

We invite you to read Jairo Restrepo Rivera's article in the book "The ABCs of organic farming and rock flour" ([click here](#) to read it), a practical guide to preparing biofertiliser from cow excrement. Try it out and share your experiences in the comments of this article!

Cow excrement-based biofertilizers: a sustainable option¹

By Jairo Restrepo Rivera

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Organic agriculture is not a well-defined package of techniques or recipes. It is not a technological alternative to replace old inputs with new ones. It is the combination of a series of technologies applied to farming communities' social, cultural, economic, environmental and political dynamics and realities of each farming community.

In organic agriculture, the recipe or miraculous input that everyone expects and that solves everything instantly doesn't exist. What do exist are many doubts and questions to ask ourselves, on a long road through experience, in which we rediscover old and -at the same time- new criteria of sustainability and self-determination for the field, by using the wisdom of peasants,

What are biofertilizers?

Biofertilizers are super liquid fertilizers with a lot of balanced energy, in mineral harmony, prepared from very fresh cow excrement, dissolved in water and enriched with milk, molasses and ash. This mixture has been left to ferment for several days in barrels or plastic tanks, under an anaerobic system (without the presence of oxygen) and often enriched with ground rock flour or some mineral salts, such as magnesium sulfate, zinc, copper, etc.

What are biofertilizers used for?

¹ Original article (in Spanish): El ABC de la agricultura organica y harina de rocas.

We invite you to read the article by Jairo Restrepo Rivera, in the book "The a, b, c of organic agriculture and rock flour" ([Link here](#)), a practical guide for the preparation of biofertilizers based on cow dung. We encourage you to try it and share your experience in the comments of this article!

They serve to nourish, recover and reactivate soil life, strengthen plant fertility and animal health, and at the same time stimulate crop protection against insect and disease attacks. On the other hand, they serve to replace the highly soluble industrial chemical fertilizers, which are very expensive and increase farmers' dependency, making them poorer and poorer.

How do biofertilizers work?

They work mainly inside the plants, by activating and strengthening plants' nutritional balance as a defense mechanism, by bringing organic acids, growth hormones, antibiotics, vitamins, minerals, enzymes and co-enzymes, carbohydrates, amino acids and complex sugars, among others. All these substances are present in the complexity of the biological, chemical, physical and energetic relationships established between plants and soil life. After a fermentation period (30 to 90 days), biofertilizers enriched with ashes, mineral salts or ground rock flour will be ready and balanced in a colloidal solution. This will increase their effects between 10 to 100,000 times compared to micronutrient quantities to be foliar-applied to soil and crops, recommended by agribusiness following technical criteria.

What materials are permanent and what ingredients are needed to prepare biofertilizers?

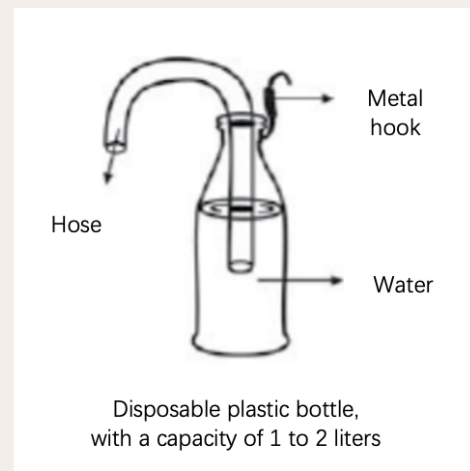
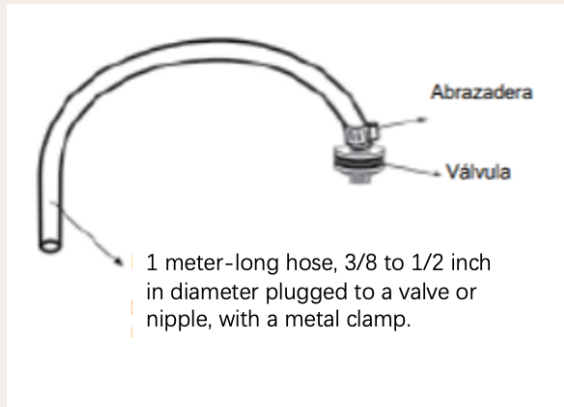
The permanent materials for preparing biofertilizers are:

- A. Plastic tanks or barrels of 200 liters capacity, with metal ring or screwed lids, in order to be hermetically sealed for a good fermentation of the biofertilizer. Remember, the fermentation of the biofertilizer is anaerobic, that is, it is carried out without the presence of oxygen.

