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ABC3

Massive reproduction of Microorganisms native to the forest

When man realizes how weak and insignificant he is in the face of the gigantic dimension of what life represents on the land of a forest, beyond reason, then he will be taking the qualitative step to understand Through observation, that life is a divinely mystical and indivisible act, which must be seen stripped of all arrogance, folly and academic justification.

In order to directly facilitate work in the countryside, and increasingly seek the independence of the purchase of how much bio-fuel they want to push peasants to eco-ecological and eco-ecclesiastical fashion, we present some ideas on how to make some bio-preparates with local resources And little economic investment; It is the local reproduction of the native microorganisms of the forest that are part of the skin or the natural living mantle that cover the forest surface ("capture of native microorganisms").

Friend reader, with the description of the next part of this Manual, it seems that there was a break in the logical sequence with which we came soaking through the description of fermented organic fertilizer type bocaishi. However, it is very opportune this apparent break to connect with other practices that are currently carried out with great success in the field, such as solid and fermented preparations from the capture of native microorganisms of the forest and fermented grass, enriched or not, With some minerals, ashes and fluor of rocks. Therefore, in many cases we recommend reading each recipe again and again before putting it into practice, since each element or technological instrument described or recommended here must be approached and worked with a systemic, dynamic and functional approach for each space And fraction of time, where they work with the proposal of organic agriculture. Forget it, however distant a recommendation is from Chapter 1 with a recommendation from Chapter 5, will always have a practical connection or at least something in common will identify them; *"The struggle to defend life independently of the market of inputs".*

Seed reproduction of native forest microorganisms

Ingredients	**Amounts**
• Wild forest mulch	30 to 40 kilo
• Semolina or bran the polishing of rice	80 kilo
• Molasses or sugarcane honey	2 to 4 gallons*
• Rock meal	2 kilo
• Plastic container of 200 liters capacity	

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NOTE:
To prepare a smaller quantity it is recommended to make the proportional calculations of the ingredients.

* The amount of molasses used to reproduce the seed of microorganisms varies from 2 to 4 gallons, because the quality of the molasses varies according to the thickness offered by the market; When it is very thick it is necessary to dissolve it with a little water, but with the care of not leaving it very watery. When preparing the mixture, the ideal is to test the moisture with the fist, which consists of taking a little of the preparation with the hand and tighten it; No moisture should come out in the middle of the fingers and when opening the hand should remain the shape of a sticky lump between the palm.

Source: Juan José Paniagua, Producer of Organic Vegetables and Jairo Restrepo Rivera, Tapezco, Costa Rica, August 2001. Organic Agriculture Workshop with emphasis on vegetables and organic coffee. UNED, State University at a Distance, San José, Costa Rica. Formulation redesigned from new experiences during the last five years of work with the use of rock meal, volcanic ash and ground tezontle, with successful results in the production of organic foods in Mexico.

What are microorganisms native to a forest?

They consist of an understanding of the geo biological memory that has evolved together in harmony with the natural forests and the climate of a given region. That is, the forests of a certain place are for microorganisms, just as the microorganisms of a certain region are for the forests, where the perfect linkage of the endosymbiosis to life. To each forest corresponds a biological memory with its own characteristics according to the ecological or climatic conditions of the place where they are established. Each microorganism has recorded in its memory the genetic history of the place and the distance where they could establish its evolution, development, reproduction, decomposition and death. In the mantle that covers the lower part of the forests (humid forest mulch) are present millions of diverse microorganisms that constantly prepare the anteroom for the superior life. There are several dozen functional groups of bacteria, actinomycetes, fungi, algae and protozoans that inhabit it in perfect harmony, to maintain The living miracle and the energy flow of life in each space and fraction of time.

How are the native microorganisms of a forest harvested?

A natural forest is visited, preferably it has not undergone any human intervention or at least Is very close to contaminated areas of poisoned crops; A part of the mulch or of the organic matter is taken wet that is deposited under the shrubs and trees of the place. Care should be taken not to scrape a large amount of soil and not collect green leaves. Also avoid the collection of very whole materials such as the leaves, branches and shrubs newly deposited on the surface of the forest land, due to the low humidity and very little microbial decomposition activity. Preference should be given to the collection of well-inoculated materials, which are white, creamy, orange, brown or brown, and at the same time give off a pleasant scent of moist scented forest. Life on the ground, we may dare to say that it is more what we have destroyed than what we have come to know.

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What is the use of the native microorganisms we harvest in the forest mulch?

To biologically enrich the bonsai fertilizer, to activate and recover soil life through fermented fertiliser preparations, to accelerate processes in the decomposition of organic matter and strengthen the health of plants, animals and humans. How is the reproduction of the native microorganisms harvested in the forest prepared?

- **On a clean floor or in the land that is cultivated,**
- **30 to 40 Kilos of the forest mulch and mixed dry with**
- **80 kilos of bran or semolina or rice paddy and**
- **2 kilos of rock meal, until a homogeneous mixture;**
- **Then add 2 or 4 gallons of molasses dissolved with a little water and stir it with a shovel or knead directly with your hands until you achieve a uniform mixture with little moisture and fruity smell very pleasant.**

Finally, in a plastic container or drum with a capacity of 100 to 200 liters, the preparation is gradually deposited in layers and tightened with a ram, in order to extract the oxygen from the mixture to the maximum; It is recommended not to completely fill the container, more or less leave the measurement of 10 to 15 centimeters free of volume.
Finally, the container is sealed tightly, leaving it in the shade and at rest for 30 days.
(Figure 11)

With the seed of the microorganisms native to a forest, refound the life that has been destroyed on cultivated land and we feed the hope of approaching the reconstruction of a biologically indivisible tissue and indispensable for a life healthy.

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Figura 11: Preparación de la reproducción de los microorganismos nativos cosechados en el bosque

How is the reproduction preparation of the native microorganisms harvested in the forest used?

After the 30-day deadline, the replicate preparation of the native micro-organisms that harvested in the forest, ready to be used for the following forms as:

Applications in solid
In the preparation of organic fertilizers, they can use 8 to 10 kilos per ton of fertilizer bocashi or compost. The application of prepared microorganisms should be made at the end of the process of fermentation of the bocashi composting; that is, the bocashi fertilizer or the compost that you want to enrich with that product, must be at an ambient temperature, so as not to cover the biological activity of the bio-preparation.

However, in order to make the response of the preparation more effective in organic fertilizers and compost, it is recommended to enrich them, preferably when these materials are ready to be applied in the lands that are to be cultivated.

On the other hand, the solid bio-preparation of the native microorganisms of the forest that multiplies in the container, has also been used with great success in animal feeding in the form of pre and probiotic.

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A series of experiences are being developed and adjusted with the following quantities supplied daily by species: Adult bovine , From 200 to 300 grams per animal, adult goats and sheep from 30 to 50 grams per animal, hens and turkeys from 10 to 15 grams per animal, rabbits from 8 to 12 grams per animal; quail 5 grams per bird. Pig fattening is recommended from 30 to 50 grams per animal and since it is very common to give these animals some kitchen waste, then we recommend to mix daily the portion of the activated micro organisms in the waste, about three or four hours before supplying them. Do not adhere to these recommendations, modify and experiment them according to local conditions and adjust them to fit your creativity and your pocket. (Figure 12)

Application in liquid form of the reproduction of the native microorganisms of the forest.
To perform this application it is necessary to reactivate a certain solid portion of the native microorganisms in a liquid medium and to undergo an anaerobic fermentation process for a period of 30 days as a simple or Super Slim type bio-fertiliser. (Figure 13)

FIGURA 12: Utilización de microorganismos nativos del bosque en forma sólida, con 30 días de fermentación en la alimentación animal

Figure 12: Use of native microorganisms in the solid forest with 30 days of fermentation in the animal feed.

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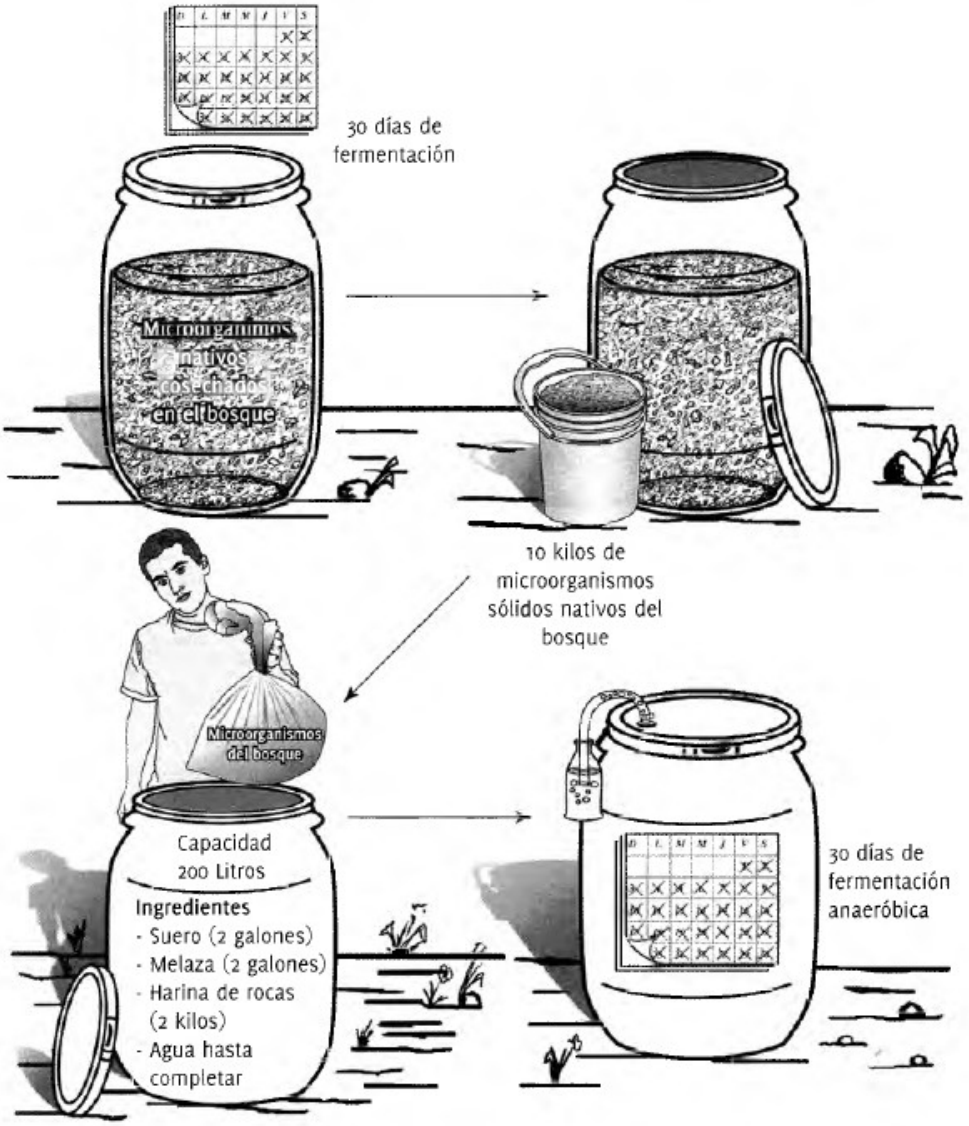
FIGURA 13: Activación de la reproducción de los microorganismos nativos del bosque en forma líquida



