



Fortalecimiento y articulación de las OSC para promoción y fomento de la agricultura orgánica en pro del desarrollo sustentable e inclusivo en El Salvador



Guide for the production of organic inputs

Ejecutado por: En Alianza con: Con el apoyo de:



FUNDESYRAM – Foundation for Socioeconomic Development and Environmental Restoration, is a Salvadoran organization with the Mission “We are an institution that promotes methodological and technological processes for the establishment of Ecodevelopment in the territories, based on the full enjoyment of social, economic and environmental rights., with the active participation of families, community organizations and local partners so that they become managers of development.”

Roberto Rodríguez Sandoval
Director Ejecutivo

MORALES ISRAEL. 2017. Guide for the production of organic inputs. FUNDESYRAM, San Salvador, El Salvador. 62 p.

Traducción abril 2024: María Lidia Martínez

Revisión de traducción: Ruth Eunice Cruz Flores, traductora de Compasión Internacional y Visión Mundial.

Fotografías y dibujos: Edgardo Erazo, FUNDESYRAM

Diagramación: Raúl Mendoza, FUNDESYRAM

San Salvador, El Salvador, abril de 2024

The content, photographs and drawings are the responsibility of FUNDESYRAM; the institutions that have supported the publication have no responsibility for the content of this document. Some descriptions and graphics have been taken from different texts, of which their origin is indicated and can be verified in the cited bibliography.

FUNDESYRAM authorizes people who want to reproduce this document in whole or in part, as long as the source is cited.

**FUNDACIÓN PARA EL DESARROLLO SOCIECONÓMICO Y
RESTAURACIÓN AMBIENTAL**

Colonia Universitaria Norte, Reparto la Virtud, Pasaje
Pablo Guzmán N° 11, Mejicanos, El Salvador.
Tel. (503) 2273-2843, Telefax. 2273-2843.
Email fundesyramdirección@gmail.com
Página Web www.fundesyram.info

FUNDESYRAM 32 años de Agroecología y Desarrollo



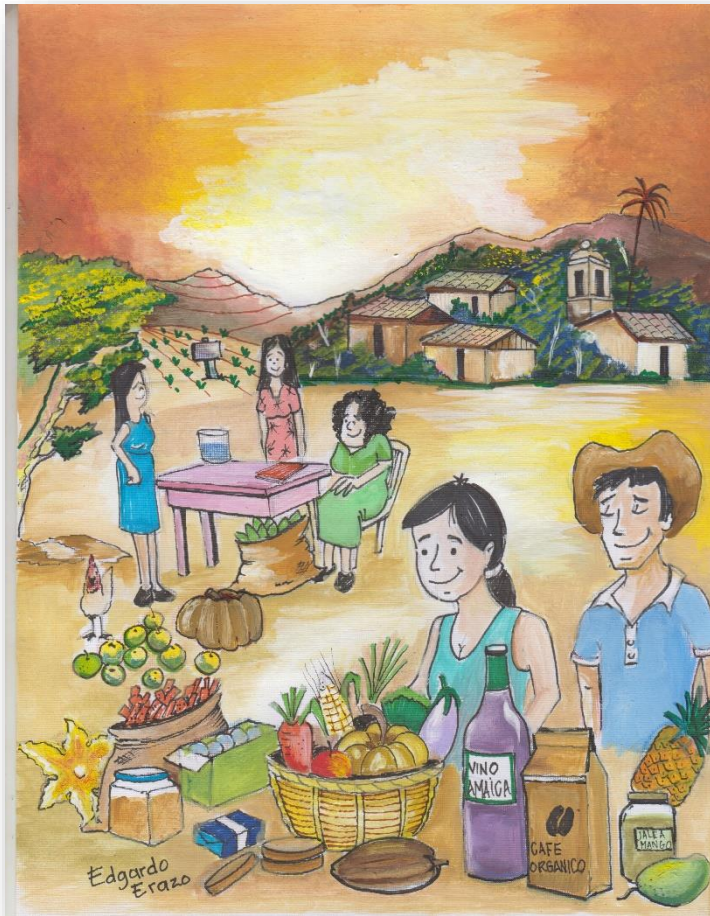
FUNDESYRAM
32 AÑOS

Contenido

1. Background of conventional production and the alternative of organic production	5
2. Preparation of rock flour, for the production of organic fertilizers	12
3. Preparation and production of Bocashi-type organic fertilizer	25
4. Preparation of microbial broths	30
5. Preparation of Bio stimulants for crop management	35
Bio stimulant based on Floripundia:	35
Bio stimulant based on chichicaste: (herbal)	37
Pumpkin-based bio stimulant:	38
Bio stimulant based on musaceae	40
Pepper-based bio stimulants	41
6. Preparation of mineral broths	42
Sulpha-calcium broth	42
Borderless Broth	43
Broth to control blight in vegetables and rust in coffee	45
Visosa Broth	46
Sulphate-Calcium broth enriched with Zinc Sulphate	47
7. Preparation of biofertilizers	49
Biofertilizer based on cow manure and mineral salts	49
Biofertilizer based on cow manure without mineral salts	52
Ferment based on Bocashi organic fertilizer	53
8. Preparation of repellent extracts	55
Repellent extract based on various plants known as M5	55
Garlic extract with Epacin	57
Garlic chili extract	58
Neen extract with garlic	60

Repellent based on Annona seed, for soil pests 61

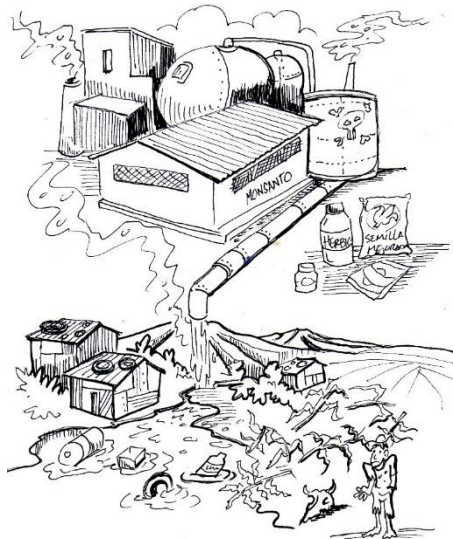
Bibliography consulted 62



1. Background of conventional production and the alternative of organic production

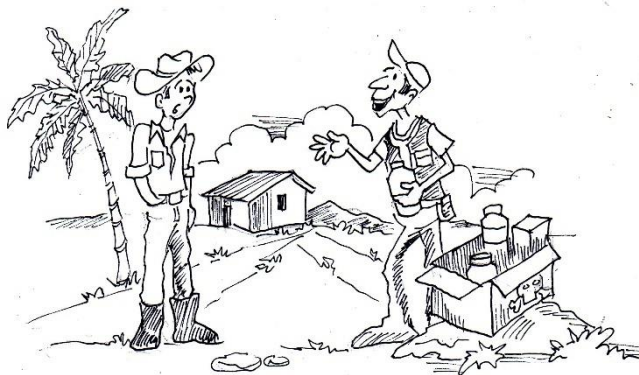
Since the beginning of the green revolution, tons of chemical products have been marketed with the promise of increasing the production and availability of food to the population. This is how we find in local markets products that are specialized for each need in crop management. and they are called like this: Insecticides to kill insects, Fungicides to kill fungi, Herbicides to kill herbs, snailicides to kill snails and molluscs, rodenticides to kill rodents, in short they offer alternatives to kill every living being including people.

