Simplified Culturing beneficial microbiology for farming

And how to utilize them!

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Advantages of using IMO/EM

- Promote germination, growth, flowering, fruiting and ripening
- Enhance the photosynthetic capacity of plants
- Increase the efficacy of organic matter as fertilizers
- Develop plant resistance to pests and diseases
- Improve the physical, chemical and biological environment of the soil
- Suppress soil pathogens and pests
- Nitrogen fixation
- Restore balance to soil ecology

Making IMO- Parent (Large Batch)

- 1 kg indigenous soil (10-15 cm below soil surface)
- 1 kg dry, brown bamboo leaves
- 5 kg rice hulls
- 5 kg wheat or rice bran
- Unchlorinated water

Making IMO- Parent (Large Batch)

- Mix all of the above together thoroughly for about 10 minutes while adding water in small amounts. Desired texture will be obtained when the mixture sticks together when held in a fist, but falls apart when poked (about 60-70% moist).
- Spread the mixture into deep tray(s) and make a hole in the middle about a foot in diameter to permit air flow. Place another tray upside-down on top of each of the trays holding the IMO mixture
- Stir the IMO mixtures every 4 days and re-wet (with water or 1/500 FAA dilution) with a spray bottle when necessary. USE POND WATER, no water which may have chlorine
- Cost of IMO – Parent: less than $1.00
- Labor cost – Less than 30 minutes, non-strenuous work
- Sometimes a gray or brown layer will form after a day or two, just mix it in and it shouldn't come back. It's the other (undesired bacteria) that will go away with the right conditions (acidic and moist).
- IMO-Parent can be used to make IMO-Liquid, to make fermented bio liquids, or spread on soils that have more than 4% organic matter
- Temperature outside my be a factor in how quickly the culture takes

Making IMO-Liquid (large batch)

Large Batch

- 15 L feed-grade molasses
  - or equal weight (1:1) brown sugar
- 75 L unchlorinated water
- 55 gallon barrel or similar container without holes
- Bungee cord
- Garbage bag or other way to seal opening
- Stirring implement (giant spoon)
- 5 gallon mesh bag (like the ones used for honey processing)
- IMO-Parent

Making IMO-Liquid (large batch)

Dissolve 15 L molasses in 75 L water using stirring spoon. Add 1 kg IMO parent mixture to mesh bag, tie off at the top to seal in IMO parent mixture. Make sure to get lots of hyphae. Add the mesh bag to the barrel with the dissolved molasses and stir slowly in ONE DIRECTION for 10 minutes. Cover IMO with trash bag and fasten using bungee cord. Don't open or even LOOK at it for 30 days. Mark the top with a label saying when it was started and when it should end. Keep in a shaded, protected area. After 30 days, remove the bag and filter the IMO through a mesh bag into containers for storage. Store in a cool place and vent IMO liquid at least twice a week.

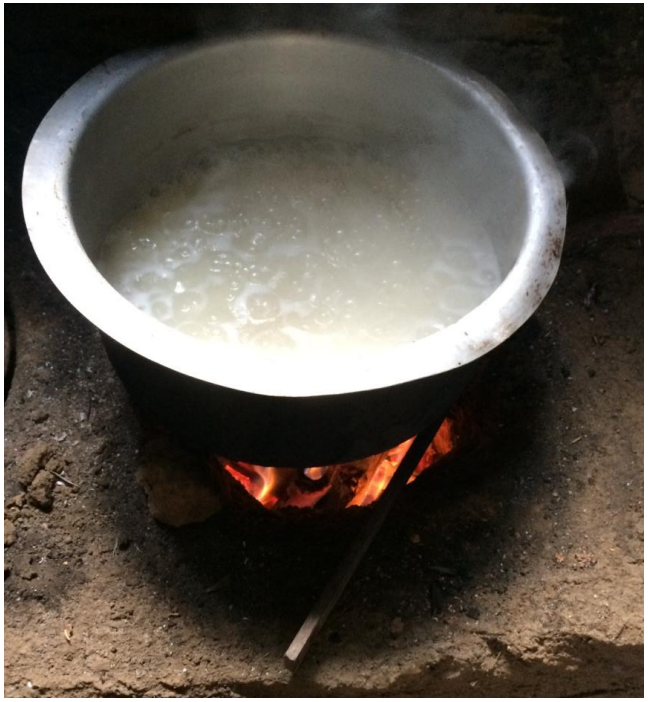
Cost of IMO- liquid: $37.40 for molasses
Cost of 90L EM: $1,378.75