Observation: In case farmers or producers do not have plastic tanks or barrels with a capacity of 200 liters to prepare biofertilizers, smaller or larger tanks can be used and proportions should be calculated accordingly.

- B. A metal valve or a piece of threaded nipple about 7 centimeters long and $\frac{3}{8}$ to $\frac{1}{2}$ inch in diameter, adapted to the lid, to allow the exit of gases (mainly methane and hydrogen sulfide) formed in the tank during fermentation of cow shit.
- C. A piece of hose about one meter long and $\frac{3}{8}$ to $\frac{1}{2}$ inch in diameter, attached to the nipple with a metal clamp, which is responsible for evacuating the gases formed during the fermentation process in the tank or plastic barrel.

- D. A disposable plastic bottle of one to two liters of capacity, where one end of the hose will go to evacuate the gases.
- E. A wooden stick to mix the ingredients.



The basic ingredients needed to prepare biofertilizers anywhere are:

- Very fresh cow excrement
- Milk or whey
- Molasses or sugar cane juice (or sugar)
- Wood ash
- Untreated water (uncontaminated)

Remarks:

- A. These are the materials and basic ingredients needed to prepare the simplest foliar biofertilizers, to be applied to any crop and that can be prepared by any farmer anywhere.
- B. The addition of some **mineral salts** (zinc, magnesium, copper, iron, cobalt, molybdenum, etc.), to enrich biofertilizers is optional and is done according to the needs and recommendations for each crop at each stage of its development. Remember, mineral salts or sulfates can be substituted by wood ash or ground rock flour, with excellent results.

What are the basic amounts of each ingredient for the preparation of biofertilizers?

The basic quantities of each ingredient used to prepare up to 180 liters of biofertilizer are:

- 180 liters of water
- 2 liters of milk (or 4 liters of whey)
- 2 liters of molasses (or 4 liters of cane juice)
- 50 kilograms of very fresh cow shit

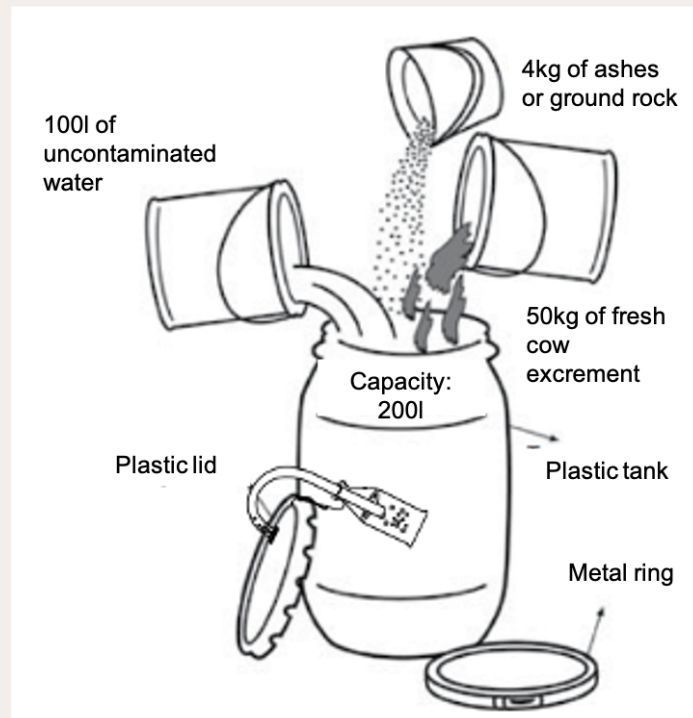
- 3 to 5 kilos of wood Ash
- Mineral salts (optional). According to the requirements and recommendations for each crop, when the information is available. They can also be replaced by 3 to 4 kg of ground rock flour. More diversity of the ground rocks in the mixture enhances the biofertilizer.