Faced with this reality, there are truths that agrochemical sellers do not say, because they have always thought that the most important thing is to make money, to live in good conditions, ignoring the damage that agrochemicals cause to the environment and people. With technical



knowledge we list some of the effects of agrochemicals:

1. They kill beneficial insects
2. They eliminate fish and other aquatic animals



3. They contaminate water for human and animal consumption

4. They eliminate organic matter from the soil

5. They increase acidity, which is responsible for low yields

6. They eliminate beneficial and food plants

7. They lose the ability of soils to retain moisture

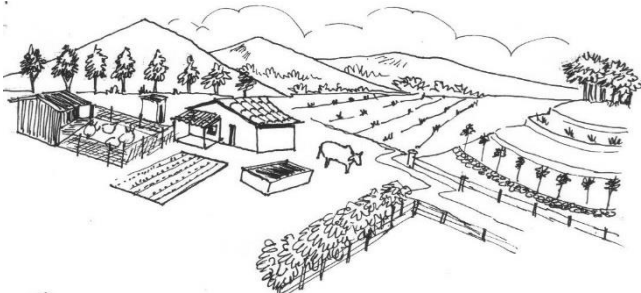
8. They increase the number of plants that are difficult to control

9. They are responsible for chronic diseases in applicators

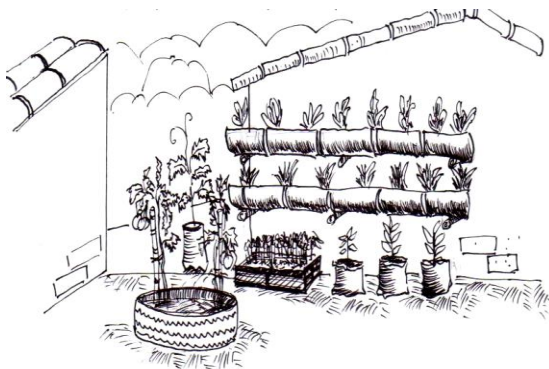
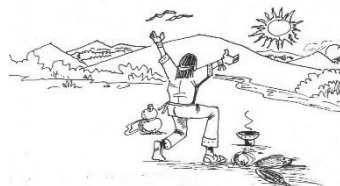


FUNDESYRAM, as an organization responsible for supporting producers, to improve socioeconomic conditions, has decided to work on the rescue of environmentally friendly technologies: valuing human health and soil health, today we are responsible for doing organic agriculture, partners with local organizations, individual producers, non-governmental and governmental organizations, enhancing human capacities, for sustainable organic production over time.

The main foundation of Organic Agriculture is to rescue the knowledge of our ancestors, who at the time had local, easy-to-apply and low-cost technologies.



In reality we are not promoting a package of inputs, nor magic recipes that will solve the needs of producers, it is rather looking for a true way to produce healthy food with resources found on the plot and generate a proposal that is easy to apply in any territory of El Salvador.



1. Collection and Activation of mountain microorganisms (MM)

In natural ecosystems there is a very wide series of beneficial natural microorganisms that are activators of the soil and ecosystems, among which we find: Yeasts, Actinomycetes. Lactic acid-producing bacteria and photosynthetic bacteria, these are responsible for decomposing the organic matter in the soil and also the waste that is deposited.



Some fix nitrogen from the atmosphere, control other harmful microorganisms, increase the availability of nutrients for the plant through their recycling, degrade some toxic substances including pesticides and produce antibiotics and other bioactive components, improving soil aggregation among other functions. .

Solid phase

The materials that we are going to use:

1 plastic barrel with metal ring of 200 litres

Irrigation system adapter with a gasket

1 piece of ½ inch clear hose

1 plastic bottle

Molasses or panela honey

Sack of semolina or rice polish

2 bags of microorganisms, leaf litter, humus, MM strains (mountain microorganisms)



Process

Collect the vines or leaf litter on the farm or in a chemical-free forest.



1. Spread plastic over the ground and empty the litter. If the ground is cemented, it is not necessary to use plastic
2. Spread the leaf litter on the plastic or on the ground, remove impurities (stones, green leaves and thin sticks)

3. Add the rice polish

4. Do the manual mixing

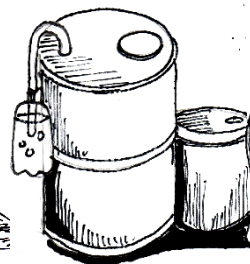
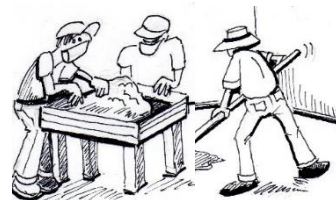
5. Apply the molasses in a few

6. Continue mixing until you have the humidity at field capacity

7. Deposit the mixture in a barrel and compact it in layers

8. Seal the barrel to prevent oxygen from entering

9. The product is ready in 25 to 30 days



Liquid phase

Materials

1 plastic barrel with metal ring of 200 litres

Irrigation system adapter with a gasket

1 piece of ½ inch clear hose

1 plastic bottle

1 Piece of mesh fabric or bag and tie to tie.

2 litres of molasses

180 litres chlorine-free water

20 pounds of solid MM



Process

1. Pour water into the barrel halfway

2. Apply the 2 litres of molasses, and shake it

3. Pour the 20 pounds of solid mm into the piece of cloth or sack, tie it and pour it into the barrel

4. Seal and let it rest for 6 days and it is ready to apply. (in this process, fungi, bacteria and yeasts are produced)

5. When the liquid mm is finished, we can continue using the solid product several times (2 or 3) following the same process, observing that the solution always has changes, that is, that it

has white spots, which is the reference horses 2 litres daily in drinking water, for goats, sheep and pigs half a litres per day in water for drinking and for pigs, it is recommended to do continuous 5-day treatments, repeating every 2 months

6. Application dose: it is applied pure to prepare inputs, to disinfest soils before planting and foliar to control diseases, it is applied at 50%, that is, half the product for half the water

7. For use in animals: used to prevent diseases and to improve feed conversion

8. MM liquids: to prevent diseases it is recommended to use it like this: for birds use 250cc per 3 litres of drinking water, for cows and



2. Preparation of rock flour, for the production of organic fertilizers



Julius Hensel (1844-1903) revolutionized agriculture with his book “Breads of Stone”, about the remineralization of soils with rock powders or flours and their rejuvenation with the biology of the soil.

In 1879 he personally confronted Julius Von Liebig (father of agro chemistry), and for this attitude, he was persecuted and defamed by many professors of agronomy and agriculture in Germany.

His writings were hidden in Germany and the United States for more than 100 years; changing the biological matrix, towards the chemical matrix and that was attached over the years, the oil matrix.

Rock: is a solid mass formed by one or more minerals of natural origin by geological processes.





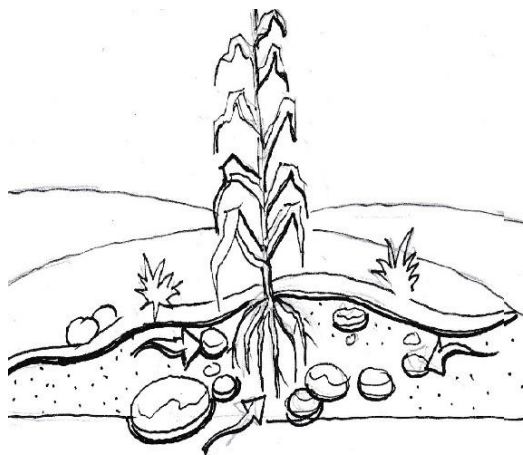
Rock Flour: it is composed of fine particles, generated by the mechanical crushing of rocks by glacial erosion or artificial grinding; In natural formation during glacial migration, crack expansion and breaking up of rock formations, they form multiple cycles creating a greater quantity.

What do rocks contain?

In the rocks we find up to one hundred minerals and trace elements necessary for the well-being of all life, for the creation of fertile, sustainable soils superior to the use of chemical fertilizers and pesticides.

The restoration and rejuvenation of soils through the use of stone powders or rock flours is a healthy procedure.

Today nutritional science has discovered the existence of elements such as chromium, vanadium, selenium; which act as traces and sub traces, and have always been present in rocks.



How does rock dissolve?

The rock is populated by microorganisms.

The rock is populated by moss and lichens.

The action of microorganisms dissolves minerals.

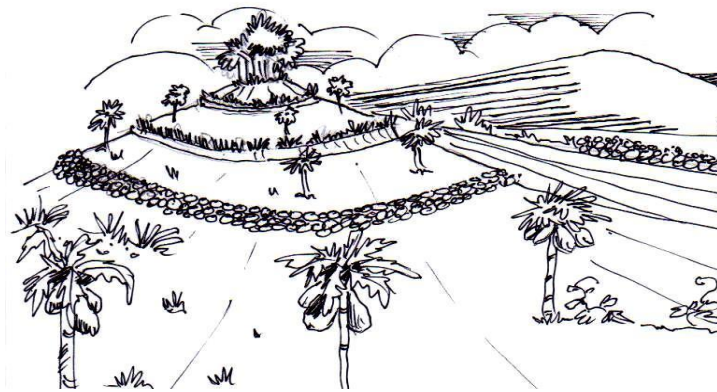
The first manifestations of plant life are presented.



What are the advantages of remineralization?

1. Restoration of elements, traces and sub trace lost to the soil
2. Increase in the nutritional value of food and animal feed
3. Increase in harvests in quantity and quality
4. Increased resistance of plants to pests and diseases
5. Increased humus and reduced soil erosion
6. Enhance microbial activity and increase the worm population
7. Enhance the flavour of fruit and vegetables and legumes
8. Help retain soil moisture
9. Help improve the development of the root system
10. Reduction of plant susceptibility to climate (resistance)

11. Reduction in mortality during transplant
12. Reduction of the need for soluble chemical fertilizers by plants
13. Fewer health problems, due to reduced use of herbicides and agro-toxics
14. Less contamination of soil and water due to reduction in the use of agro-toxics
15. Provides products in accordance with the goals of sustainable agriculture



How to find and prepare rock flours?

