Make your own bio-fertilser

Genevieve Barlow* | *October 13, 2010

EUGENIO Gras picked a huge bone out of the pile of beef bones in the wheelbarrow and held it high.

A big smile filled his broad, handsome Mexican face.

AT A GLANCE

- **Who: Eugenio Gras**
- **What: biological fertiliser**
- **Why: make your own**
- **Where: Tylden**
- **Report: GENEVIEVE BARLOW**

"Beautiful," he said, as he dropped the skeletal remnant into a 44-gallon drum, wherein a small fire was smouldering.

"Bones will last ages and won't be decomposed very easily.

"They have a very strong chemical bond between the calcium and the phosphorus and won't let that go easily.

"So first we have to break down the structure of that bond. That's why we make a bone fire."

Around him, faces were peering into the drum. They included young and old farmers, some large-scale and others small-scale, old hands and newcomers, all of whom had paid $650 for a three-day biofertile workshop at Tylden, near Woodend, that included mastering the art of making superphosphate.

And what an art it proved to be.

Among other steps, it included chasing suckling calves in a nearby paddock with buckets ready to catch their dung as it appeared, fresh and full of live organisms, for immediate use.

The bacteria in this fresh dung - lactobacillus - aids fermentation, a key to making phosphorus available in this style of superphosphate production.

Eugenio is a member of the Council for Sustainable Agriculture and Permaculture, a Mexican organisation devoted to researching and promoting organic farming.

He was recently brought to Australia by Regenerative Agriculture, a collective of private farm education providers, and conducted his superphosphate workshop at the Falloon family farm near Tylden.

Eugenio has been working with poor farmers in Latin America and Brazil, teaching them to make organic fertilisers with readily available ingredients.

He calls these bio-fertilisers but they are essentially superphosphates, phosphorus and mineral-rich mixes, made using biological processes or naturally occurring micro-organisms to break down minerals and make them available to plants.

Commercial superphosphates are made using chemical processes.

An industrial engineer by training, Eugenio has been a builder, dairy farmer and processor, forestry manager, and has helped establish an organic cattle ranch in Mexico.

"In Mexico, (commercial) superphosphate costs the same as it does in Australia, but the farmers earn far less," Eugenio said.

"This version is cheap, we use simple technology and farmers can learn how to make it and transfer that

Making change: Mexican Eugenio Gras gives farmers fertiliser recipes they can make themselves.

Youthful curiosity: Eugenio Gras's methods for regenerating agriculture attracts interest from young and old farmers (above). Sieving the bone ash (below) is part of making the fertiliser.

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knowledge among themselves."

The recipe he recommended at the FarmReady approved Tylden workshop was simple enough.

It comprised:

- **Two buckets (40 litres) of fresh dung or the rumen of the cow.**
- **Two litres of whey (or raw milk with lime or apple cider vinegar).**
- **Two litres of molasses.**
- **200g of dry yeast.**
- **5kg of rock dust (or 4kg rock dust and 1kg ashes, or, 3kg rock dust, 1kg ashes and 1kg bone dust).**
- **Chlorine-free water, warmed but no hotter than 30C.**

This made enough for one hectare.

The official recipe posted on RegenAG's website omits the bone dust and opts for 3kg of rock dust and 2kg wood ashes, but bone dust is high in phosphorus.

The bones, collected from an abattoir the day before, are piled into the 44-gallon drum and burnt for at least five hours, then crushed and sieved.

Eugenio said the resulting dust contained highly concentrated phosphorus and is rich in minerals.

If transporting a rumen (blood and bone-free) to the bio-fertiliser-making site, he recommended resting it in five litres of water with half a litre of molasses.

The molasses kept the bacteria in the rumen alive. The container in which the rumen-water-molasses mix was transported should not be sealed as the build-up of gases would blow off any lid.

To make the bio-fertiliser, Eugenio said farmers should use food-grade plastic tubs with wide necks that could be sealed airtight.

Steel drums were not suitable.

At Tylden he used a 200-litre tub, drilled a hole in the sealed lid for a coupling, and then inserted a hose in the coupling. This formed a valve to let gases out as the mix fermented.

He placed the external end of the hose in a two-litre plastic bottle that had a hole in its upper part.

The bottle was attached to the tub with wire and left to dangle.

"Once we have added all the ingredients, we add the water, stir and close the tub, making sure the gas can escape," Eugenio said.

The mix was left to ferment for two months.

"Then you can take it out and put it into smaller 20-litre containers but don't close the lid because it will keep fermenting slowly," he said.

"Then use one of the containers of the mix to do the same again.

"One will be enough to do six fermentations a year."

Eugenio said care should be taken to ensure the resulting product was not putrid before using.

Smell, colour and protein content indicated a good mix.

"It must smell nice and fermented," he said.

"If it smells putrid, then something is wrong and you must not use it.

"It must be amber brownish, never violet, purple, black or blue."

Another way to test it was to mix 100ml of the bio-fertiliser with 100ml of ethanol.

A resulting thick curd indicated high-protein content and a good mix.

To spray on plants, strain 5-10 litres of the bio-fertiliser into 100 litres of water.

Eugenio recommended spraying it early in the morning on the underside of leaves and using a nebuliser.

This way plants absorb the biofertiliser through their stomata.

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He said corn required 25-30 litres a hectare, and fruit trees a bit more.

In Central America, he said farmers had developed small and large-scale bio-fertiliser production units.

To counter claims that the process was unhygienic, some were buying lactobacillus (concentrated microorganisms) to trigger fermentation, instead of using cow dung or rumen.

He said cotton yields had increased from 4.2/ha to 5.4t/ha in Mexico.
Tomato growers, while achieving the same yields, had cut input costs by 60 per cent.

Avocado growers had cut input costs by 60-80 per cent for a 20 per cent boost in yields.

The aim, he said, was to build healthy plants that yielded well.

Along with green manuring, mulching and applying compost teas, biofertiliser could help regenerate land at a cost poor farmers could afford, so they could produce healthy food.

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That's not biofertilizer that's a methane digester and the resulting product is called methane digestate. First off, this thing is taking manure and generating methane, which is 23 times more potent a green house gas as carbon dioxide. They're not capturing the methane, which means it is being released into the atmosphere. This is frankly absurd. Associating this with regenerative agriculture or permaculture given it's a greenhouse gas producing machine is plain wrong. Second, if you call this what it is, a methane digester and not a "biofertilizer", you can rely on the scientific literature of methane digesters (of which there is a lot) and know that the product of anaerobic fermentation contains what are called Potential Environmental Pollutants or PEPs. Sure the methane digest has a high ammonia content and works like Nitrogen fertilizer BUT the anaerobic process does not break down a number of potential toxins in the inputs (manures). The science tells us that you need to use the output of a anaerobic methane digester and put it into AEROBIC compost in order to break down the PEPs. Put this stuff on crops we eat when it may have PEPs, I wouldn't eat it. A lot of this stuff needs to be run by scientists and called the correct name so we don't have intentional misleading or accidental ignorance leading us down an unsustainable (climate change producing) environmental path or producing foods that contains toxins.

Posted by: ***Mike*** *09:54am Saturday 16th October*

If they made bio-char from their crop waste and incorporated that into the soil their fertilizer costs would be reduced even more.

Posted by: ***Ken Bourne of B.C. Canada*** *02:12am Thursday 14th October*

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