Activación de la reproducción de los microorganismos nativos del bosque en la forma de biofertilizante sencillo o Súper Magro

Ingredientes:

- 10 kilos de microorganismos.
- 2 galones de melaza de caña.
- 2 galones de suero de leche.
- 1 galón de EM territorial nativo activado.
- 100 litros de agua no tratada.

Tiempo de fermentación anaeróbica 30 días.

Preparación:

Una bolsa de tela de algodón o costal de fibra vegetal, para depositar los 10 kilos de microorganismos nativos que se reactivarán dentro de un recipiente o tambor plástico de 200 litros de capacidad, con tapa y aro metálico para el sellado hermético y fermentación anaeróbica por 30 días, tipo biofertilizante sencillo o Súper Magro.

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Activation of the reproduction of the native microorganisms of the forest in the form of a simple bio-fertilizer or Super Magro

Ingredients:

- 10 kilos of microorganisms.
- 2 gallons of cane molasses.
- 2 gallons of buttermilk.
- 1 gallon of native territorial EM activated.
- 100 liters of untreated water.

"Anaerobic fermentation time 30 days.

Preparation:
A bag of cotton cloth or bag of vegetable fiber, to deposit the 10 kilos of native microorganisms that will be reactivated inside a plastic container or drum of 200 liters capacity, with lid and metal ring for the hermetic sealing and anaerobic fermentation for 30 days, type simple bio-fertilizer or **Super Magro**

Activation of the native microorganisms of the forest to produce native, local or territorial EM

Ingredients	Amount
• Microorganisms	5 kilos
• Sugar cane molasses.	1 gallon
• Untreated water.	175 liters

Preparation:
All the ingredients are mixed in a plastic container of 200 liters of capacity where the microorganisms we put them in suspension, in a bag of cotton or fiber, type tea and **allowed to ferment anaerobically for 5 to 10 days**, in the style of simple bio-fertilizer or **Super Magro**. This preparation is a very native species of native forest or territorial EM, which does not depend on The most effective microorganisms for the peasant are those that he can prepare from their own local biological resources, and that they can easily find in a forest close to their crop. This species of territorial or native EM can be added directly to the volume of water to be used for the preparation of bocashi fermented organic fertilizer; It is recommended to use up to 200 liters per 2 to 3 tons of fertilizer to be prepared. On the other hand, when crops undergo very drastic attacks of some fungal and bacterial diseases, it is recommended to apply the territorial or native EM of the forest in the pure form, that is, without mixing it with water. In all crops where foliar fertilizers are applied, the local or native forest micro-organisms EM can be used at 2% in the final mix of any one of the foliar preparations.

On the other hand, we can also affirm in a very optimistic way, that there is still more that we infinitely do not know about what remains of the micro-life on earth, compared to the little we know about it,

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Another very practical way to work with bioferments, both solid and liquid, is to work with the production of silage grass.

Production of grass silage with native microorganisms for the treatment of prairies

Ingredients	***Amount***
Pasture treated	* 20 kilo
Semollna or rice bran or pulp	80 kilo
Molasses or sugarcane honey	2 to 4 gallons
** Native or territorial MS	1 gallon
Rock meal	2 kilo

*The grass treated with microorganisms should be harvested preferably at the point where it is found to make a silo for livestock and should be well chopped.

**The amount of molasses used to reproduce the silage grass fermentation varies from 2 to 4 gallons. Because the quality of the same varies according to the thickness offered by the market; The most important thing is to do the test for the control of the final moisture of the preparation, it should be left with an appearance of a loose dough and a pleasant smell in the style of bread fermented with fruits.

***Preparation*:**
The way in which the production of silage is prepared and applied is identical to how the preparation of the reproduction of the native microorganisms harvested in the forest is used.

Recommendations
Application of the native microorganisms of the forest, activated by the processes of liquid fermentation: All bio-ferments Activated in a liquid form, which originate from the capture and reproduction of native microorganisms of the forest, can be applied in any crop or agricultural space, since the activated fermentations from the silage grass are viable and more efficient for the treatment of prairies And pastures in the production of milk and beef. For the application of activated bio-ferments, in many cases, very low or very high doses can be experienced, which can vary between 2 and 7 liters of the fermented, dissolved in each 100 liters of water.

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Preferably the application is foliar. In some cases, liquid bio-preparations can be applied directly to the worked earth, but ideally it is under some green cover or that has a good percentage or content of organic matter, in order to make it more efficient. Their retention, to avoid the leaching and to obtain a better response of the crops to the product. **When mixing the chosen dose of the product with the 100 liters of water, it is recommended to add 2 liters of molasses, in order to stimulate its adhesion and strengthen the bio-prepared energy response in plants. The best times to apply the product are in the early hours of the morning or in the afternoon, when the sun is close to hiding.**

Application: Other recommendations for the application of activated bio-rhythms: Every day new forms and places where to apply the different preparations based on ferments, among them we highlight the applications that have been made in the treatment of animal facilities, in order to make a good collection of manures and maximize the quality of the same; Stables, sheep folds. Hens and rabbits among other constructions can be treated simultaneously with a mixture of rock meal and a spray of dissolved bio-ferences at a concentration between 3% and 5%. Applications of rock meal based on phosphorus, oak, basalt, serpentine, some volcanic ash, sedimentary clays, zeolites, and other silicate-based materials in the proportions of 1 to 2 kilograms per square meter of floor An excellent complementary tool to incorporate and enrich the manures with a series of other elements of nutritional importance for the crops. On the other hand, the bad odors that emerge in these installations, due to the excess of humidity and evaporation of the nitrogen in the form of ammonia, are mutated of a miraculous form for the benefit of the health of the animals and the people who work In these facilities. In the specific case of laying and fattening birds, the application of rock litter to manure harvesting largely eliminates disease and animal mortality, as the concentration of ammonia in the nursery environment causes damage In the respiratory tract, weight loss and decrease in the production of eggs.

It is also recommended the application of bio ferments in all processes where all types of organic materials used for the manufacture of large volumes of aboneras or composites are milled or ground, As the bioferments were to maximize and diversify the biological inoculation of the materials, accelerate the decomposition of them and improve the final quality of composting. Another ideal recommendation is the application of bioferments, both in fresh pastures and dry fodder, At the time of serving them to the animals in the dining rooms.

Finally, when cattle are raised in the form of free pasture with rooting of pastures, bio-ferments are recommended in the dosage between 2% and 4%, applying directly on the biomass or pasture before the cattle enter to consume it and after He leaves the paddock to let him recover; It is also advisable to make a second application of the bio-fermentation in the course of the recovery, in order to rehabilitate again the nutraceutical quality of the fodder for the animals.

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Activation of the native microorganisms of the forest enriched with minerals and anaerobic fermentation in the style of the biofertilizer Super Magro

Ingredients	Quantity
• Tamper plastic 200 liter capacity	1
• Microorganisms native to the forest.	15 kilos
• Milk Whey	2 gallons
• Cane molasses	2 gallons
• Native EM or activated territory	2 gallons
• Sulfa to dezinc *	1 kilo
• Magnesium sulfate *	1 kilo
• Sulfa to iron *	300 grams
• Potassium sulfate *	2 kilos
• Manganese oxide *	300 grams
• Borax *	1 kilo
• Sodium molybdate * *	100 grams
• Cobalt chloride * *	50 grams
• Phosphoric rock or phosphites	3 Kilo
• Water up to fill the volume of the drum 175 liters of its total capacity.	

Preparation
A bag of cotton cloth or bag , To deposit the 15 kilos of native microorganisms that will be reactivated inside a plastic container or drum of 200 liters capacity, in which the other ingredients of the mixture are in liquid form. It is necessary to seal the container with the cap and the metal ring tightly, so that the anaerobic fermentation process can be successfully carried out for a period of 30 days, as a super-magro bio fertilizer.

All amounts of ingredients based on sulfates, rustof manganese and borax, at times can be added together to the fermentation of the native microorganisms of the forest that are being activated in liquid medium in the plastic container; with care to do it up to day 4 after having started the Super Magro type anaerobic fermentation. That is, once the first day is done, mixing all the basic ingredients, such as are: the 15 kilos of the native microorganisms, the 2 gallons of molasses, the 2 gallons of serum, 2 gallons of native or territorial MS and water, are left ferment anaerobically for 4 days and then the container is opened to add the minerals as a whole, and before proceeding to cover again the container, it is recommended to apply again molasses in the proportion of one gallon for the whole mix.