In different areas of the country, you can easily find rock sources around farms, volcanoes, rivers and mountains. Look for rocks that melt easily and have darker colours. Stones in the process of forming soil, attacked by water and plants, break and grind more easily.



Break the stones with a hammer and then, if possible, grind the pieces with a mallet or other system, until you obtain a fine flour.

For large quantities, the best solution is to grind the mixed rocks from the river in a grinder and then pass them through a sieve or mesh of 0.075 mm or finer.

How to dissolve the rock?

1. Crushing with an industrial crushing plant



2. Crushing with a homemade mill
3. Crushing manually using a flat stone and grinding with another small one
4. Heat them strongly in an oven and put them in cold water, if the rocks are very hard

What type of rock is most suitable?

Generally, the use of glacial rock is recommended first, followed by river rocks, sea shores and mixtures of metamorphic rocks. Rocks that contain a heterogeneous combination of several types of rock formation or mineralogy can generally be used. Metamorphic or igneous rocks such as basalts, serpentines, mechanists and rhyolite, etc., are highly recommended.



How to identify which type of rock is the best?

1. Practical and simple methods and one of those methods is through the observation of rocks, every farmer or professional who is dedicated to this exciting topic has to look at the rocks and analyse it very carefully.

2. The type of vegetation and its behaviour on top of the rocks are clear parameters that we take into account to be able to affirm whether the rocks are rich or deficient in minerals, which are essential in the development of any plant.

3. Colouring is another of the fundamental aspects.



Uses of Rock Flour

Incorporated into soils at different stages of crop growth.

1. In the preparation of the different organic inputs

2. Breeding of seeds

3. Substrates and Seedbeds

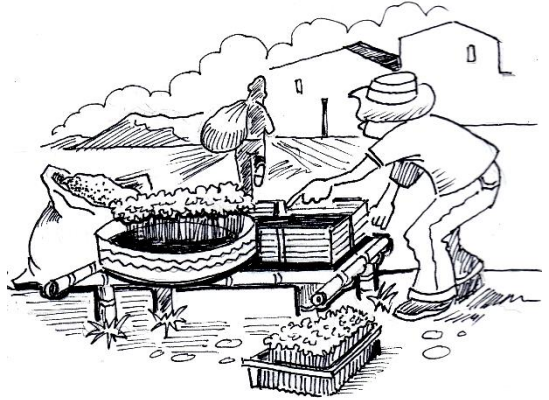
4. Concentrate for chickens

5. Concentrate for sheep



Substrates and rooting agents

A substrate is any solid material other than soil, natural, synthetic or residual, mineral or organic, which, placed in a deposit (bag, tray, pot and others), in pure form or in a mixture, allows the proper development of the system. root of the plant, serving as support or anchoring of the new plant.

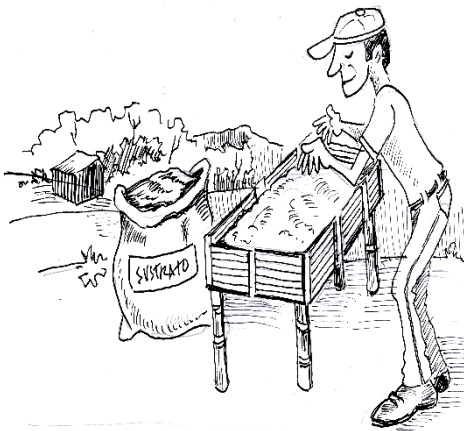


Characteristics of the ideal substrate

To obtain good results during germination, rooting and plant growth, the following characteristics of the growing medium are required:

Physical properties:

- High water retention capacity readily available
- Sufficient air supply
- Particle size distribution that maintains the previous conditions
- Low apparent density
- High porosity
- Stable structure, which prevents contraction (or swelling of the medium) or compaction

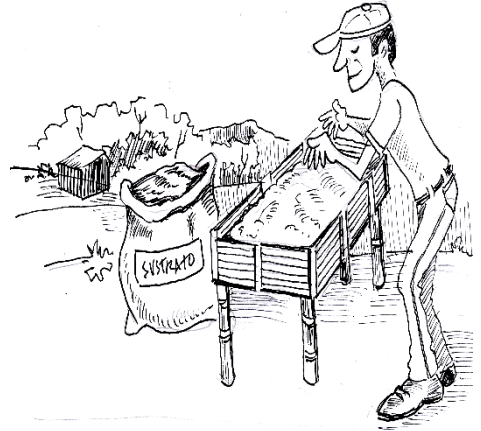


Chemical properties:

- Sufficient level of assimilable nutrients
- Low salinity

Other properties

- Free of seeds, weeds, nematodes and other pathogens
- Reproductivity and availability
- Low cost
- Easy to mix
- Easy to disinfect and stabilize
- Resistance to external physical, chemical and environmental changes



There are commercial and artisanal substrates, the important thing is that they meet the characteristics or conditions necessary for the good development of the plants, it is also necessary to consider availability and cost.

To develop the practice of preparing substrates, several alternatives are presented, preparing different mixtures, using the available materials according to the proposals detailed below:

First alternative

40% vermicompost

40% black earth

20% gravel

2 litres of liquid microorganisms



Second alternative

4 pounds of strained black earth

4 pounds bocashi

2 pounds of rock flour

1 litre of microorganisms



Third alternative

1 pound rock flour

4 pounds bocashi

4 pounds of strained earth

1 pound rice husk

1 litre of microorganism





Fourth alternative

2 pounds of bocashi

5 pounds of strained black earth

1 litre of microorganisms

Fifth alternative

2 pounds bocashi

1 pound of gravel

2 pounds of yellow-ant bran

1 litre of liquid microorganisms

2 pounds of strained black earth

2 pounds of forest litter

1 pound of vermicompost



Sixth alternative

- 4 pounds bocashi
- 4 pounds of strained black earth
- 1 litre of microorganisms
- 2 pounds of coffee peel

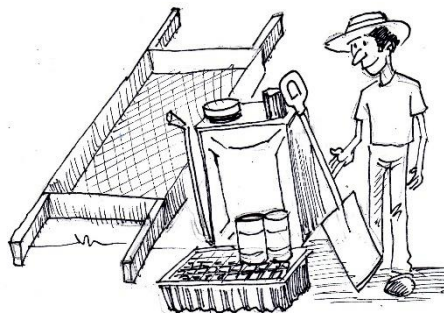
Seventh alternative

- 2 pounds of rock flour
- 3 pounds bocashi
- 5 pounds of strained black earth
- 2 pounds of rice chaff
- 2 litres of liquid microorganisms



Basic equipment for preparing substrates

1. Strainer
2. Backpack pump or manual sprinkler
3. Shovels
4. Trays
5. Seeds according to the species to be planted

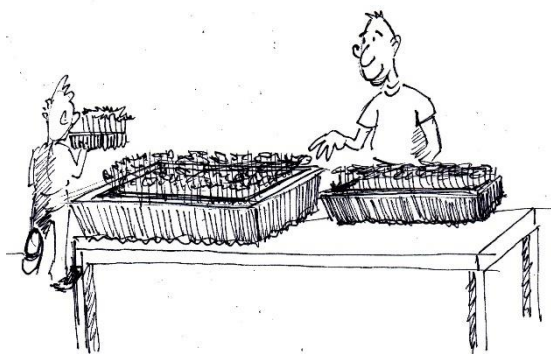


Procedure

The preparation process is simple and practical, following the steps



1. Drafting the materials separately and then making the mixture
2. Preparation of the mixture, leaving field capacity; if it is not used immediately, it is stored in bags, ensuring that it is not exposed to rain and sun
3. tray filling
4. sowing
5. Application activated microorganisms



6. Sprouted trays
7. Seedlings taken to the field and transplanted

The best seedlings will depend on the care taken in the first 20 days after sowing

3. Preparation and production of Bocashi-type organic fertilizer

What is Bocashi fertilizer? Bocashi type fertilizer is a fermented fertilizer. Its name comes from the Japanese language and means steam cooked, relating to the temperatures that occur in the production process. The strength of bocashi is the high population of microorganisms it provides to the soil.



