Returning Organics to Soil

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Making Fermented Hydrolysate

History
Fermentation as a process has been part of human culture for millennia. It is used in an extensive range of products in every country in the world.

Sauerkraut has its variations in Europe and Kim Chi its numerous forms in Asia. Both use fermentation as a process to transform organic substances into storable and simpler compounds by the action of enzymes, which act by hydrolysis. This is a process by which organic molecules are broken down or pre-digested into smaller compounds or nutrients.

The lactobacillus based hydrolysate product, which will be made in this process can be used as a foliar fertiliser or biostimulant, which will assist in plant growth and provide strength and resilience to crops.

To ferment a product requires the capture and use of the correct enzyme. Some reliable background information on this process is provided by the following website:
http://theunconventionalfarmer.com/recipes/lactobacillus-serum/

In addition the Carcass Disposal Group of the USDA in 2004 conducted research to evaluate the process of lactobacillus fermentation as an alternative storage process in the event of a large-scale animal death emergency. This can be found at:
https://krex.k-state.edu/dspace/bitstream/handle/2097/662/Chapter5.pdf?sequence=14

The first step in this process is the manufacture of the base Lactobacillus (LAB) inoculant.

What is inoculant?

An inoculant is essentially a biological stimulant, which initiates extensive additional enzymatic processes. This in turn can result in a higher quality compost. If used in a mixture of water, macerated animal or food material and a carbohydrate, it results in a hydrolysate or fertiliser.

The conceptual basis of the use of inoculant in a compost process can be

seen in the work of Maye Bruce (M E Bruce) derived from biodynamics and also Sir Albert Howard.

In her book on the 'Quick Return Method of Composting' Bruce states that the compost process relies on the mixed herbage pulling in yeasts and biology from the atmosphere and 'radiating' this through the heap.

You can obtain her full book at no cost here:
journeytoforever.org/farm_library/QR/QRToC.html

The liquid inoculant described in this document can be used to make compost or it can also be used to control odours in an array of situations and to initiate fermentation processes in hydrolysate.

Liquid products, based on lacto bacillus, will give a similar result to other products such as QR and other commercially available compost activators.

It is important to remember that if you use either the liquid or the QR material you will reach the same point in terms of a high-quality compost product.

The liquid however is more versatile because it can be applied to a range of other uses including odour control or the manufacture of hydrolysate liquid products, as described here.

How to make inoculant

The mixtures to be made are to be used in the process of making hydrolysate. The first step is to capture biology for the air to make the LAB mix.

MAKING LACTIC ACID

- Rice
- Water

1. Rinse one cup of rice in a half-litre of water (you can leave the rice in the water – we have sometimes had similar results if we remove the rice after four hours) – you can also experiment with using wheat, oats or barley as the initial grain – they all draw in different and various species of *lacto bacillus*
2. Let the water sit for 4 to 5 days indoors, or in a secluded area, with a loose-fitting lid. (The loose lid is intended to exclude small insects but allow air and lactobacillus in)
3. Open the container – it will smell slightly sour. The liquid now contains Lactic Acid *(lacto bacillus*) drawn in from the atmosphere.

MAKING THE BASE SERUM

To build and feed an expanded biology in the mix and store the serum:

1. Mix the half-litre of prepared lactic acid rice water in two litres of milk.
2. Leave for a few days with a loose fitting lid (this can be up to five days

in a cold climate or only one or two days if the temperature is over 30 deg Celsius) until a ‘cheese’ forms on top and separates from the liquid. The ‘cheese’ once formed can be removed from the top. (Depending on climatic conditions and the type of milk used, dried or tinned, the cheese may, on occasion, form at the bottom of the mix – although this is seems rare). The cheese is a good feed for stock or chickens or can be put into compost. When fed to animals it should increase their feed efficiency, meaning, given the right circumstance, you may be able to reduce their feed inputs. You can find references to fermented chicken feed on the internet.

3. This leaves creamy-yellow to milky water - this is the base serum.
4. To store, add equal parts of rainwater (or town tap water left to sit for at least one hour to blow off the chlorine) with one cup of molasses and keep in the fridge or a cool location. It can last for up to three years.

You can see this process described in more detail on video at:
http://www.youtube.com/watch?v=IG4M71vMbTs

Why use hydrolysate
Hydrolysate can be manufactured from food waste, road kill, animal waste and feral animals.

The finished product, through an enzymatic process, will make available all the nutrient contents of the inputs to the fermentation. It results in a biostimulant product which can make the available nutrients more readily available.

As such can reduce on farm costs, while minimizing on farm waste and create and effective and efficient use for otherwise wasted organic products.

How to make hydrolysate and apply
Any material to be used as an input into hydrolysate must first be macerated to the smallest fraction possible.

If it can be achieved a size of 5mm or under is preferred. This means that once in solution the maximum macerated product is exposed to the enzymatic process.

The basic recipe is as follows:
To the macerated quantity of waste – fish, meat, road kill, food waste – add the same quantity of tank, dam or river water, add carbohydrate such as molasses or sugar in a ratio of one fifth of the initial weight of the quantity of waste – to this add 200 mls of inoculant to every 20 litres of materials.

Mix this material into a container to which a fermentation lock of the sort used to make beer has been fixed.

Leave for a minimum of four weeks to ferment.

To apply strain the liquid off the solids and to use as a spray dilute at a rate of 120 to 1.

Consult an agronomist as to application rates for any given circumstance.