IMO - liquid is applied to farmland that has 3-4% organic matter. Used to make IMO - Carbohydrate

Making IMO- Parent (Small Batch)

If have sticky rice, prepare it as if for consumption
If do not have sticky rice, make a rice porridge with available rice by adding 2 additional cups of water and cooking longer until all of the rice sticks together well (40 min – one hour)

Hollow out a section of bamboo or other container (making sure to leave one end open)



Making IMO- Parent (Small Batch)

Wrap the container with un-inked paper. Newspaper is NOT a good material to use, the ink causes coloration of the rice and inhibits some culturing of bacteria

Dig a hole the same size as your container 10-15 cm down under a fabaceous tree, leaving the top open. Cover with leaf litter and whatever other material you have on the surface of the ground.

Leave sit for 3-7 days. Depending on what time of year this is done, it may take different amounts of time for the bacteria and fungus to culture the rice. In the Rainy season it will go faster and in the dry season it will be slower.

In Florida 3 days is enough in the dry season and 1-2 is enough in the rainy season

In TZ (highlands) 5 days was enough in the dry season and 1-2 is enough in the rainy season

Dig it up! You should see white fungus and potentially white dot of bacteria too! (We will talk later about how to get more bacteria if you would like)

Pink, green, grey or black bacteria/fungi should be discarded.

Making IMO-Liquid (small batch)

- Mix one part IMO-Parent with molasses/brown sugar (by weight)
- Add 1:1 by weight water after 1 week
- Let sit for 30 days, strain through a mesh bag and keep the IMO-Liquid in a vented container, making sure to vent it once a week
- Use as desired!

Uses of IMO Liquid/EM

Frequency	Rate	Instructions
Daily	1:10000	Through Irrigation
Weekly	1:100 - 1:250	Foliar Feed
Monthly/Seasonally	1:50	Foliar Feed
Soaking Seeds	1:1000	5-10 min – don't let them ferment!
Bokashi	1:100	Add to bran (60-70% moisture) then use
Deep Litter System	1:100	Spray as needed (based on smell and soil texture)

What's appropriate for my soil?

IMO	Method	Percent of organic matter in soil requiring restoration
IMO Parent	Microorganisms collected locally	More than 4%
IMO Liquid	IMO- Parent and sugar 1:1	3-4%
IMO Carbohydrate	IMO-Liquid and bran 1: 1,000	2-3%
IMO Compost	IMO-Carbohydrate and soil 1:1	1-2%
IMO Manure	IMO-Compost and manure 1:1	Less than 1%

Making IMO- Carbohydrate

- IMO- Liquid
- Water
- Rice bran
- FPJ, FFJ or FAA (optional)
- Straw or other mulch

Spray 1:1000 dilution of IMO-Liquid onto bran pile. It's best to have the bran pile formed on soil. Increase moisture level to 60-70% with FPJ, FFJ or 1:500 FAA dilution. Cover the pile with straw/mulch to keep it moist and control temperature. After 6-7 days it should have white fungi covering the top

IMO-Carbohydrate is spread on soil surface and is suitable for soils that contain 2-3% organic matter.

Making IMO- Compost

- IMO- Carbohydrate
- Soil (preferably compost)
- Straw or other mulch
- FPJ, FFJ or FAA (optional)
- You can also water down IMO-Liquid 1:100 and add it to your compost pile while turning it (at least half way through decomposition)

Mix IMO-Carbohydrate and soil 1:1 in a pile 30-40 cm tall. Moisten to 60-70% with FPJ, FFJ or 1:500 FAA dilution. Cover with straw or mulch to keep moister and control the temperature. After 6-7 days white fungus should be visible.

IMO-Compost is applied to soil surface and is suitable for soils that contain 1-2% organic matter.