Materials:

Process:

1. Distribute the materials in three layers, like this:

•First layer:

4 bags of soil

4 bags of manure

4 ash bags

1/3 of a bag of Bocashi

1 bags of rice chaff

1/3 bag of rice polish



20 litres of liquid microorganisms

2 litres of molasses

15 pounds of rock flour

•**Second layer:**

4 bags of soil

4 bags of manure

4 ash bags

1/3 of a bag of Bocashi

1 bags of rice chaff

1/3 bag of rice polish

20 litres of liquid microorganisms

2 litres of molasses

15 pounds of rock flour



• **Third Layer:**

4 bags of soil

4 bags of manure

4 ash bags

1/3 of a bag of Bocashi

1 bags of rice chaff

1/3 bag of rice polish

20 litres of liquid microorganisms

2 litres of molasses

15 pounds of rock flour

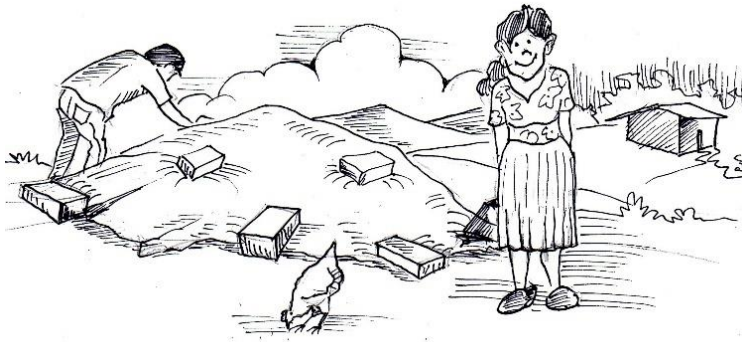


2. After each layer, it is moistened and the first test is done, then the next layer begins, until the third layer is completed

3. Mix homogeneously

4. Leave the pile at a height of 50 to 70 centimetres

5. Protect it from water and sun, preferably in a protected place and avoid covering it



6. Measure the temperature every day, which must exceed 60 degrees Celsius

7. Carry out two turnings daily, to lower the temperature and aerate the fertilizer

8. The temperature is controlled with the height of the pile, the higher the height the higher the temperature, the lower the height the lower the temperature

9. The fertilizer is ready 21 days after preparation, taking temperature as an indicator, since this must be the same as the ambient temperature



Uses and application:

Bocashi fertilizer can be applied to all crops and according to experience there have been good results. The amount to use depends on the type of crop and size of the plant, but it can vary from 4 ounces to 1 pound, placing the fertilizer at the bottom of the hole, this when it comes to sowing application or initial application; Then a small layer of soil is placed and then we place the plant to plant. The following applications are made by incorporating the fertilizer on the sides of the plant in a half moon, taking care to cover it. The frequency of these applications should be 15 days. Results will not be seen immediately



4. Preparation of microbial broths

***Lactobacillus* bacteria**

The *Lactobacillus* preparation is used to prevent and control diseases, foliage and soil pests such as blind man's hen, and increases plant defense.

MATERIALS

2 pounds of rock flour

100 litres of water

1 gallon of whole milk

5 pounds of green leaves from healthy trees

1 pound magnesium sulphate

1 litre of molasses

4 pounds of microorganisms





Procedure

1. Place the barrel in a cool, shaded place and add 50 litres of water
2. Add all the ingredients one by one and mix with a wooden paddle
3. Add 50 litres of water and cover for four days

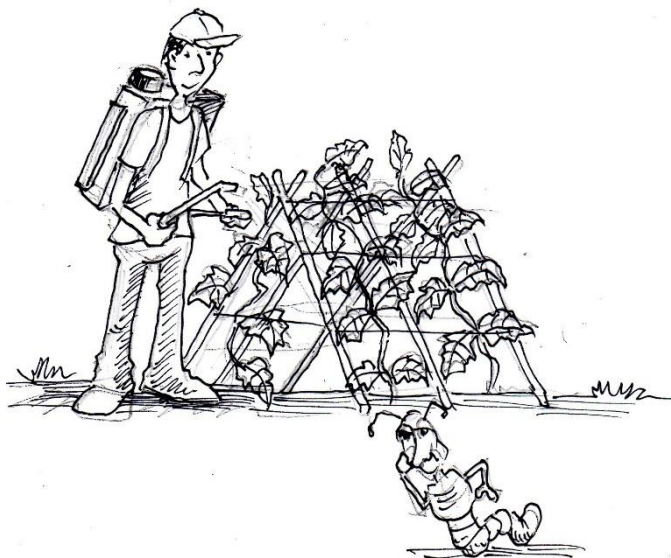
Fermentation time

After four days it is ready to use, it is used a week after preparation and preferably use it all so as not to store it.

Applications

It is used to control pests and fungi on the foliage and in the soil it controls blind hen, it is used in all vegetable crops, basic grains, and fruit trees.





Dosage: 4 litres per 20 litres pump and 3.5 litres for a 17-litres pump, applied foliar and to the soil.

Protective rules for the applicator

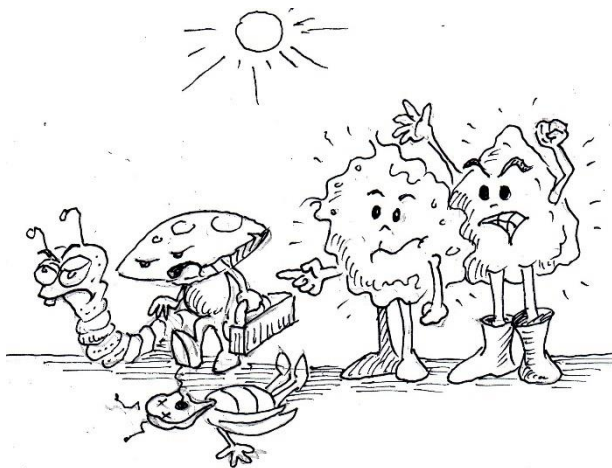
Lactobacillus is an organic preparation, but it must be taken into account that if it comes into contact with the eyes, skin and other parts of the body, it can cause some damage. Gloves, a mask, rubber boots, coats and glasses must be used.



Phototrophic bacteria

Phototrophic bacteria are those that transform harmful substances in the soil (pesticides and herbicides), using sunlight and soil heat as a source of energy and generating favourable conditions for other beneficial fungi and bacteria to develop.

MATERIALS



100 litres of water

2 pounds of rock flour

3 litres of molasses

1 gallon of whole milk

4 pounds of solid microorganisms

Procedure

1. Prepare a barrel with a capacity of 100 litres
2. Place 50 litres of water in the white plastic barrel
3. Add 2 pounds of rock flour
4. Add 4 pounds of solid mm
5. Apply 1 gallon of whole milk



6. Add 3 litres of molasses
7. Complete with 50 litres of water
8. Mix to uniform the solution
9. Seal or cover
10. Leave it completely in the sun for 30 days, so it is ready to use

Dosage: 2 litres per 20 litre- pump and 1.5 litres per 17 litre- pump, applied to the soil. This can be applied in warmer hours or at midday.

Protection measures.

Phototropic bacteria is an organic preparation, but it must be taken into account that if it comes into contact with the eyes, skin and other parts of the body, it can cause some damage. Gloves, a mask, rubber boots, coats and glasses must be used.



5. Preparation of Bio stimulants for crop management

Bio stimulant based on Floripundia:



This product is used to control nematodes.

Materials:

4 ½ pounds floripundia (leaf and flower)

2 litres of liquid MM

250 cc of molasses

20 litres of water

1 paddle to move

1 plastic bucket and 1 piece of plastic

Procedure:

1. Pour 10 litres of water into the bucket
2. Apply 250 cc of molasses and stir
3. Apply 2 litres of liquid mm
4. Chop the floripundia leaves and flowers well and apply them
5. Complete with water
6. Cover
7. Let it rest for 15 days

**Application dose:**

It is applied pure to the soil before sowing, to control nematodes and in foliar form, 200 cc per 4-gallon pump.

Bio stimulant based on chichicaste: (herbal)

It provides minor elements to the crop and acts as a growth stimulator.

Materials

5 pounds of chichicaste

2 litres of liquid mm

4 ounces of magnesium sulphate

250 cc of molasses

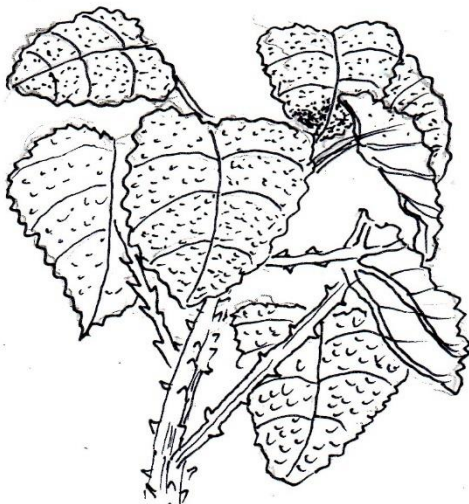
20 litres of water

1 paddle to move

1 plastic bucket and 1 plastic pebble.