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** On the other hand, some elements can be applied in the activation of the native microorganisms of the forest, for the specific treatment of some crops, in which they want to give priority to some or some of them; For example, for the cultivation of alfalfa and other legumes, besides enriching the bio preparates with the other sulphates, we can also emphasize other elements such as phosphite, boron, molybdenum and cobalt. In many cases, the ideal is to know the demand of each crop at each moment of the physiological development of the plant, or at a minimum, to know what is the most appropriate moment in the development of the plant to make such application or recommendation. Finally, with the aim of being more practical with the works directly in the field, we recommend to the extent of the possibilities eco To make the enrichment of the bio preparates with each element in separate containers, and thus to have them available and to immediately apply them according to the closest moment of the need of the crop; With this management, we would often avoid unnecessary applications of some elements that the crop would not demand in those stages of its development. The concentration of the applications of this bio preparate are foliar and can vary between 3% and 10% for all crops; Provided that said bioprepared is to be applied directly to the cultivated soil, it should be rich in organic matter and the concentrations may be a mixture of 10% to 50% of the biopreparate, with 90% to 50% water.

All the mixtures of the activation and the anaerobic fermentations of the native microorganisms of the forest can be done without adding sulphates to it. Both the application of phosphites, as well as the flour of rocks and ashes, or the proportional mixture between them, are sufficient for the achievement of satisfactory results within the organic agriculture in peasant hands. Finally, because of the availability of high volumes of whey in some cattle regions, we can in several cases substitute volumes of water for volumes of whey in the preparation of the activation of bioferments based on microorganisms native to the forest. Successions and successful formulations in America Latina

With successful results in the hands of farmers in Latin America
several decades ago develop various practical experiences with the preparation of fermented bio fertilizers based on cow shit, which exceed more than 400 formulations currently. Based on the principles of the **Super Magro** biopreparation, of Brazilian origin, again the creative spirit of the peasants arises in this opportunity by the reproduction of native microorganisms of forest, enriched with flour of rocks and other ingredients within reach of his pocket, with the The purpose of getting to the step to the different socio-economic crises that constantly overwhelm them and expel them from the campo.

Entre the most successful formulations that farmers are preparing from anaerobic fermentation, with the activation of native microorganisms of the forest,

ABC3

Bio-roca

Ingredients	Amount
Multi mix of rock and phosphite flour	8 kilos
whey (fermented milk)	50 liters
Native actives of the forest activated	10 kilos
Cane molasses	2 gallons
Native or territorial MS	1 gallon

Water to complete a volume of 180 liters in a container of 200 liters of capacity.

Preparation

Prepare in a 200 liter plastic drum or container in which the 50 liters of whey are mixed with 10 kilos of activated native micro organisms and 1 gallon of cane molasses dissolved in 50 liters of water; Then cover the mixture in an anaerobic super lean type and let it rest for 4 days.

After the 4 days of fermentation, open the container by adding the 8 kilos of the multi-mix of rock meal, the other gallon of molasses Of cane dissolved in 20 liters of water and finally the gallon of native or territorial EM. It completes the volume of the drum with water, being careful to leave a space of 15 centimeters between the lid and the liquid; The container is closed with the anaerobic Super Slim type and left in final rest for 15 to 30 days, and then begin its applications in the crops.

How much does it apply?

Regularly in the majority of cases, applications that can vary between 2% and 3% are recommended; that is, they are mixed in 100 liters of water of 2 to 3 litres of the bio-preparation. This product is recommended for all crops. In the case of growing potatoes, avocados, mango, legumes and vegetables such as cauliflower and broccoli, higher dosages can be experienced.

ABC3

Bio-fire (Phosphorus)

Ingredients	Quantity
• Phosphoric rock	12 kilos
• whey	50 liters
• Activated native forest microorganisms,	10 kilos
• Cane molasses	2 gallons
• Native or territorial EM	1 gallon

- Water up to a volume of 180 liters in a container of 200 liters capacity.

Preparation It is prepared in a drum or plastic container of 200 liters capacity, in which the 50 liters of with 10 kilos of native forest microorganisms activated and 1 gallon of cane molasses dissolved in 50 liters of water; Then cover the mixture in an anaerobic super lean type and leave it to stand for 4 days.
After the 4 days of fermentation, open the container by adding the 12 kilos of phosphoric rock, the other gallon of cane molasses dissolved in 20 Liters of water and finally the gallon of native or territorial EM. It completes the volume of the drum with water, being careful to leave a space of 15 centimeters between the lid and the liquid; The container is closed with the anaerobic Super Thin type and left in final rest for 15 to 30 days, and then begin its applications in the crops.

How much is applied?
Regularly in the majority of cases, applications that can vary between 2% and 3% are recommended; that is, they are mixed in 100 liters of water of 2 to 3 liters of the bio preparation. This product is recommended for all crops. For the case of crops rich in associations of microorganisms and abundant organic matter at ground level, as is the case of many leguminous species, the applications of this product on the surface of the planet present excellent results, mainly when they are made crops or rotations.

ABC3

Bio-filling (Potassium)

Ingredients	Quantity
• Firewood fireplace ash …….	8 kilo
• whey …….	50 liters
• Activated native forest microorganisms.	10 kilo
• Cane molasses ……..	2 gallons
• E M native or territorial …….. .	1 gallon
• Water up to a volume of 180 liters in a container of 200 liters capacity container.	

Preparation

It is prepared in a drum or plastic container of 200 liters capacity, in which the 50 liters of whey are mixed with the 10 kilos of activated native microorganisms of the forest and 1 gallon of Cane molasses dissolved in 50 liters of water; Then cover the mixture in an anaerobic super lean type and leave it to rest for 4 days.

After the 4 days of fermentation, the container is opened adding the 8 kilos of firewood ash, the other gallon of cane molasses Dissolved in 20 liters of water and finally the gallon of native or territorial EM. It completes the volume of the drum with water, being careful to leave a space of 15 centimeters between the lid and the liquid; The container is closed with the anaerobic mixture Super Thin type and left in final rest for 15 to 30 days, and then begin its applications in the crops.

How much is applied?

Usually in most cases applications are recommended that Can range from 2% to 3%; That is, they are mixed in 100 liters of water from 2 to 3 liters of bio prepared. This product is recommended for all crops. For the cultivation of potato, banana, banana and some roots, larger dosages can be experienced, ranging from 6% to 8%.

ABC3

Bio-lime (Broth)

Ingredients	Quantity
• Calcium carbonate	6 kilo
• whey ....,	50 liters
• Activated native forest microorganisms.	10 kilograms
• cane molasses	2 gallons
• Native or territorial EM	1 gallon
• * Water to fill a volume of 180 liters in a container of 200 liters capacity.	

Preparation

It is prepared in a drum or container Of plastic of 200 liters capacity, in which the 50 liters of whey are mixed with the 10 kilos of native microorganisms of the forest activated and 1 gallon of cane molasses dissolved in 50 liters of water; Then the mixture is covered in an anaerobic form Super Lean and left to rest for 4 days.

After the 4 days of fermentation, the container is opened by adding the 6 kilos of calcium carbonate, the other gallon of cane molasses dissolved in 20 liters of water and finally the gallon of native or territorial EM. It completes the volume of the drum with water, being careful to leave a space of 15 centimeters between the lid and the liquid; The container is closed with the anaerobic mixture Super Thin type and left in final rest for 15 to 30 days, and then begin its applications in the crops.

How much is applied?

Usually in most cases applications are recommended that can range from 2% to 3%; That is, they are mixed in 100 liters of water from 2 to 3 liters of bio prepared. This product is recommended for all crops. In the case of the treatment and prevention of the disease known as "black culture" and mainly affecting tomato cultivation, higher doses are recommended, which may vary between 4% and 6%. On the other hand, experiments carried out with calcium chloride in substitution of the calcium carbonate of the original formulation have yielded good results, mainly in the tomato, peppers and potato cultures.

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Bio-green (Magnesium)

Ingredients	Quantity
• Magnesium sulphate	4 kilos
• whey.....	50 liters
• Activated native forest microorganisms.	10 kilo
• Cane molasses	2 gallons
• Native or territorial EM .....,.	1 gallon
• Water up to a volume of 180 liters in a container of 200 liters capacity.	

Preparation

It is prepared in a drum or plastic container of 200 liters capacity, in which the 50 Liters of whey with 10 kilos of activated native microorganisms and 1 gallon of cane molasses dissolved in 50 liters of water; Then the mixture is super auropically Super Thin type and left to stand for 4 days.

After the 4 days of fermentation, the container is opened by adding the 4 kilos of magnesium sulfate, the other gallon of cane molasses dissolved in 20 liters of water and finally the gallon of native or territorial EM. It completes the volume of the drum with water, being careful to leave a space of 15 centimeters between the lid and the liquid; The container is closed with the anaerobic mixture Super Thin type and left in final rest for 15 to 30 days, and then begin its applications in the crops.

How much is applied?

Regularly in most cases applications are recommended that can vary between 2% and 3%; that is, they are mixed in 100 liters of water of 2 to 3 liters of the bio preparation. This product is recommended for all crops.

In very humid climates and of great precipitations, of the same form that many elements are easily leached, the magnesium does not escape to that phenomenon; This is why it is very important to be careful to cover this need or deficiency in crops, with doses that can vary between 4% and 6%.

Bio-scrap (Iron)

Ingredients	Quantity
• Pieces of oxidized iron	10 kilo
• whey	50 liters
• Native forest microorganisms activated.	10 kilo
• Cane molasses	2 gallons
• Native or territorial EM	1 gallon

Water to fill a volume of 180 liters in a container of 200 liters capacity.

Preparation

It is prepared in a drum or plastic container of 200 liters capacity, in which The 50 liters of whey is mixed with 10 kilos of activated native microorganisms and 1 gallon of cane molasses dissolved in 50 liters of water; Then cover the mixture in an anaerobic super lean type and leave it to stand for 4 days.