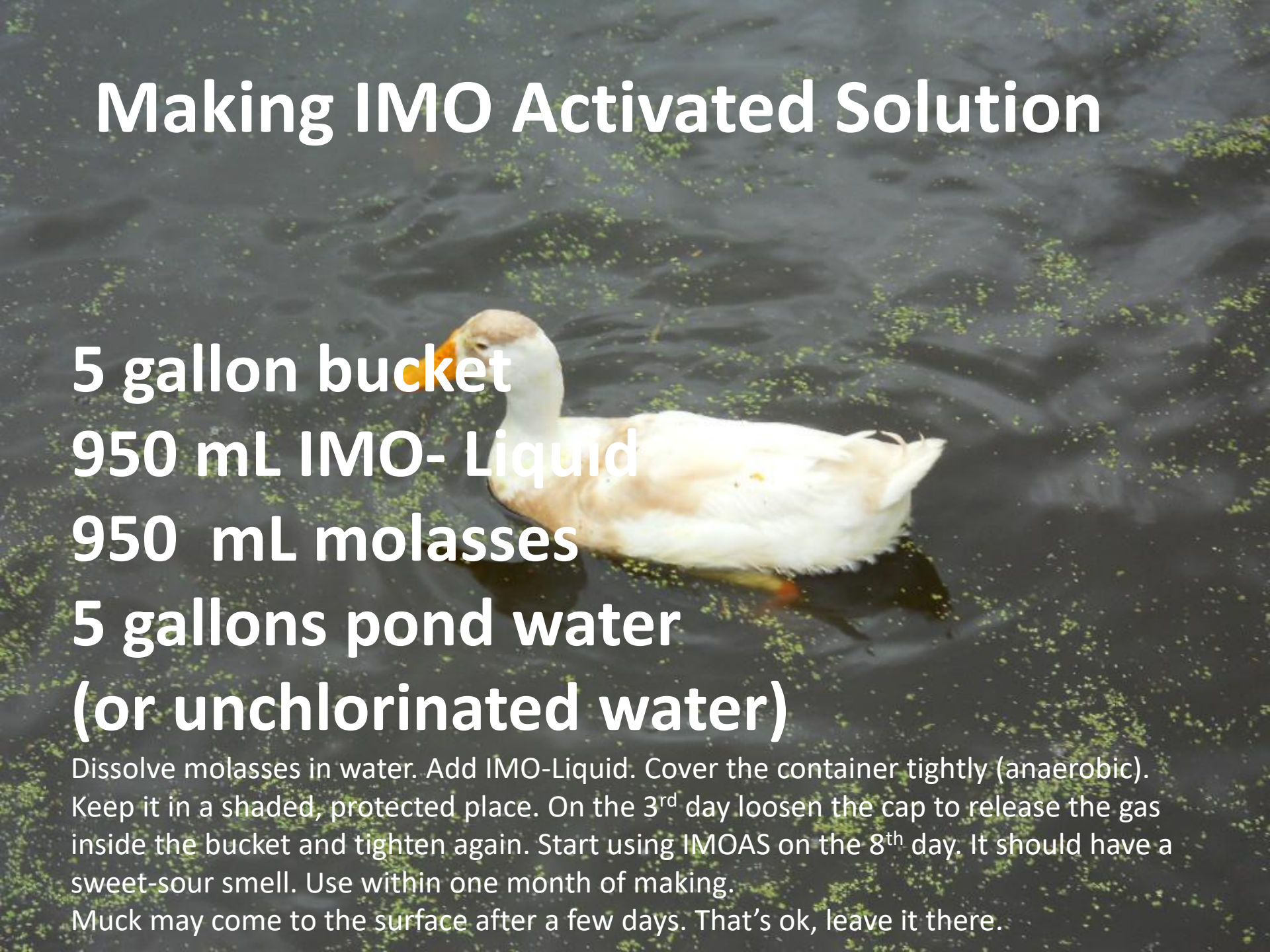
Making IMO- Manure

- IMO-Compost
- Manure
- Straw or other mulch
- Sea water (optional)
- FPJ, FFJ or FAA (optional)

Mix IMO-Compost and manure at 1:1 ratio and build a mound 30-40cm tall. Mix thoroughly, add moisture to 60-70% with 1:1000 FPJ, FFJ or FAA dilution. Cover with mulch to keep moist and to control temperature. Mix with sea water diluted 30 times to enhance IMO-Manure affect. In 5-7 days white fungus should appear.

IMO-Manure is used as a soil cover and is suitable for soils that contain VERY low organic matter (less than 1%)

Making IMO Activated Solution



5 gallon bucket
950 mL IMO- Liquid
950 mL molasses
5 gallons pond water
(or unchlorinated water)

Dissolve molasses in water. Add IMO-Liquid. Cover the container tightly (anaerobic). Keep it in a shaded, protected place. On the 3rd day loosen the cap to release the gas inside the bucket and tighten again. Start using IMOAS on the 8th day. It should have a sweet-sour smell. Use within one month of making.
Muck may come to the surface after a few days. That's ok, leave it there.

References & Further Reading

- Tancho, Arnat. Textbook in Natural Farming: Principles, Concepts & Appropriate Techniques in Tropics. Maejo University, Thailand. 2013.
- Lowenfels, Jeff and Wayne Lewis. Teaming with Microbes: The Organic Gardener's Guide to the Soil Food Web. Timber Press. 2010.
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