Procedures:

1. Put 10 litres of water in the bucket
2. Pour the $\frac{1}{4}$ litre of molasses and stir to dilute it
3. Chop the "chichicaste" leaves and apply to the bucket
4. Add magnesium sulphate
5. Add water



6. Cover

7. Let it rest for 15 days

Dose:

2 litres per 4-gallon pump, applied to foliage for all crops.

Pumpkin-based bio stimulant:

Improves crop growth and makes an important contribution of carotenes to improve food synthesis.

Materials:

2 pounds seedless pumpkin, you can use papaya or carrot

2 litres of liquid MM

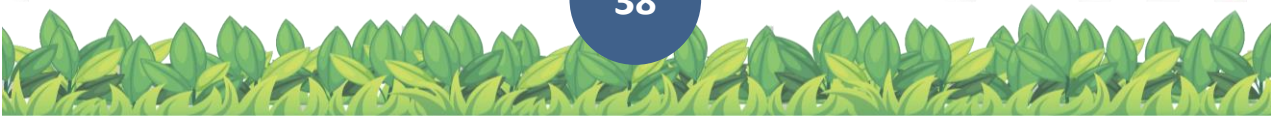
½ pound rock flour

4 oz calf manure (meconium)

1 ½ litres of molasses

20 litres of whey or water

1 paddle to move



1 plastic bucket

Procedures:

1. Pour 10 litres of whey or water into the plastic tank halfway up
2. Chop the squash well and add to the tank
3. Add the calf manure (meconium)
4. Add the molasses and then the rock flour and the mm
5. Seal and leave in the sun for 30 days

Application form:

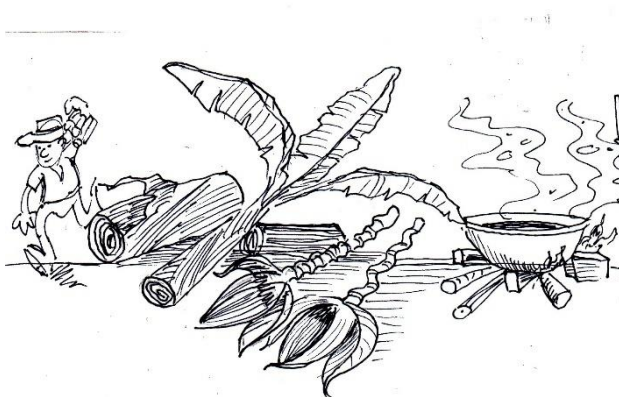
Prepare a 20 litres bucket, add $\frac{1}{4}$ litre of molasses, mix, and add 1.5 litres of pumpkin foliar, of this mixture apply 2 gallons to the 4 gallon pump, complete with water and apply



Bio stimulant based on musaceae

Materials

- 1 pound magnesium sulphate
- 5 rachises with musaceae flower
- 20 litres of water
- 0.5 pound monoammonium phosphate



Procedure

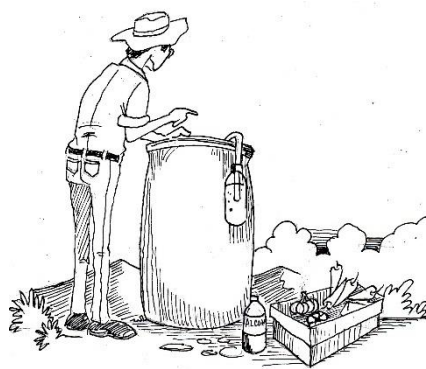
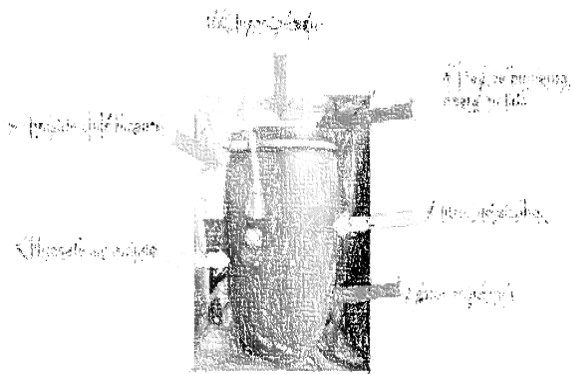
1. Boil the water
2. Chop the rachis and the musaceae flower
3. Place them in the pot when the water is boiling
4. Cook it for 20 minutes
5. Get off the fire
6. Add the salts

Dosage: 300 cc per 4-gallon pump, to improve flower size and fruit quality

Pepper-based bio stimulants

Procedure

1. Pour the 50 litres of water into the barrel
2. Crush the garlic, pepper and chili well and add them to the barrel
3. Add the alcohol and the mm
4. Top up the water
5. Seal
6. Leave to rest for 15 days



Dose

100 cc per 4-gallon pump for vegetables and 300 cc per pump for fruit trees, in addition to stimulating growth, Controls: fungi and insects (weevil, fruit fly and larvae)

6. Preparation of mineral broths

Sulpha-calcium broth

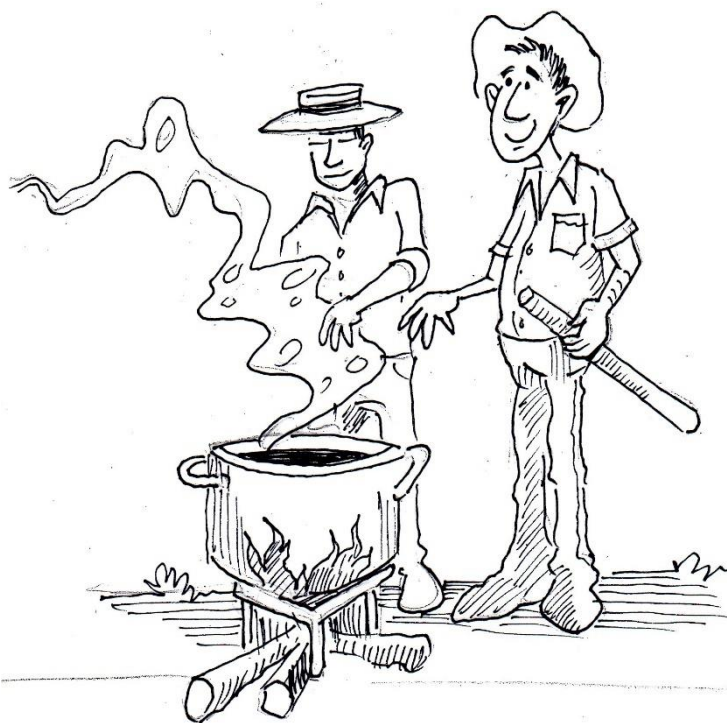
It is a broth prepared from sulphide and lime and is used to control pests and diseases in different crops such as vegetables, fruit trees, coffee and basic grains.

Materials

- 10 pounds hydrated lime
- 10 pounds of pure sulphide
- 20 litres of clean water
- 5 pounds of rock flour

Process

1. Light the fire
2. Put a pot with 20 litres of water to boil
3. When the water is boiling add the sulphide, lime and rock flour
3. Start moving with a paddle for 30 to 40 minutes, the product should be a red wine colour similar to the colour of a clay tile



4. Take it off the heat and let it cool
5. Strain it and store it in a dark place, where the sun's rays do not reach it

Dosage: 200 to 250 centimetres per 20 litres pump are used for vegetables and according to other experiences, up to one litre per 20 litres pump is applied for fruit trees and coffee.

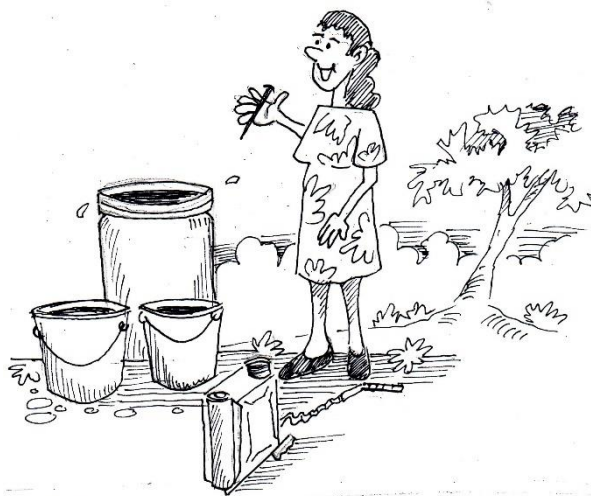
In legume and cucurbit crops it is not recommended to apply them during flowering.