After the 4 days of fermentation, the container is opened by adding the 10 kilos of oxidized pieces of iron, the other gallon of Molasses of cane dissolved in 20 liters of water and finally the gallon of native or territorial EM. It completes the volume of the drum with water, being careful to leave a space of 15 centimeters between the lid and the liquid;

The container is closed with the anaerobic mixture Super Thin type and left in final rest for 15 to 30 days, and then begin its applications in the crops.

How much is applied?

Usually in most cases applications are recommended that Can range from 2% to 3%; That is, they are mixed in 100 liters of water from 2 to 3 liters of bio prepared. This product is recommended for all crops.

Recommendation: This preparation is recommended for crops that are mainly established in land of alkaline pH.

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Bio-glass (Silicon)

Ingredients	Quantity
• Volcanic ash or red tezontle.	12 kilo
• whey	50 liters
• Activated native forest microorganisms.	10 kilo
• Cane molasses	2 gallons
• Native or territorial EM. .	1 gallon
• Water up to a volume of 180 liters in a container of 200 liters capacity.	

Preparation
It is prepared in a drum or plastic container of 200 liters capacity, where the 50 liters of whey are mixed with the 10 Kilos of activated native microorganisms of the forest and 1 gallon of cane molasses dissolved in 50 liters of water, Then cover the mixture in an anaerobic super lean type and leave it to stand for 4 days.
After 4 days of fermentation, it opens The container adding the 12 kilos of volcanic ash, the other gallon of molasses of cane dissolved in 20 liters of water and finally the gal Of native or territorial MS. It completes the volume of the drum with water, being careful to leave a space of 15 centimeters between the lid and the liquid; The container is closed with the anaerobic Super Thin type and left in final rest for 15 to 30 days, and then begin its applications in the crops.

How much is applied?
Can vary between 2 and 3%; That is, they are mixed in 100 liters of water from 2 to 3 liters of bio prepared. This product is recommended for all crops.

Recommendation:
It has the purpose of strengthening the immune system of plants, while making them more resistant against drought, increases the efficiency of photosynthesis by concentrate the solar rays as a magnifying glass does.

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Bio-fossil (Diatoms).

Ingredients	Quantity
• Dust diatoms	10 kilo
• whey	50 liters
• Microorganisms native to the forest activated	10 kilos
• Molasses cane	2 gallons
• Native or territorial EM	1 gallon
• Water up to a volume of 180 liters in a container of 200 liters capacity.	

Preparation

It is prepared in A 200-liter plastic drum or vessel in which the 50 liters of whey is mixed with the 10 kilos of activated native forest microorganisms and 1 gallon of cane molasses dissolved in 50 liters of water; Then cover the mixture in an anaerobic super lean type and leave it to stand for 4 days.

After the 4 days of fermentation, open the container by adding 10 kilos of diatom powder, the other gallon of cane molasses dissolved in 20 liters of water and finally the gallon of native or territorial EM. It completes the volume of the drum with water, being careful to leave a space of 15 centimeters between the lid and the liquid; The container is closed with the anaerobic Super Thin type and left in final rest for 15 to 30 days, after which to begin its applications in the cultures.

How much does it apply?

In most cases, applications that can vary between 2% and 3% are recommended; that is, they are mixed in 100 liters of water of 2 to 3 liters of the bio preparation. This product is recommended for all crops.

ABC3

Bio-charcoal (Leonardite)

Ingredients	Quantity
• Leonardite Hydrolate ....,.	2 liters
• whey	50 liters
• Activated native forest microorganisms,	10 kilos
• Molasses cane	2 gallons
• Native or territorial EM	1 gallon
• Water up to a volume of 180 liters in a 200 liter capacity container.	

Preparation

It is prepared in a drum or plastic container of 200 liters capacity, in which the 50 liters of whey with 10 kilos of native forest microorganisms activated and 1 gallon of cane molasses dissolved in 50 liters of water; Then cover the mixture in an anaerobic super lean type and leave it to stand for 4 days.

After the 4 days of fermentation, the container is opened adding the 2 kilos of leonardite powder, the other gallon of cane molasses dissolved in 20 Liters of water and finally the gallon of native or territorial EM. It completes the volume of the drum with water, being careful to leave a space of 15 centimeters between the lid and the liquid; The container is closed with the anaerobic mixture Super Thin type and left in final rest for 15 to 30 days, and then begin its applications in the crops.

How much is applied?

Usually in most cases applications are recommended that can range from 2% to 3%; That is, they are mixed in 100 liters of water of 2 to 3 liters of the bio preparate of leonardite hydrolate. This product is recommended for all crops. It is very appropriate to make the storage of the organic materials destined for the feeding of earthworms and to enrich those that are deposited on the earth for their recovery, especially the materials that remain of the post-harvest in the form of stubble or cover. Mulch type or padded

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ABC3

In some preparations we can make the combination of two or more elements in order to meet some needs or multiple deficiencies in some crops; On the other hand, when one has the certainty of which elements are indispensable for the cultivation, then we can prepare them together.

Results of the application of rock meal by the polarity inversion system magnetic Fernando Arango, Pachita Center, Jamundí, Valle del Cauca, Colombia.

Bio-stove (Rock and potassium)

Ingredients	Quantity
• Multi mixtures of rock flour	4 kilos
• Ashes from a wood-burning stove	8 kilo
• whey	50 liters
• Forest native microorganisms activated	10 kilos
• cane molasses	2 gallons
• Native or territorial EM	1 gallon
• Water up to a volume of 180 liters in a 200 liter capacity container.	

Preparation
It is prepared in a drum or plastic container of 200 liters capacity, in which the 50 liters of whey with 10 kilos of native forest microorganisms activated and 1 gallon of cane molasses dissolved in 50 liters of water; Then cover the mixture in an anaerobic super lean type and leave it to stand for 4 days.

After the 4 days of fermentation, the container is opened by adding the 4 kilos of the multi meal of rock flour, the 8 kilos of ashes Wood stove and the other gallon of cane molasses dissolved in 20 liters of water and finally the gallon of native or territorial EM. It completes the volume of the drum with water, being careful to leave a space of 15 centimeters between the lid and the liquid; The container is closed with the anaerobic Super Thin type and left in final rest for 15 to 30 days, and then begin its applications in the crops.

How much is applied?
Can vary between 2% and 3% with emphasis on the filling of coffee beans; That is, they are mixed in 100 liters of water from 2 to 3 liters of bio-prepared. This product is recommended for all crops. For the cultivation of potato, cassava, avocado, mango, legumes and vegetables such as cauliflower and broccoli, larger dosages can be experimented, mainly for the filling of fruits in the banana and banana crops.

ABC3

Preparation of multi-mixes from the Minerals bioactivated with native microorganisms of the forest

Peasants, with bio power in their hands, have been massively disseminating nutritional multime- diaries for different crops according to needs or deficiencies, among which vegetable crops are particularly noteworthy. These multi-mixes are made, as the minerals have passed individually through the process of 15 to 30 days of the fermentation with the native microorganisms of the activated cocoa.

On the other hand, the different difficulties are very understandable One of them being the majority of peasants in Latin America, because of the plunder of their economies and the lack or no interest of the State to help them remain in their plots or territories without being enslaved to industrial agriculture, predatory and dehumanized. In this situation, we observed the impossibility of many oral communities because they could not have access to many of the inputs recommended here, such as mainly sulphates; Nevertheless, the constant exercise of the creativity of the most humble people of the countryside, makes them more autonomous to develop their own bio preparados from the resources closest to their plots and limited economy. For this, increasingly, they are using the ashes of their stoves very successfully of firewood, mixing them with some powders or carina of rocks of crushed companies that they are very close to their plots, in exchange of some sulfates that are not within your reach.

Recommendations

Recommendations for the application of the native microorganisms of the forest, activated by the process of anaerobic fermentation, enriched with minerals, in the form of bio-fertilizer **Super Magro**:

All bio ferments activated in liquid form, which originate from The capture or reproduction of microorganisms native to the forest, and enriched with minerals, are suitable for application in any crop or agricultural area. In many cases, very low or very high doses can be experienced, **which can vary between 2 and 7 liters of fermented, dissolved in every 100 liters of water.** Preferably the application is foliar. In some cases, liquid bio-ferment can be applied directly to the worked earth, but ideally it is under some green cover or that has a good percentage or content of organic matter, for the purpose To make its retention more efficient, to avoid leaching and to obtain a better response from the crops to the product. **When mixing the chosen dose of the product with the 100 liters of water, it is recommended to add 2 liters of molasses, in order to stimulate their adherence and to strengthen the energetic response of bio-prepared plants**. The best times to apply the product are the early hours of the morning or in the afternoon, when the sun is close to hiding.

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For farmers who do not have the possibility to get the forest mulch to prepare and multiply Its own seed of native microorganisms, the alternative is in capturing and reproducing microorganisms from its own soil. This capture is carried out with the burial of discarded plastic bottles, which are cut in half, or similar containers can also be used, with a height of approximately 15 centimeters; The containers are partially filled (8 centimeters) with a mixture of precooked rice covered with a superficial bath of molasses of cane, then covered with a piece of tulle or mosquito net and buried to a depth that can vary from 10 to 20 Centimeters, and depends on the most active life of the soil. Do not forget that each experience on each plot is different. You must identify or mark with some stakes the place where the containers were buried, which are recovered or are unearthed in 10 or 15 days (you have in your hands the biological identity of your land); Will be observed in these containers a large number of colonies of microorganisms that are developing, and can be passed to identify and reproduce to incorporate them in the preparation of fertilizers or decomposition of the organic matter that has available in its plot.

Finally, peasant friend Or producer, do not rely on these recipes and numbers recommended here, experiment your own dosages, adjust them to your measurement and the needs of each crop; He is always attentive with his eyes in cultivation. Do not let your hand in your pockets by traders, agronomists and certifiers who in many cases want to discourage you to push services, supplies and poisons that destroy the economies and the lives of the most humble people in the field.

