

# Making and Using Bio-Ferments

## Culturing Facultative Anaerobes

It is a fairly simple process to culture facultative anaerobes with readily available and affordable ingredients. They are relatively hardy and adaptable organisms that can be employed in a number of ways, i.e.

- to brew liquid fertilisers using animal, fish, plant, seaweed and mineral/salt nutrients
- as a reducing and chelating/complexing agent for sulphate/salt nutrients
- for the fermentation of various foods and beverages
- as a culture for static composting, i.e. SPICE and Bokashi
- to promote mineralisation and humification of organic materials in the soil
- to break down wastes and toxins
- for generating fuel by-products from organic matter digestion
- to make probiotic supplements for livestock
- for biological seed coating and as a seedling dip



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## Basic Cultures:

### 1) Native Microbe Seed

To make a 200L drum you need approximately:

40kg cereal bran

20kg litter duff that contains visible white fungal growth

20L molasses

Untreated water

Mix the dry ingredients on a concrete floor gradually adding molasses, along with some water to moisten, until you reach a uniform consistency. The end product when squeezed in the hand feels moist but not to the point where water drips out.

Pack all the ingredients into the drum compressing as you go to expel as much oxygen as possible. Leave a 10 cm gap at the top to allow for expansion. Close off ensuring it is airtight and store out of sunlight for at least 30 days before use.

### 2) Fresh Rumen Contents/Manure

For a culture, rumen contents or manure must be used no more than a few hours after coming out a ruminant animal.

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## 3) Lab Serum

Recipe:

### 1) Starch wash

Wash some rice or other starchy cereal with water (can also use water leftover from cooking potatoes) and then drain the water into a container.

### 2) Collect the LAB culture

Cover the container with a tea towel/muslin/fine netting and leave in the open, preferably outside so lactobacillus bacteria can find their way to the starchy liquid. It should be ready within a couple of days and have a slightly sour aroma. Siphon or syringe liquid from the middle into a container avoiding scum from the bottom and top layers and put in a sealed clean container.

### 3) Feed the LAB

Combine 1 part LAB liquid with 10 parts milk in a container leaving a small gap at the top. If your container is fully sealed then slightly undo the lid every day to let gas escape and reseal immediately or use a container fitted with an airlock.

In 4-7 days (happens quicker in warmer conditions) the liquid should have separated into two distinct layers consisting of curds and whey. Strain the whey into a sealable container. This is your finished LAB serum. To store for up to a year, refrigerate or mix with molasses at a rate of 3 to 1. It is best to release gas then reseal a couple of times during the first week of storage or use a container fitted with an airlock.

## 4) BAM, Kefir, Effective Micro Organisms etc...

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## Making Fermented Biofertiliser



### Ingredients for a 200L Barrel (multiply by five for 1000L IBC)

#### Starter Culture

- 40L Fresh rumen contents/Manure or 20L of Native Microbe Seed/Lab Serum/BAM/EM culture or 10L recently made Bio-fertiliser. (you can use any combination of the above, reducing the rates proportionately with number of different starter cultures you use).
- 4 Litres of molasses
- 8 Litres of milk/whey
- 200g of bakers/brewers yeast (optional)

#### Optional Extras:

- Up to 3kg - Basalt dust, rock phosphate, diatomaceous earth, dolomite, micronized guano etc... Up to 2kg - wood/grass/bone ash, soluble seaweed, sea minerals, blood and bone, fishmeal, sea salt, humic substances, ground biochar etc...  
(Place extras in a fine mesh sack/bag. Remove after a week)

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## Process

Put the starter culture in the barrel first.

Mix molasses with some warm water, milk and yeast then add to the barrel.

Top the barrel up with water leaving a 20 cm gap. Leave a larger gap if you plan to add subsequent ingredients and foods to the barrel.

Insert the sack/bag of optional extras.

Seal the barrel. The lid must be airtight and fitted with an airlock so gas can escape but air cannot get in.

The facultative anaerobes feed on the milk/whey (protein), molasses (energy) and minerals and go through cycles of growth, reproduction and death, forming spores and cysts when the food runs out.

The finished product contains a rich mix of amino acids, chelated/complexed nutrients, phyto-hormones, vitamins, enzymes etc...



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## Applying Bioferments

Bioferments can be applied as a foliar spray, through fertigation or as a soil drench.

It can be mixed with water at dilutions anywhere between 1 and 20 and 1 in 100.

The usual foliar application rate is between 8-10L/Ha for horticulture crops and 4-5L/Ha for broadacre crops.

Sulphate/Salt fertilizers can be mixed with bioferments at recommended application rates. The organic acids in bioferments act as reducing and chelating/complexing agents, improving the stability and uptake of inherent nutrients.

These rates can be doubled if used through fertigation or as a soil drench.

To improve uptake the following ingredients can be mixed with fermented bio-fertilisers before application:

- Fish Hydrolysate @ 0.2-0.4L/100L, 2-4L/Ha
- Fulvic Acid Powder @ 25-50g/100L, 250-500g/Ha

Include a Surfactant/Spreader/Sticker at recommended rates for foliar spray application.

To dress seeds dilute Bio-ferment 1:4 with water and slowly add to seeds while stirring/agitating until they are lightly coated with moisture. Leave to dry.

*Fermented Bio-fertilisers are acidic so best not mixed with alkaline inputs. Otherwise, they can be applied in combination with a wide range of products but if unsure, carry out a jar test to check compatibility.*