Borderless Broth

This broth is used to correct nutritional deficiencies and to control diseases in crops.

Materials

- 6 oz hydrated lime
- 7 oz copper sulphate
- 20 litres of water
- 2 plastic buckets
- 1 new nail to measure acidity



Process

1. Measure the water and pour 10 litres into each bucket
2. Prepare or weigh lime and copper sulphate separately
3. In one bucket dissolve the lime and in the other the copper sulphate
4. Make the mixture by applying the copper sulphate on the lime and continue mixing with the paddle
5. Test the acidity by placing a clove in the solution for 2 minutes. If the clove turns black, add more lime until it does not change colour
6. The mixture should be a deep light blue colour



Dosage: 2 litres per 20 litres pump, for vegetables and 2 gallons per 4 gallon pump for fruit trees and coffee.

In tomatoes we have had excellent experience in the control of early blight and late blight.

Broth to control blight in vegetables and rust in coffee

- 2 ounces of copper sulphate
- 7 oz hydrated lime
- 1 litre of sulphur-calcium broth
- 20 litres of water



Procedure

1. Pour 10 litres of water into the bucket
2. Apply the lime, and then the copper sulphate
3. Add the sulphate- calcium broth
4. Stir until a good dissolution is achieved
5. Complete with 10 litres of water

Dosage: 3 litres per 4-gallon pump, for vegetables and at 50%, that is, half water and half product, for coffee and fruit trees

Visosa Broth

This product is used to control different diseases in various crops (fruit trees, basic grains, coffee and vegetables).

Materials

3.5 ounces of copper sulphate

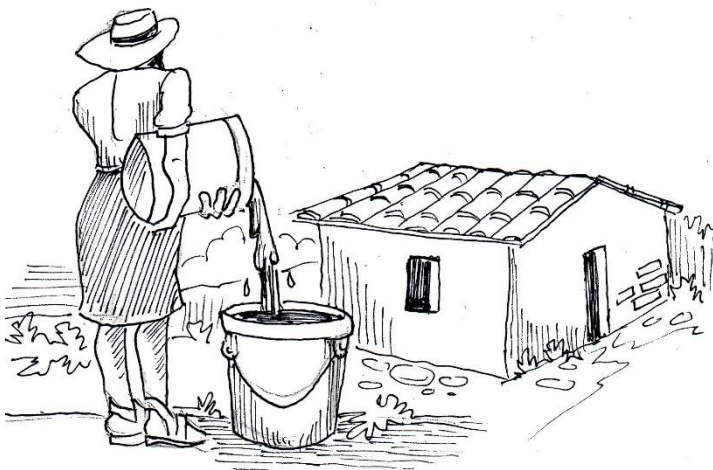
4 ounces of zinc sulphate

3 ounces of borax or boric acid

3 ounces of magnesium sulphate

20 litres of water

3.5 ounces hydrated lime



Process

1. Measure the water and pour 10 litres into each bucket
2. Weigh the salts separately
3. Dissolve the lime in a bucket
4. Dissolve the other salts in the other bucket

5. Make the mixture by applying the dissolved salts on the lime
6. Continue mixing for about 2 minutes
7. Test the acidity by placing a clove in the solution for 2 minutes. If the clove turns black, add more lime until it does not change colour

Dosage: 2 litres per 4-gallon pump are applied for vegetables, for fruit trees and coffee, 2 gallons per 4-gallon pump

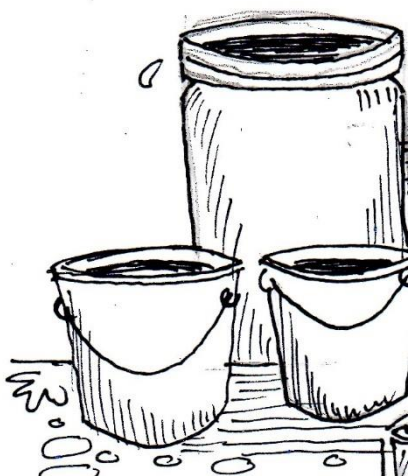
Sulphate-Calcium broth enriched with Zinc Sulphate

Materials

- 1 pound zinc sulphate
- 5 litres of sulphate-calcium broth

Preparation

1. Place 5 litres of sulphate-calcium broth in the plastic bucket
2. Add the pound of zinc sulphate
3. Stir until a homogeneous mixture is achieved



Application rate: 300 centimetres per 4-gallon pump for vegetables

750 cc per 4-gallon pump for fruit trees and coffee.

Ash Broth: It is a broth prepared from ash and soap and is used to control pests and diseases in different crops such as vegetables, fruit trees, coffee and basic grains.

Process:

1. Light the fire
2. Put the pot with the 20 litres of water to boil.
3. When the water is boiling, add the ash, the rock flour and then the soap
4. Start moving until the mixture begins to homogenize and from this moment, start counting 30 minutes, which is the time necessary for the product to be ready
5. Let it cool before straining it and storing it in any container



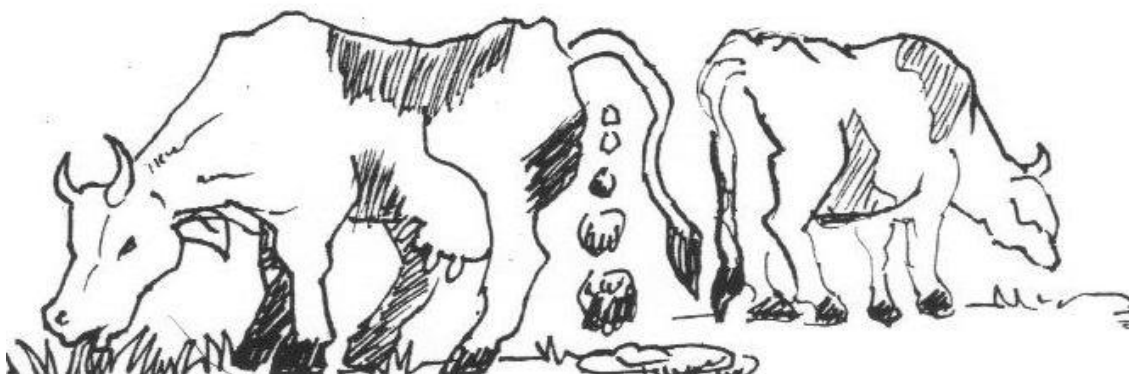
Dose:

2 litres are used per 20 litre- pump, according to our experience it is excellent in controlling whiteflies and aphids.

7. Preparation of biofertilizers

Biofertilizer based on cow manure and mineral salts

Organic fertilizers exist of several types, which each farmer can make their own formula according to the existing conditions in the area. This foliar fertilizer is a nutritional supplement.

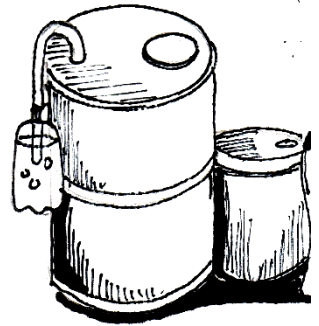


Procedure

- Deposit the manure in the barrel
- Dilute each of the sulphate (Manganese, Magnesium, Zinc, Potassium, Borax) in hot water at 60° degrees Celsius, when they are already dissolved, apply them to the plastic barrel

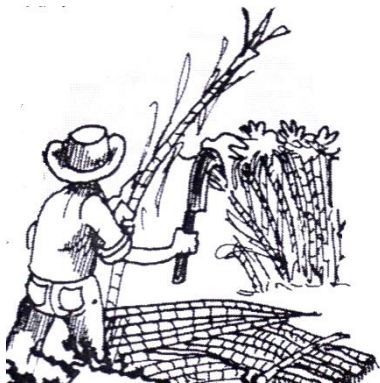


- Dilute the molasses in water (approximately 3 gallons), apply it to the plastic barrel
- Dilute the ash in water (approximately 3 gallons), apply it to the plastic barrel
- Dilute the dolomitic lime in water (approximately 3 gallons), apply it to the plastic barrel
- Apply the milk to the plastic barrel
- Add the 15 gallons of microorganisms
- Fill the plastic barrel with water
- Cover the barrel with its respective water seal
- Identify the products by putting a label on the barrel



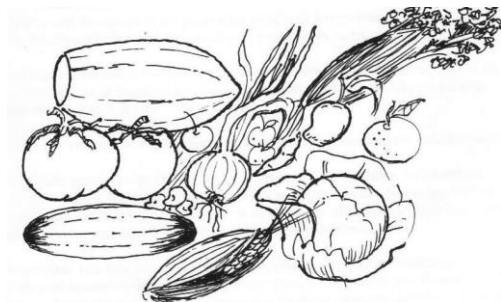
Maintenance

Insert a paddle into the barrel (with the mixture) and shake it for 5 minutes, twice a day (morning and afternoon), for 10 days, then wait without moving it for 25 days, a period in which the biofertilizer will be ready.