Note:
Some formulations Of the simple and multi-mix biopreparations described above, have been drawn directly between the author of the book and the experiences of peasants in Latin America, according to the local resources available in each country and the closest adjustment to the nutritional reality of each crop.

ABC3

Scientific checks of the effects of the application of the bio-ferments in the soil through laboratory analysis of molecular biology in Costa Rica

About three years ago we were introduced to the first preliminary results of the molecular biology research in Costa Rica, Bio ferments prepared for the production of bananas or In that country. This work was carried out by a team of scientists working in the laboratories of the National Banana Corporation of Costa Rica, CORBANA.

Later, in a meeting held at the end of March 2011 in one of the properties of the current president of that institution, don Romano Orlich, scientist in molecular biology Eduardo Salas was authorized to present and publicly disclose the conclusive results of the most recent research carried out by that organization's work team

A presentation that occurred on April 1, 2011, at 4 and 30 pm in the auditorium located at the Rita facilities in Guápiles, Costa Rica. Team: Eng. Agr. Olmán Quirós was the one who carried out all the analyzes in the laboratory of Molecular Biology of CORBANA. In his laboratory methods he does not use commercial kits which are very expensive because of his understanding of the principles of molecular methods he has developed methodologies which are extremely economical and very clean of contaminants.

Agr. Juan Samuels, Section of soils of CORBANA, his interest motivated him to realize the samples of the soils in the different farms. Identified with organic agriculture.

Agr. Romano Orlich, owner of the banana plantations Pénjamo and Rebusca, who for the past 4 years wants to give back to the land what he has given to him, through farming practices more environmentally friendly, uses his own bio ferments, mineral broths and incorporates matter Organic since 2007. He is the president of CORBANA.

Mr. Freddy Masis is the manager of the farms of Romano Orlich,

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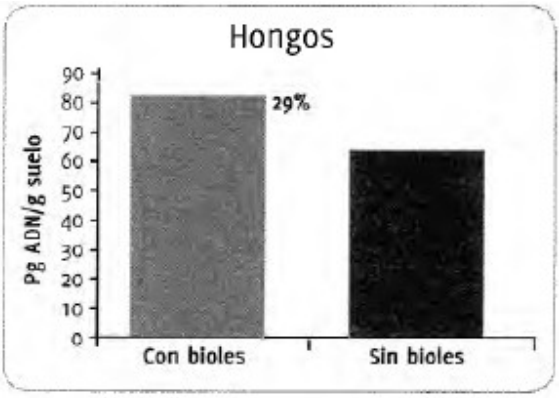
Title of the research
Effect of the application of bio ferences in banana soils on the biomass and diversity of micro organisms.

Methodology

- Sampling of soils of farms with 1.5 to 4 years of applying bio ferment And neighboring estates without application.
- Extraction and quantification of the DNA of soil microorganisms by means of PCR6 in real time.

Objective
To evaluate the effect of the constant application of bio ferences on the biomass and diversity of microorganisms of banana soils.

Next we transcribe in this Manual some graphics with the interpretation And the impact of the results that the scientist gave us during the presentation of the conference.



The gray bar is for the farms (Pénjamo, Rebusca and San Pablo A) who use bio-ferments and the white bar is for the farms (San Pablo B, Zurqui and Oropel) that they never used bioferments. The Zurqui farm is ale damages the Rebusca farm, the Oropel farm is adjacent to the Pénjamo farm, the San Pablo farm has a part A with bioles and another part B that does not use bioles. When averaging the farms with bioles there is an increase of 29% in fungi compared to the average of 3 farms without bioles.

An average the farms with bioles gives an increase of the 29% in mushrooms compared to the average of 3 farms without bioles.

of a course he received from Juan José Panlagua, immediately: I dare Don Romano implement what he learned in his fincas Agr. Walter Herrera, an independent consultant, has implemented concepts of bio fertilizers and mineral broths in a section of cea of CORBANA (San Pablo) at the request of Romano Orlich. The ecto has 1.5 years of being carried out.

Gerardo Mora is manager of the San Pablo Agr. Eduardo Salas, defined the sampling, analyzed, summarized and in- teated the data. Real-time PCR is a method to identify and quantify DNA. In this way we quantify the biomass of the microorganisms with specific markers in units of picograms (Pg). The advantage with respect to the use of petri dish counts is that in the latter case only 1% of what is actually in the soil can be detected, whereas with PCR the whole meta-genome of the microorganisms is detected. In this work no specific microorganisms were detected but large groups such as fungi, bacteria

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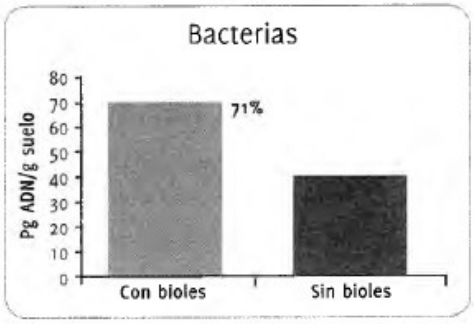
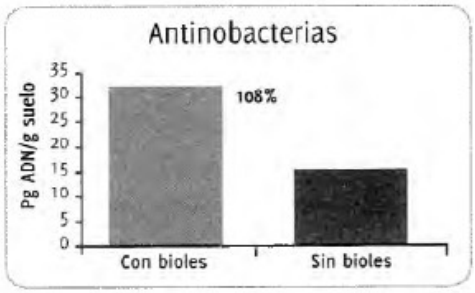
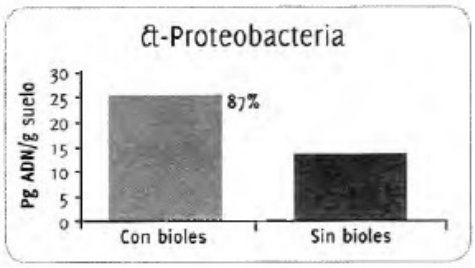
and actinomycetes. In addition, groups with specific functions such as ammonia-oxidizing bacteria (ammonia-oxidizing bacteria) and which are aerobic autotrophic ones that oxidize ammonium to nitrite (NH, to NO2) were detected. For this group a conversion factor was used converting the DNA Pg. To cells per gram of soil.



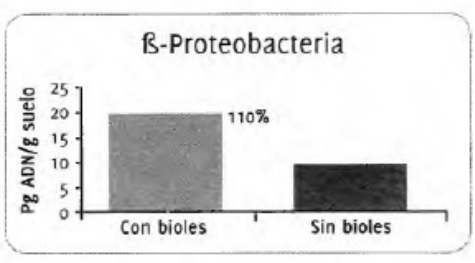
The gray bar is for the farms (Pénjamo, Rebusca and San Pablo A) that use bio ferments and the white bar is for the farms (San Pablo B, Zurqui and Tappel) that never used bio fermentos. When averaging the farms with bioles gives a 71% increase in biomass of bacteria, compared to the average of 3 farms without bioles.



The gray bar is for farms (Pénjamo, Rebusca and San Pablo A) that use bio ferences and the white bar is for the farms (San Pablo B, Zurqui and Troll) that never used bio fermentos. When averaging the farms with bioles gives an increase of 108% in biomass of Actino bacteria, with respect to the average of the 3 farms without bioles.



The gray bar is for the farms (Pénjamo, Rebusca and San Pablo A) that use bio ferments and the white bar is for the farms (San Pablo B, Zurqui and Troll) that Never used bio-ferments. With bioles, there is an 87% increase in alpha proteomic biomass, compared to the average of the 3 farms without bioles.



The gray bar is for the farms (Pénjamo, Rebusca and San Pablo A) that use bio-ferments and the White bar is for the farms (San Pablo B, Zurqui and Troll) that never used bio-ferments . When averaging the farms with bioles gives an increase of 110% in biomass of beta protean bacteria, compared to the average of the 3 farms without bioles .

The gray bar is for the farms (Pénjamo, Rebusca and San Pablo A) that use bio ferments and the white bar is for the farms (San Pablo B, Zurqui and Troll) that never used bio-ferments. When averaging the farms with bioles an in 21% increase in firmicutes biomass, with respect to the average of the 3 farms without bioles.

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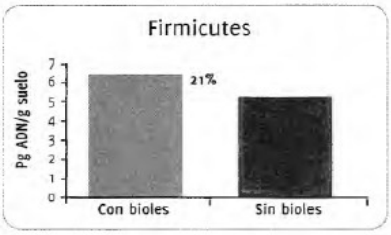

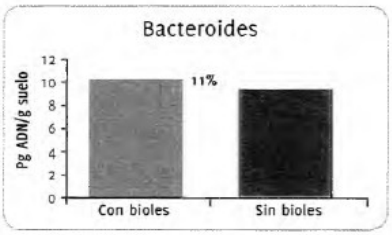

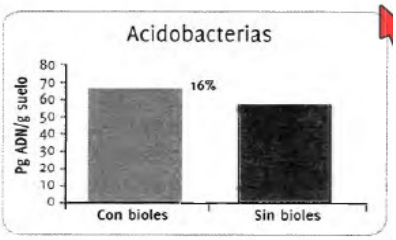

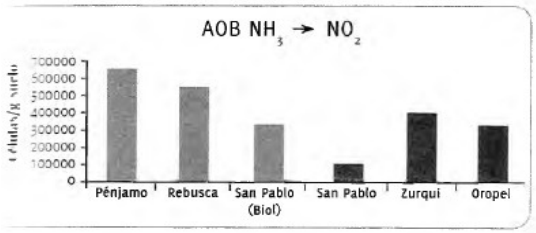

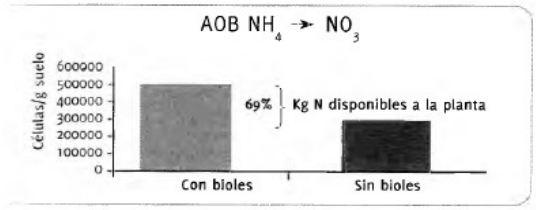

The gray bar is for the farms (Pénjamo, Rebusca and San Pablo A) that use bio-ferments and the white bar is for the farms (San Pablo B, Zurqui and Troll) that never used bio-ferments.

