ sack by placing 15 – 20 litres of fresh green leafy plant material (grass, weeds, herbs, fresh seaweed etc.), 3 litres of bone meal, 3 litres of rice bran into the sack and closing it with string. You can add a handful of basalt rock dust if available. Place the ‘teabag’ like sack into the barrel and secure to the side of barrel so you can readily access it.

Step 3: Add nutrients to water by mixing 3 litres of molasses, 5-7 litres of seawater and 6-10 litres of Mixture 1 (Lab Serum) to the barrel. Then fill the remainder of the barrel to the top with clean water. If you do not have access to seawater then make it by adding 1 cup of sea salt to 7 litres of clean water. Now add the balance of water to the barrel (around 50 litres).

Step 4: Activate the mixture. Close lid on barrel and leave the mixture to activate for 5 days. Every day open the lid to check on the mixture and jiggle the ‘teabag’ sack at least once a day every day for the 5 days. After 5 days remove hessian tea bag and discard the contents of the tea bag into your compost. Keep the liquid in the barrel. This is Mixture 2 (also called *Compost Inoculant*) and is now ready for use.

Step 5: Use the inoculant . Apply the compost inoculant as a foliar or soil stimulant dilute 1 litre with 10 litres of clean water. When applying as a compost inoculant apply at 1 litre per 10 cubic meters. Do not be concerned if a grey mix forms on top of the mixture after a few weeks. The product should be used within 3 – 4 months.

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Batch Recipes

Mixture 1 – Lab Serum

Step	5 - 6 Litres		180 Litres		1000L	
1	Rice	1 Cup	Rice	1.5 - 2 kgs	Rice	5 kgs
	Water	1 Litre	Water	35 L	Water	175
2	Milk	2 Litres	Milk	70 L	Milk	350
	Lacto Culture	1 Litre	Lacto Culture	35 L	Lacto Culture	175
3	Whey	Approx. 2.7 litres	Whey	Approx. 90 L	Whey	Approx. 450 L
	Water	Approx. 2.7 litres	Water	Approx. 90 L	Water	Approx. 450 L
	Molasses	300 ml	Molasses	9 L	Molasses	50 L

Store in a sealed container, in the shade if possible. It should last at least 2 years.

Mixture 2 – Compost Inoculant

Step	Wheelie Bin		1000L IBC	
1	Water	100 L	Water	500 L
2	Green leafy stuff	15 – 20 L	Green leafy stuff	100 L
	Blood & Bone	3 kgs	Blood & Bone	15 kgs
	Bran	3 kgs	Bran	15 kgs
	Basalt Dust*	1 kg	Basalt Dust*	5 kgs
	Seaweed Meal*	1 kg	Seaweed Meal*	5 kgs
3	Molasses	3 L	Molasses	15 L
	Seawater	7 L	Seawater	35 L
	Lab Serum/EM	7- 10 L	Lab Serum/EM	50 L
	Water	60 -70 L	Water	300 L

* Optional if available

When applying as a compost inoculant apply at 1 litre per 10 cubic meters of compostable material. See the SPICE Fermentation Compost Fact Sheet for more info.