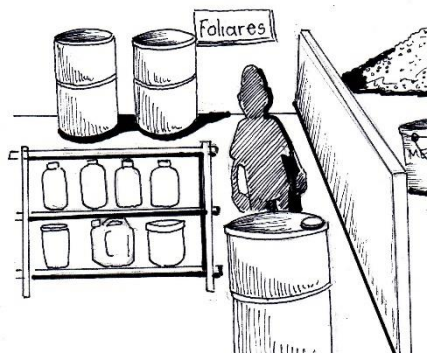
Dose

Vegetables, basic grains: 1 litre of bio fertilizer per 4-gallon pump. Apply it every 8 days, during the crop cycle.



Fruit trees, coffee, cane:

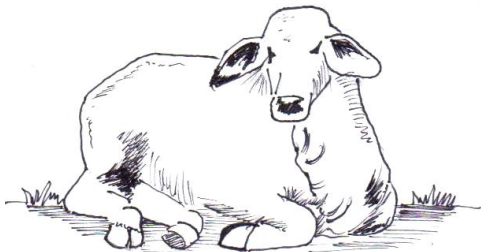
3 litres of bio fertilizer per 4-gallon pump, apply it 4 times a year (after harvest, after flowering, **fruit formation, before harvest**)



Ornamental: 2 litres of bio fertilizer per 4-gallon spray pump. Apply it every 15 days, depending on the state of the plantation

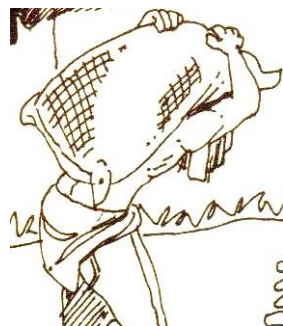
Storage: Stored in places where the sun's rays do not penetrate, in a cool place.

Biofertilizer based on cow manure without mineral salts



Biofertilizers are super liquid fertilizers with a lot of balanced energy and in mineral harmony, prepared from very fresh cow manure, dissolved in water and enriched with milk, molasses and ash, which has been placed to ferment for several days in plastic barrels, under an anaerobic system (without the presence of oxygen)

They serve to nourish, recover and reactivate the life of the soil, strengthen the fertility of plants and the health of animals, while at the same time they serve to stimulate the protection of crops against the attack of insects and diseases. On the other hand, they serve to replace highly soluble chemical fertilizers from the industry, which are very expensive and make farmers dependent, making them increasingly poorer.



They work mainly inside the plants, activating the strengthening of the nutritional balance as a defence mechanism, through organic acids, growth hormones, antibiotics, vitamins, minerals, enzymes and co-enzymes, carbohydrates, amino acids, and complex sugars, among others, present in the complexity of the biological, chemical, physical and energetic relationships established between plants and soil life.

Ferment based on Bocashi organic fertilizer

It works as a crop growth stimulant and improves the quality of the fruits. It is easy to prepare and is an alternative when it is not possible to obtain cow manure.

Materials

15 gallons of MM activated

2 gallons of milk or 15 litres of whey

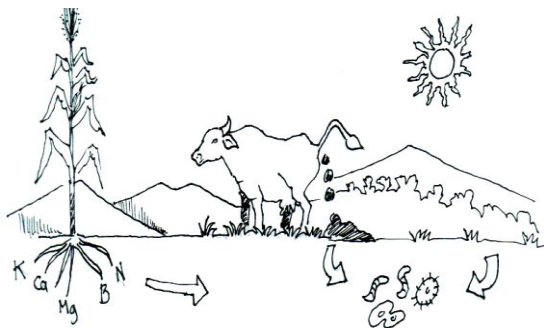
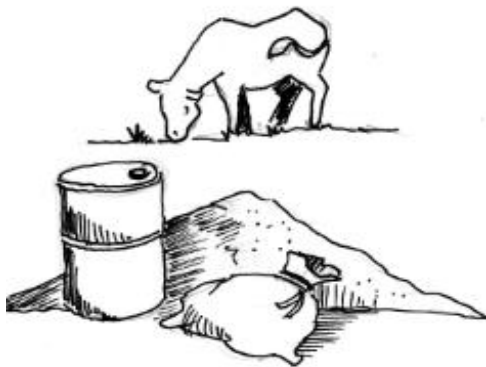
100 litres of clean water

5 pounds lime rock flour

1 piece of ½-inch clear hose and irrigation nipple

1 gallon of molasses or 10 litres of cane juice

20 pounds of bokashi





Procedure

1. Pour some water into the barrel
2. Deposit the molasses and dilute it with a trowel
3. Add the milk and shake
4. Apply the mm
5. Add the rock flour and stir with the paddle
6. Tie the 20 pounds of bocashi-type fertilizer in a piece of sack or cloth and place it in the barrel
7. Complete with water

Maintenance

It consists of moving once a day, for 2 minutes, for 10 days

Dose

It is recommended to apply 2 to 3 litres per 4-gallon pump, for any crop.

8. Preparation of repellent extracts

Repellent extract based on various plants known as M5

M5 is an extract made from organic raw materials and works as a repellent, fungicide and bactericide.

Materials

- 1 gallon of molasses
- 2 pounds lemon grass
- 3 pounds of dead flower
- 3 pounds of “chichicaste”
- 3 pounds of epacin
- 2 pounds of floripundia (angel’s trumpet, (and hallucinogen flower that grows on bushes)
- 2 pounds mint
- 2 pounds of rue
- 150 litres of water
- 5 pounds of hot chili
- 5 pounds of garlic



10 gallons of liquid MM

5 pounds of ginger

1 gallon of vinegar

Note: in relation to the plants that are added, all the plants found in the field that have good colour and look healthy, without pest or disease problems, can be used.

Preparation:

100 litres of water are placed in the barrel

Add the gallon of molasses and dissolve well with the water

Chop the garlic, onion, chili, and ginger well and place them inside the barrel

Add the gallon of vinegar

All the remaining plants are finely chopped and placed in the barrel

Add the 10 gallons of microorganisms

Complete with water

Seal well and let it rest

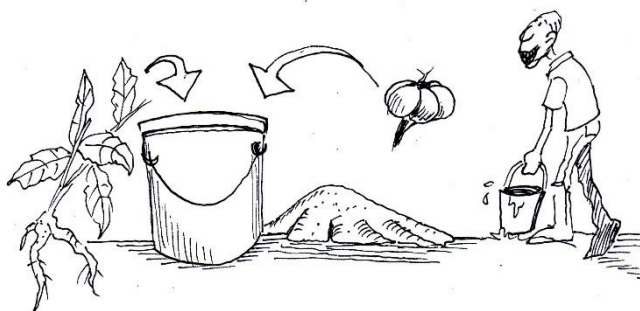


Maintenance consists of removing it twice a day for 5 days, letting it rest protected from the sun and rain for 25 days, during which time it is finished and available for use.

The recommended doses range from 250 to 350 cubic centimetres, applying it to the foliage of the plants, and trunking.

Garlic extract with Epacin

This product has effects against fungi, viruses, insects and bacteria



Materials

5 pounds epacin leaf and root

8 litres of MM liquids

Half a pound of rock flour

4 ounces of magnesium sulphate

10 heads of GARLIC

10 litres of water

1 plastic bucket



Process

1. Crush the garlic and “Epacina” well
2. Add the crushed materials to the tank with 5 litres of water
3. Add 8 litres of activated microorganisms
4. Fill with water and seal
5. Leave it to rest for 15 days, so that it is ready.

Dosage: half a litre per 4-gallon pump, it has been used to treat basic grain seeds to control soil pests with good results.

Garlic chili extract

Materials

- 5 pounds of hot chili
- 8 litres of liquid MM
- Half a pound of rock flour
- 4 ounces magnesium sulphate



1 pound of garlic

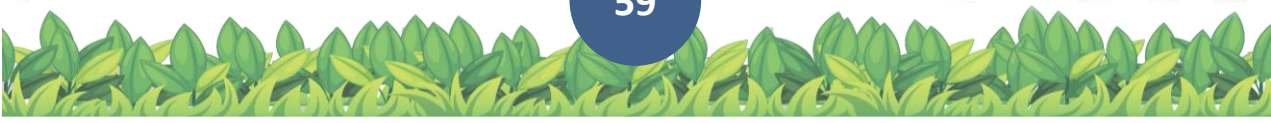
10 litres of water

1 plastic bucket with lid

Process

1. Crush the garlic and chili well
2. Add the crushed materials to the tank with 5 litres of water
3. Add the 8 litres of activated microorganisms
4. fill with water and seal
5. Leave it to rest for 10 days, so that it is ready.