Al average the farms with bioles gives a Increase of 11% in bacterioid biomass, compared to the average of 3 farms without bioles. The gray bar is for the farms (Pénjamo, Rebusca and San Pablo A) that use bio ferments and the white bar is for the farms (San Pablo B, Zurqui and Troll) that never used bio fermentos.

When averaging the farms with bioles gives a Increase of 15% in bacterioid biomass, compared to the average of the 3 farms without bioles.

Ammonia-Oxidizing Bacteria (AMB). They are aerobic autotrophic bacteria that oxidize ammonium to nitrite (NH3 to N02). It is evident that farms with bio-ferements have more of these bacteria. Ward Distance: Jaccard (Identity)

The importance of these bacteria is that they put available nitrogen from organic matter to assimilable forms for plants, once in nitrite intervene another group of bacteria to pass it to nitrate.

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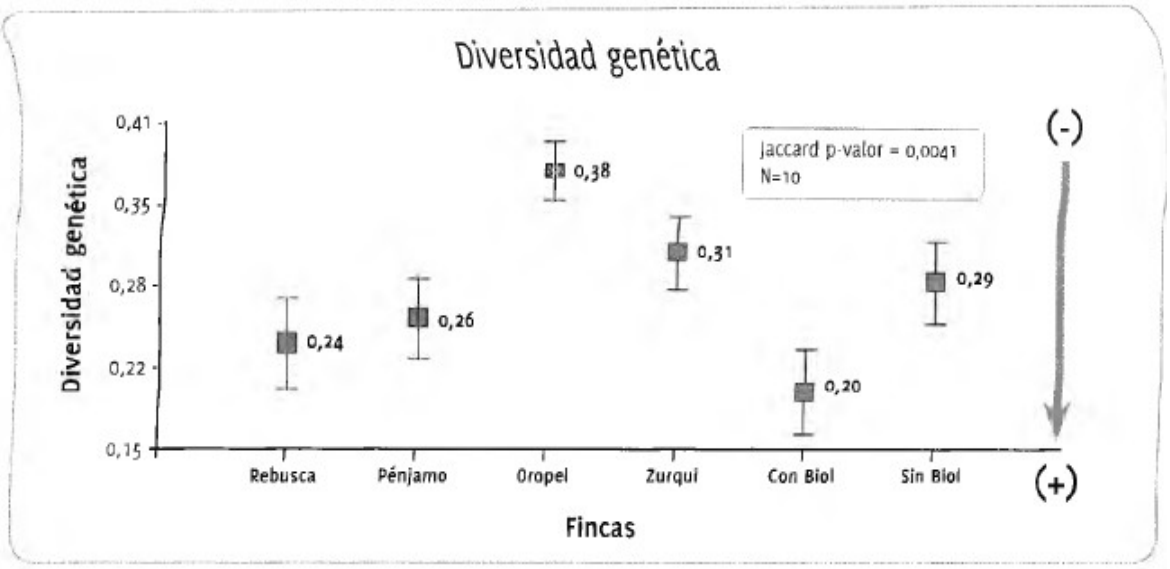
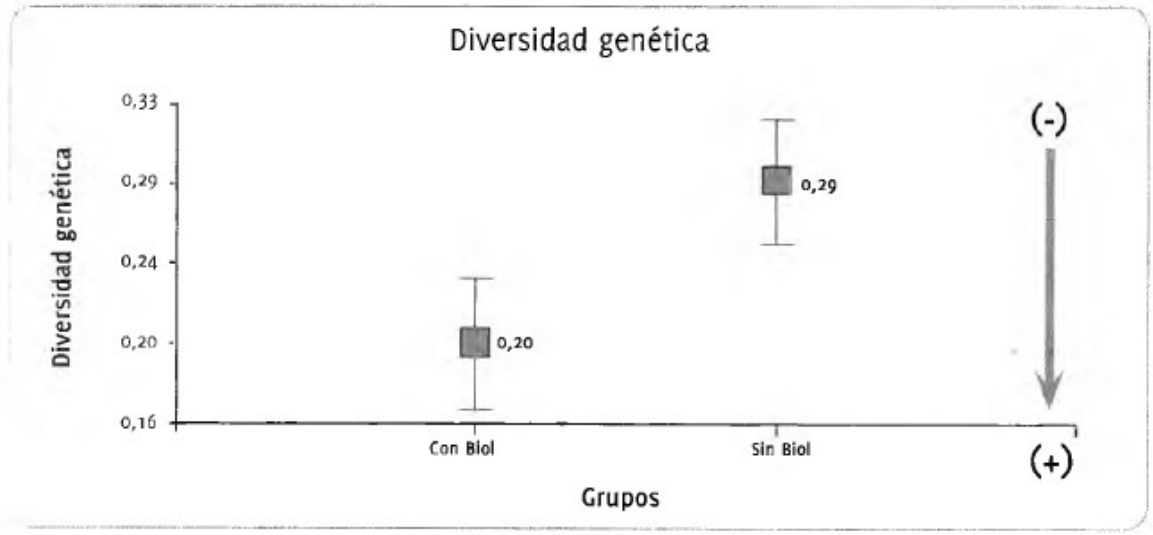


This graph represents
This graph shows the genetic diversity of the native microorganisms of the different soil samples of the farms. The lower the value, the greater the diversity. It can be observed that the San Pablo farm with biol gives the lowest value (0.20) followed by Rebusca and Pénjamo, which are farms that use bioles; the lowest diversity was in the Oropel farm (0.38), which is a farm owned by a transnational company, as well as the Zurqui farm with conventional management. The San Pablo farm without biol has a lower diversity than the farm with biol.



Similar to the previous graph but in this case the average of the three farms with bioles i's is presented. the average of the three farms without bioles. The lower the value, the greater the microbiological diversity in the soil.

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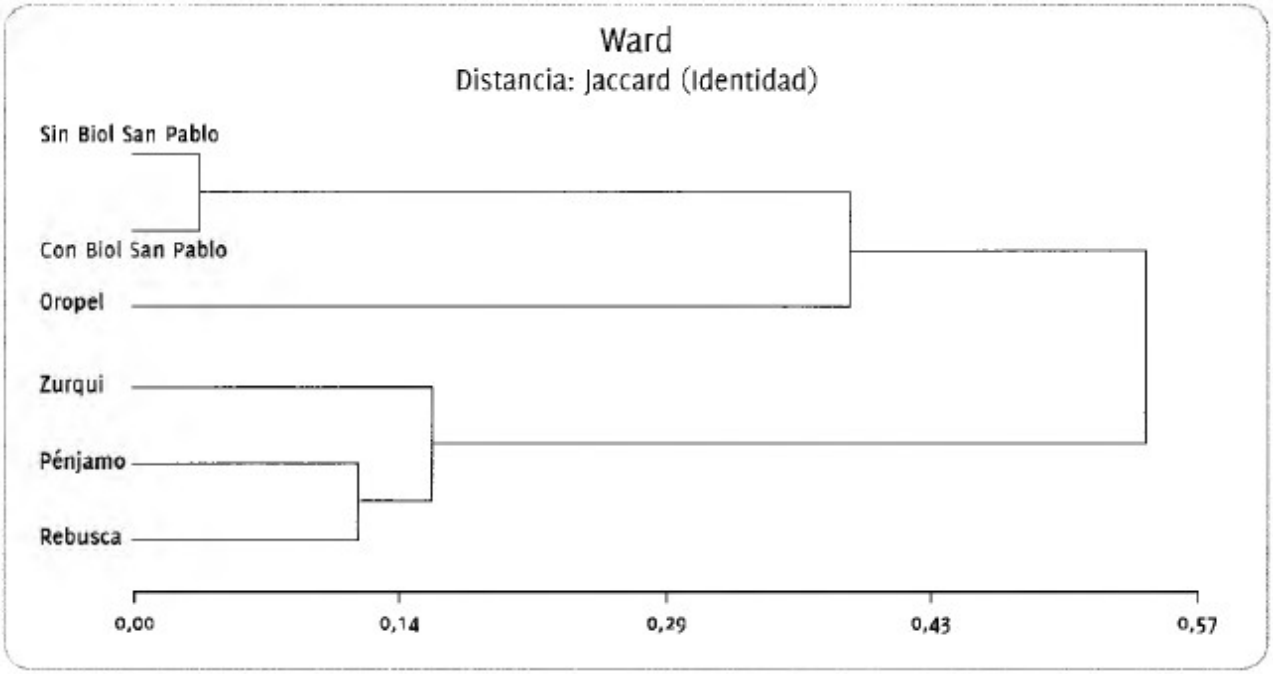

By means of a dendogram the genetic distances of the microorganisms found, the groupings represent smaller genetic distances and therefore means that they are related or genetically related. For example, the estate San Pablo without biol and San Pablo with biol have very similar genetic distances, that is to say the microorganisms are very related and very distant of those found in Rebusca estate. This suggests that the incorporation of biols in San Pablo does not carry foreign microorganisms to the soil, so that the greater biomass and diversity determined in the San Pablo area with bioles is the result of a stimulus to the autochthonous microorganisms of the soil of San Pablo. This also suggests that biof erment rather than a carrier of microorganisms carries a nutrient broth rich in co-factors, minerals and other substances that microorganisms require for their development and reproduction. It also suggests that the soil of San Pablo is very poor in these substances and that over the years a microbiological erosion happened that it is necessary to activate and recover to increase the productivity of the system.

CONCLUSIONS

The constant application of bio-ferments:

• Increased microbial biomass and that of specific functional groups of great importance in soil health.

• Increased microbial diversity.

• The bio-ferments analyzed did not present fecal coliform.

We can say: More than an irony, the laboratory of that company, which confirms its fullness, is how, with the wise practice of peasant practice, the use of bio-ferments, cow shit, has been decoded for dozens of years. , the reproduction of microorganisms native to the forest, the **Super Magro** and fermented organic fertilizers, among other preparations.

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"The wisdom, the common sense and the practical exercise of the peasants are far from our academic understanding: and above any laboratory, no matter how complex it may be; for more titles that we hold for our research, we can scarcely understand the sigh of a microorganism "

The wisdom gives the lesson to the academic world that everything wants to justify and also deny others.

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Annexes

Reasons why a high row is less efficient than a row of adequate size in the preparation of the fertiliser or composts

Reasons by which a high row is less efficient than one (2.5 m width x 1.2 m / height) (maximum 2.5 width x 1.2 m / height).

Pressure of materials, of the biological, chemical and physical point:

an internal structure is possible for oxygen or good aeration, which leads to:

Little oxygen flow or none, few minutes

After the turning of the material increases the temperature, which, soon afterwards or after turning, exceeds 65 ° C at the center of the high temperature.

Carbonization and bad smells.

Biological instability.

Excessive moisture loss until reaching the point where the process is no longer viable.

Excessive loss of nutrients.

Press of materials acceptable from the biological, chemical and physical point of view.

The pressure of the materials still tolerates a structure Internal, which allows: Possibility of oxygen flow for several hours after turning.

The material pressure is still in the range where the temperature can be kept below 65 ° C between turns. As long as temperatures stay below Of 65 ° C:

The material undergoes a composting process, it does not burn or overheat. Biological process stable and gradual.

The moisture loss is maintained in an acceptable range that can be restored in some cases.

The process tends to be preserved in every sense; That is, the loss of nutrients is minimized. i -oria, Seminar-Humus-Management and composting for agriculture and communes, Valle de Bravo, Mexico. February 2012. Adaptation Jairo Restrepo.

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You might assume that in the case of a very high row it should be possible to maintain the temperature within the desired range by means of more frequent turns. This is true to some extent. Because more material affects a greater number of factors and inhibits the process in many ways, you will find it difficult to keep the temperature below 65 ° C, even with more frequent turns. (Any larger size (maximum 2.5 m of 2.5 m x 1.2 m) width x 1.2 m height)

Well decomposed compost

Microbiological conversion

Toxic row	**Optimal row**
(reduced phase)	(oxidative phase)
CH 4 Methane	CO 2 Carbon dioxide
NH Ammonia	NO 3 - Nitrate
PH3 Phosphine Phosphine phosphorus Phosphorus hydride	PO4 – Phosphate
SH2 Hydrogen sulfide hydrogen sulfide	SO4 – Sulfate
BH3 Borane Boron Trihydroboron Boron hydride	BO3 – Borate

It can be said .
A soil is not fertile because it contains large amounts of humus, or minerals theory, or nitrogen (nitrogen theory), but due to the Growth of numerous and varied microorganisms, Organisms that decompose nutrients from the organic matter supplied by plants and animals and reconstruct them in forms available to the plant. This special "soil life" skill consists of making available to the plant Minerals, in forming humus and other different substances, muccus and the lumpy structure of the soil. A soil with the above mentioned qualities establishes an excellent environment of healthy growth and vital for the roots of the plants. Our "soil life" is in charge of A good supply of water-nutrients-active agents (phyto hormones, antibiotics, enzymes and co-enzymes, etc.) for plants and protects them from pathogens and insects, ensuring the best possible growth in different climates.

According to The Theory of Vitality, the fertility of a soil is greater, the greater the weight and variety of its life, which grows and feeds on and within it. The metamorphosis of cow shit Wm towards decomposition

ABC3

The metamorphosis of cow shit towards decomposition
1. Cow shit, once excreted by the animals, immediately goes through an oxidation process, gradually changing color and drying, allowing a better circulation of oxygen through the different particles of the organic material that composes. .

2. Cow shit receives solar rays, and with this phenomenon undergoes a process of natural microbiological selection. This is because many manures contain microorganisms that apparently have no function in the formation of a healthy humus or that their functions are still very unknown.

3. Some species of insects, both diurnal and nocturnal, visit cow shit by inoculating it with other external microorganisms that help and complement the final decay process of the same.

4. Some birds gradually break or pierce the dried plaster of cow shit, exposing this material more and more to the action of sunlight and oxidation.

5. Shaggy beetles visit the shit of cow shit. (They introduce or inoculate in the shit microorganisms that are essential for the process of decomposition and final humus).

6. formation. The rain drags the first substances decomposed and highly soluble in water towards the first layers of the soil.

7. Thereafter, microorganisms in the soil continue the process of humus formation, fully integrating it into the nutrient solution of the soil.

8. A soil must constantly have humidifying microorganisms in order to fix the water-soluble substances and conserve them.

Once decomposed substances enter the soil, the soil microflora begins to act. There are two main groups of microorganisms in the soil:

The decomposers and the humidifying or rebuilding of the permanent base that originates the miracle of life. In this case, the decomposition has already occurred on the ground and humidifiers are performing their task.

The decomposing microorganisms are "resting". If there were some piece of root or crop residue, the decomposing microorganisms would start their task again.

In a soil with a suitable population of decomposing and humidifying microorganisms, millions of these microorganisms will take turns to work infinitely organic matter.

Of course, if they do Lacking humidifiers, decomposers will always perform their task, but no one will take care of joining the nutrients. This can lead to situations of waste, nutrient leaching and decompensation.

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The main damages in the lack of humidifying microorganisms (lack of nutrient binding) are two:

- Plants absorb too much highly soluble nutrients, which is harmful to the health of Animals that feed on a pasture or for humans that eat vegetables produced in those soils.
- Nutrients are leached to the water table, contaminating water and the environment with high concentrations of nitrates.

A very important observation, which anyone can make, is that animals generally do not like to feed again on the pastures, soon Time of having eaten in them. Sometimes, animals are forced to do so because of the forced management they are subjected to, but they leave patches where their shit has gone.

There is a very important reason for this behavior to occur, especially in cattle , And is that in soils that have a poor or no humidifying microflora, grass will absorb many highly soluble nutrients, which are not healthy for animals. Instinct protects animals from eating grasses with high nutrient contents (especially nitrogen in the form of nitrates).

An experience that anyone can perform is When applying a compost of excellent quality in a prairie, you will notice that the animals in the next time they visit the pasture, the same will be devoured as if they had not been in a long time.

The explanation behind this fact is that the Compost of excellent quality that was applied contains humidifying microorganisms, which help to unite the nutriments of the cow shit that has been left on the pastures. Then the grass that regrows and grows will be free of unhealthy elements and the animals will like to graze in those places.

It is very important to understand that microorganisms will perform their task well and populate a place to the extent that they remain occupied. When there is no supply of food or organic material to the soil, the microorganisms will stop working and begin to die.

"The cattle eat what they like most and not what we most want them to eat."

It is the microorganisms that mobilize nutrients for plants .

Humidifying microorganisms are the first to die. If a soil remains undernourished for a long time, then it loses its humidifying abilities forever, since dead humidifying microorganisms simply do not come back to life when food or organic materials are once again available on the spot.

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When a soil has remained malnourished For a long period, the decomposing microorganisms are reduced, but the humidifying microorganisms are further reduced.

Generally, the decomposition of organic matter will be occurring even when the number of decomposing microorganisms is reduced.

Once the nutrients become soluble in water, Only a part of these are set and used; The rest is lost.

The best indicator of this problem are nitrates in the water table or in rivers and lakes. There are basically three steps that take organic matter up to humus

There are basically three steps that carry the organic matter until humus

1. Decomposition of the raw organic matter in nutrients highly soluble in water.

2. A first fixation of water soluble nutrients, in "short chain compounds", called nutrient humus.

3. A union and subsequent fixation of the humus nutrient in compounds of longer chain, called permanent humus.

The better the macro and microbiological ecosystem works, the more quickly it traps the nutrients without any loss.

The use of humus

In simple terms, it could be said that: This is the process by which the plant sends signals to the microorganisms about what nutrient it needs; The microorganisms from the humus remove these nutrients to make them available to the plant.

This always occurs from the nutrient humus state, which is reduced to substances soluble in water.

The permanent (long chain) humus is first reduced to Nutrient humus (short-chain) and then to water-soluble plant nutrients.

> *The word used to denote the Earth, at the beginning of the Indo-European languages, makes years of age (no one knows exactly how many) was dhghem. From this word, which means nothing more than earth, came the word humus, which is the result of the work of soil bacteria. And, to give us a lesson, humble and humane came from the same root.*
>
> Lewis Thomas (1913-1993)

ABC3

In composting, we are interested in reaching the state of nutrient humus. Our objective is not is to produce permanent humus through a composting process. All we need to achieve by means of composting is to digest and protect the nutrients in such a way that they are not soluble in water.

Permanent humus formation can occur in the soil, since the danger of losses has been overcome with the formation of nutrient humus.

It is important to keep in mind that the compost must be "incorporated" only in the "arable layer" of the soil, where the flow of oxygen is guaranteed.

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Some physical, chemical and biological contributions that are achieved with organic matter and green fertilizers

Organic matter and green fertilizers are important for the geological and biological evolution of the soils that are grown in Latin America, since they make the insoluble soluble and facilitate to conquer both the depth of them (the profile) increasing the thickness more and more of the meat or cultivable layer (the horizon), same time that they recover them and conserve them against the impacts that cause its erosion.

Organic matter and green fertilizers mimic and cushion the great impacts that land undergoes with the current irrational exploitation of agricultural systems, based on socioeconomic and environmental pressures imposed by a mercantile agrarian society.

That constantly looting and degrading face meet Increasing tax and placist? needs, without questioning the importance of the conservation and rehabilitation of the earth, as a social contribution to the construction of permanent, more just and humane agrarian populations.