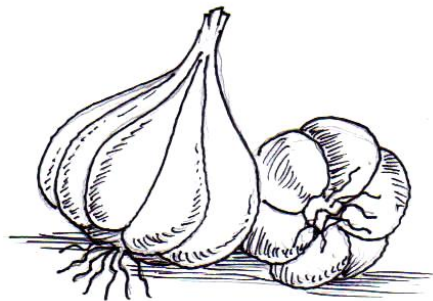
Dosage: 300 cubic centimetres per 4-gallon pump, controls whiteflies, aphids, aphids and turtle bugs.



Neem extract with garlic

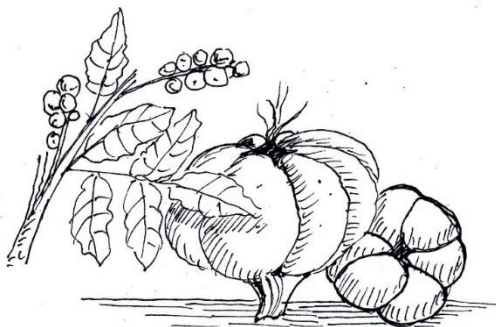
Materials

- 10 pounds of neem leaves
- 8 litres of liquid MM Half a pound of rock flour
- 4 ounces of magnesium sulphate
- 1 pound of garlic
- 10 litres of water
- 1 plastic bucket with lid



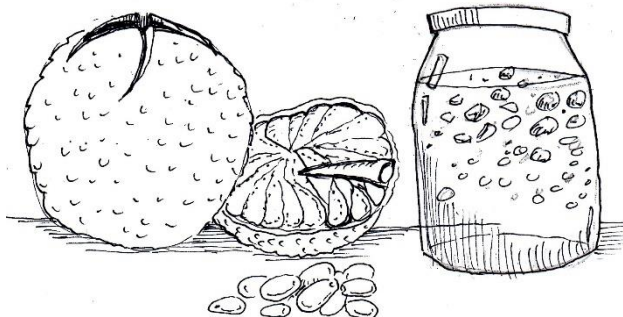
Process

1. Crush the garlic and Neem leaves well
2. Add the crushed materials to the tank with the 5 litres of water
3. Add the 8 litres of activated microorganisms
4. fill with water and seal
5. Leave it to rest for 15 days, so that the product is ready



Dosage: 1 litre per 4-gallon pump, it is excellent for controlling lepidopterans in all vegetable and basic grain crops.

Repellent based on Annona seed, for soil pests



Materials

- 1 plastic container and a straining blanket
- 1 pound of custard apple seeds
- 1 litre of alcohol

Procedure:

1. Grind 1 pound of custard apple seeds
2. Add 1 litre of alcohol to the ground custard apple seed
3. The alcohol should cover the ground seeds
4. Leave to rest for 15 days in a glass or plastic container
5. After 15 days, pass the solution through a sieve

Dosage: add $\frac{1}{2}$ litre of this solution in 15 litres of water to apply to the base of the plant with the pump or watering can.



Bibliography consulted

Añasco, A and Picado, J, 2005. Preparation of solid and liquid organic fertilizers. CEDECO. San Jose Costa Rica. 65 P.

Añasco, A and Picado, J, 2005. Control and prevention of insects and diseases. CEDECO. San Jose Costa Rica. 59 P.

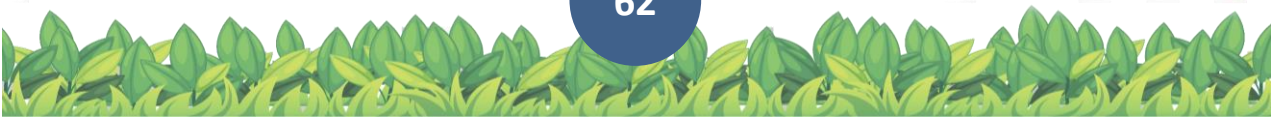
Bejarano Mendoza, C, A and Restrepo, J. 2002. Bocashi-type fermented fertilizers, mineral broths and biofertilizers. Santiago de Cali, Colombia 63 p

Jimenez. J and Añasco, ah .2005, Cover crops and green manures. CEDECO. San José, Costa Rica, 33 p.

Pacheco, F. 2003. Production, use and some technical aspects of bio ferments, organic fertilizers. Principles, applications and impact on agriculture. CIAT, UCR, CATIE, ACCS.

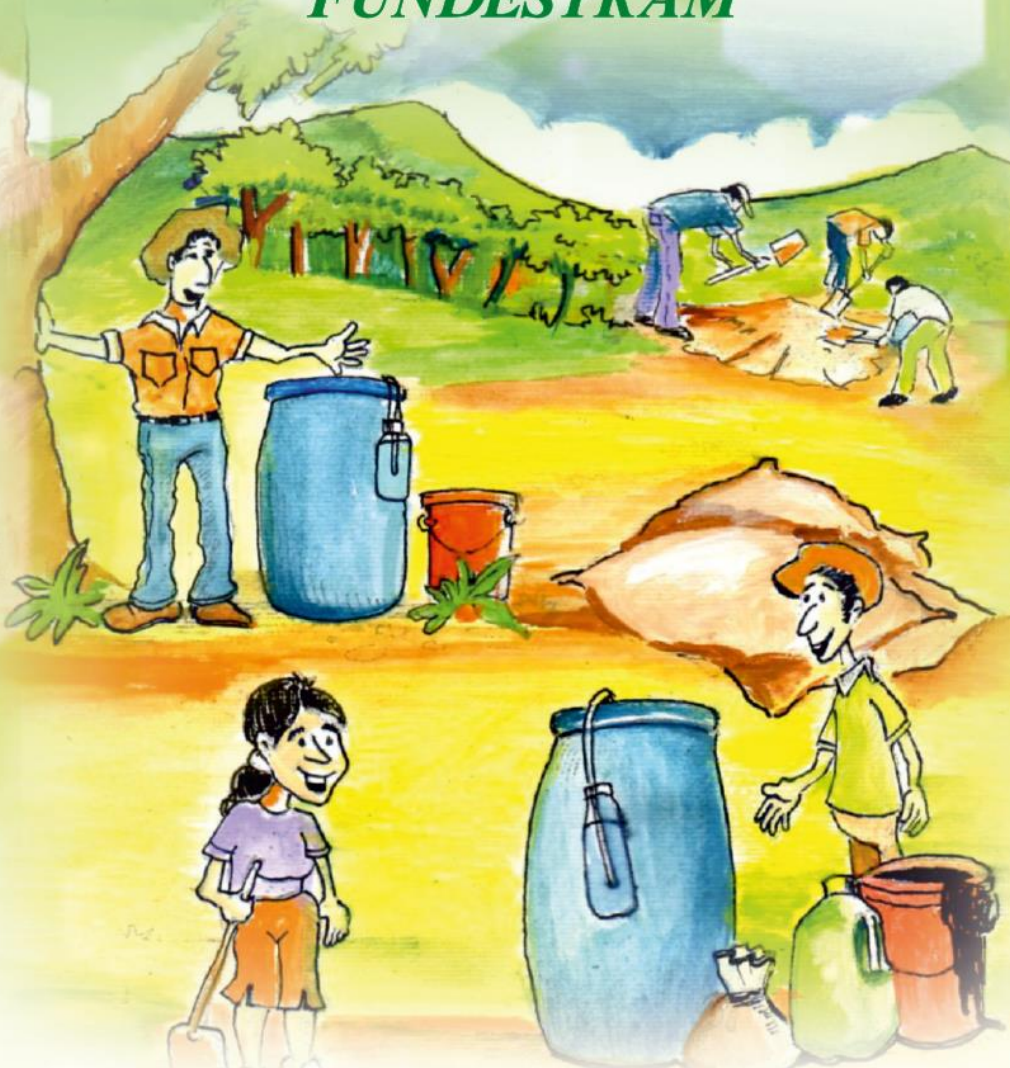
Restrepo, J. 1998. Soil, life and organic fertilizers, collection organic agriculture for beginners. IF MORE. Managua Nicaragua. 86 p.

Restrepo, J. 2002. Biofertilizer prepared and fermented from cow shit. Juquira Candiruú Foundation. Cali Colombia.105 p.





FUNDESYRAM



www.fundesyram.info



YouTube