On the other hand, natural memes differ from agro-systems; reagents because of their great systemic stability, amism and functionality, while systems lose these characteristics due to the which constantly robs and degrades them of the need to satisfy increasing "tax" and security needs, without questioning the importance of the conservation and rehabilitation of the land, as a social contribution to the construction of agrarian populations perma - e month, more just and humane. On the other hand, natural memories differ from agrosystems; Reactive because of their great systemic stability, their ammism and functionality, while the systems lose these characteristics by the Anthropogenic, leading in extreme cases to a situation of contamination, degradation, and irreversible bio-geochemical alteration.

The first exercise to regenerate a destroyed soil is to recover its digestive system with a temporary crop of organic matter. Without em- ? Care must be exercised with the mother; And the dependency that can be generated with this contribution. At present, much "organic farming" ca "is not sustainable, due to the dependence mm? Of the entrance of high volumes of organic materials into the system in production. Ideally, all organic ecosystems are dependent on life.

Organic agriculture, it's not
synonym of organic matter.

On the other hand, what the earth needs is not fully composted organic material. When we totally process the organic matter, to take it to the crop where we are going to need it, we are denying a series of physical and biochemical processes that should happen in the place of the crop, very useful for the health of the same one; Among these processes we can cite principally the formation of phytins, vitamins, hormones and biological sequences necessary for the permanent reconstruction of life on earth.

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Finally, in this sense we present below some contributions, which are achieved when working with organic matter And the green manure in lands that are in conditions of cultivation in Latin America.

Some physical contributions of the organic matter

- Preserves the humidity.
- Increases temperature changes.
- Cushion heat capacity.
- It protects from the sun and wind, avoiding soil reseal.
- Allows the addition of elementary particles.
- It avoids the direct impact of water droplets.
- Reduces evaporation.
- Improves water balance.
- Reduces erosion.
- Reduces surface runoff from water.
- It facilitates drainage in tillage.
- Increases structural permeability.
- Lighten clay soils.
- Physically slows the development of other plants.
- Maintains a more stable thermal regime.
- Reduces the disintegration of soil particles and surface encrusting.
- "Increases the formation of hydro-resilient aggregates.

Finally, soils are compacted or denser by the constant total or gradual loss of organic matter. It is the one that gives the soil mechanisms of cushioning, formation of aggregates and structure.

Some chemical inputs of organic matter

- Regulates the pH.
- Increases buffer power.
- "Increases cation exchange capacity.
- Maintains the cations in a changeable form.
- It favors the phosphate fertility of the soil.
- It favors the formation of biophosphates or phosphohumidates (humic acids + phosphate anions).
- Form chelates.
- It maintains reserves and the stable balance of nitrogen in the soil.
- It increases the retention power of macro nutrients such as; Calcium, magnesium, potassium and nitrogen.
- It facilitates the formation of compounds, with great freedom of movement in the soil.
- In the case of iron, organic matter acts by complexing the iron and aluminum ions in acid soils.

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Chemical carbon is not organic matter and dead soils do not produce without chemical fertilizers.

- For potassium, the organic matter reduces the fixation of the same by the clays, which gives points of absorption of the potas, reversible - increase of the cation exchange capacity (CIC) -, which act as an alternative to the spaces Internal of the clays.

Some biological contributions of the organic matter

- It favors the radicular respiration.
- It promotes seed germination.
- It promotes the health of the roots.
- It regulates the micro and macrobiological activity of the soil.
- It becomes one of the main energy sources for heterotrophic microorganisms. The gaseous exchange released by the constant microbiological activity favors the evolution of mineral solubilization.
- It modifies and increases the enzymatic activity.
- It increases the activity of the rhizosphere. Improves nutrition and availability of minerals for crops.
- It favors the biodegradation of many toxic substances present in the soil.
- It increases the biological digestion of the soil.
- It favors the production of phyto stimulant substances such as indole acetic acid (AIA), tryptophan and various organic acids.
- It favors the increase of the aerobic microbial population, responsible among other actions for the humification of the organic matter, the nitrification, the fixation of the atmospheric nitrogen, as well as the biological evolution of the sulfur and the phosphorus.
- It favors, among other substances, the increase of vitamins (B6, B12, pantothenic acid, riboflavin, biotin, among others) and even from many antibiotics such as streptomycin, penicillin and terramycin.
- Potentializes the effects of mineral fertilization.
- It promotes and acts directly on the physiological and biochemical processes of plants, increasing the permeability of cell membranes, increasing the activity of synthesizing phenomena, as well as the content of chlorophyll and the intensity of respiration, and in general Balanced the metabolism of vegetables and in parallel the one of the

ABC3

Understanding the diversity of all metabolic processes, which occur between soil life and plant roots, is very important to understand the importance of the richness of the diversity of organic matter that we permanently manage in the coverage of The soil. Finally, when the contribution of organic matter in the soil is different, we can be sure to be working with the enrichment of different biochemical processes for good health status of crops, as microorganisms on the earth change rapidly and They become pathogens when there is a nutritional disturbance in it.

Nature says: "Everything that is sick must disappear, then reprocess it to put it back into circulation."

Understanding this principle is basic to understanding the disease crops. Pathogens arise insofar as the harmony of nutrition between the roots and microbiology of the soil is out of control. For example, a microorganism such as Trichoderma readily inhabits the conductive vessels of plants with complete peace of mind, increasing their resistance against drought, but in nutritionally deficient plants that same organism attacks its roots, leading to death. On the other hand, the fungus Aspergillus niger helps the seeds to be born or to sprout more quickly in the earth, but when the seed is not healthy, then it helps to die. Rizotocnia is a fungus that increases in large proportions the resistance of plants to water deficiency, but when the plant is weak, then it makes it prey. Pseudomonas bacteria fix nitrogen very close to the roots in tobacco cultivation, but when there is a potassium deficiency it attacks the plants. (Personal communication with Dr. Ana Primavesi, Ecuador, September, 2010).

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Main contributions are achieved with green manures.

- They conserve soil moisture and reduce evaporation.
- They prevent the direct impact of water on the soil.
- They prevent soil disintegration and prevent the formation of surface impermeable crusts.
- They protect the soil from the sun and wind.
- They are a constant source of organic matter.
- They reduce surface runoff of water.
- They contribute to the improvement of the rate of infiltration and drainage of soils.
- They favor the bio-structure and stability of the soils.
- They increase the effective capacity of the cationic exchange of the soil.
- They improve the permeability of the soils, their aeration and porosity.
- They fix the atmospheric nitrogen and promote their contribution to the soil.
- They control the development of plant populations by their suppressive and / or allelopathic effect.
- They improve the capillarity in the soils.
- They are used to perforate compacted layers and have the behavior of a biological plow, both in the horizontal and vertical directions.
- They serve to extract water and minerals from the subsoil by increasing their availability and mineral evolution.
- They produce organic phyto-stimulating substances of growth, allelopathic and phytoprotectors.
- They aid the formation of organic acids fundamental to the process of mineral solubilización.
- They can be used for food both animal and human.
- They are an alternative energy source (firewood, charcoal, fodder, others) .
- They favor the colonization of the soil by the macro and micro life in the deeper layers.
- They serve as a constant source of production of biomass and seeds (perennial and annual),
- favor the biodiversity of the Fauna and Flora - contributing to environmental stability.
- They are a source of nutritional enrichment of the soil and of recycling. They serve to soIubilizar nutrients Available in crops.
- They are synthesized in the plant nutrient cycles in the soil / microvida / plant.
- They reduce the leaching of nutrients to deeper layers of the soil. - Gradually increase the thickness of the soil.

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- Useful for the constant weathering of the rock – soil.
- They provide the soil with a high rate of microbiological humus.
- They allow farmers to have greater economic options.

Green manures are a system that is both safe , Economic, efficient and simple to have a conversion from conventional agriculture to organic agriculture.

- Its rotation and associates favor the control of insects, nematodes and microorganisms, particularly those that attack the roots.
- They combat desertification, when they control all the factors that cause erosion in the soils.
- They contribute to the achievement of safer and more efficient harvests.
- They serve to control many species of insects with the "trap effect or formation of coats", while attracting other beneficial species.

Mathematical calculation to prepare organic fertilizers

To prepare an organic fertilizer we must mix materials rich in nitrogen, with other rich materials In carbon. There is a mathematical formula that Allows to calculate how many parts by weight of the material rich in carbon (C / N > 30), must enter for each part of

material rich in nitrogen (C / N < 30), for the balanced composition of a good organic fertilizer.

Considering that the ideal relationship to prepare a good fertilizer is C / N = 30/1, then The formula would be the following:

X = (30 times Nn) minus Cn / Ce minus (30 times Nc)

X = Quantity by weight of the material rich in carbon, for each part of nitrogen.

Nn = % nitrogen, in the material rich in N.
(See table).
Cn = % carbon, in the material rich in N.
(See table).
Nc = % nitrogen, in the material rich in C.
(See table).
Ce =% carbon, in the material rich in C.

Example of the calculation of a fertilizer.
You want to make a fertilizer using:

1) Chicken + fibrous material.
2) Chicken + coffee residue
3) Chicken + fibrous material and coffee residue

Questions? How many parts should be mixed by weight of each carbon-rich material for a part of the weight of chicken meat rich in nitrogen?

Answer In the table of the composition of the different materials we obtain The following information:

Chicken	N = 2,76%	C = 29,01%	C/N = 11/1
Basket of fibrous material	N = 1,07%	C = 39,59%	C/N = 37/1
coffee residue	N = 0,6 2%	C = 51,73%	C/N = 83/1

Quantity of fibrous (30 x 2.76) - 29.01 / 39.59 - (30 x 1.07)
= 53.79/7.49 = 7,18 parts fibrous

Quantity of coffee residue (30 X 2.76) - 29.01 /51.73 - (30 x 0.62)
= 53.79/33.1 = 1.62 parts of coffee residue.