How to prepare it:

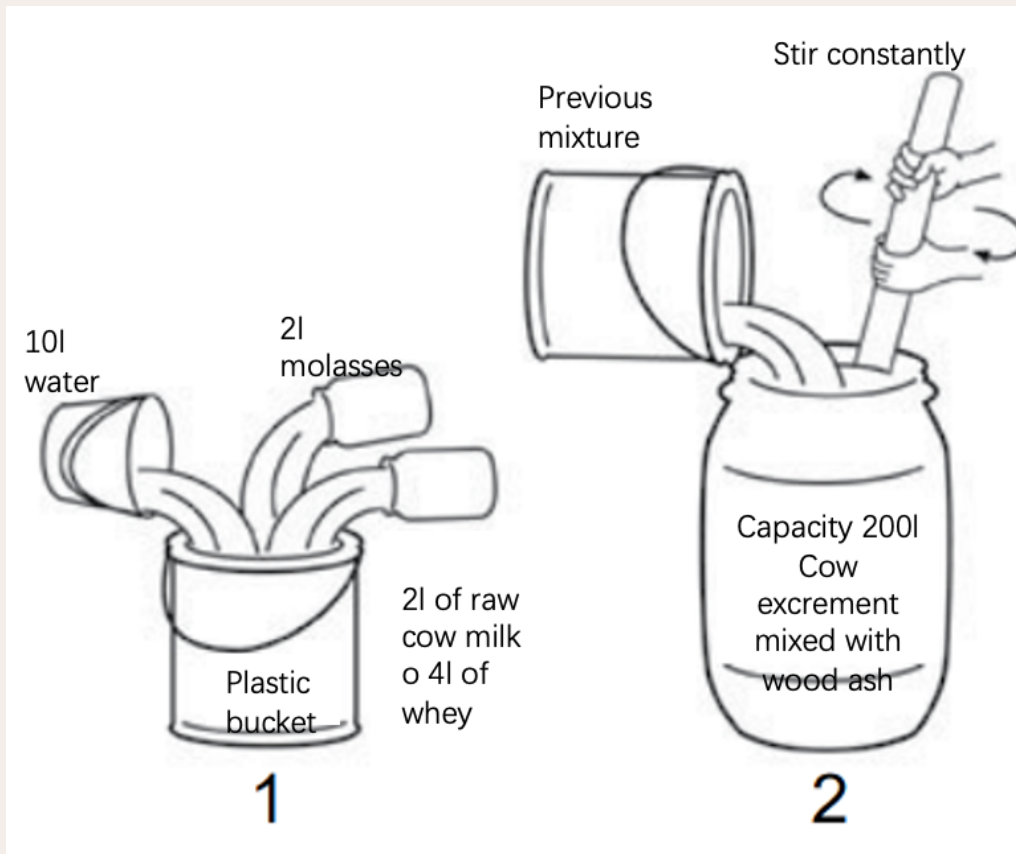
The procedure described below produces the simplest biofertilizer:

1st step: Use a 200-liter capacity recipient to dissolve 100 liters of uncontaminated water, 50 kg of fresh cow excrement, 4 kg of ash, and stir until a homogeneous mixture is obtained.

Observation: If possible, it is advisable to collect fresh cow excrement in the stables where the cattle are kept during the early morning: the less sunlight received by the excrement, the better the results obtained with biofertilizers.

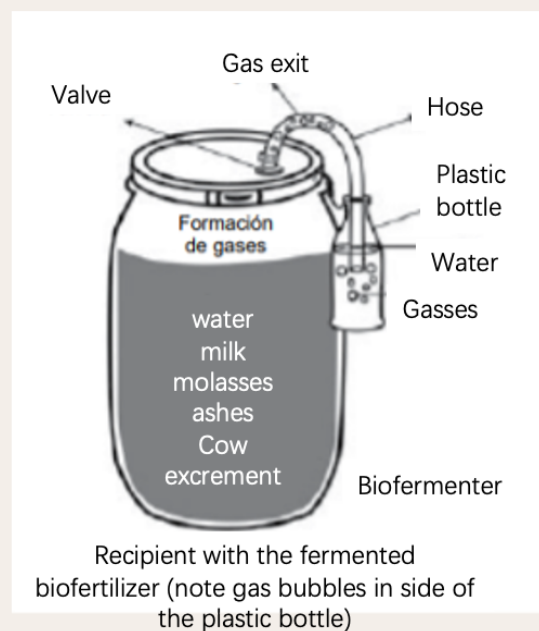
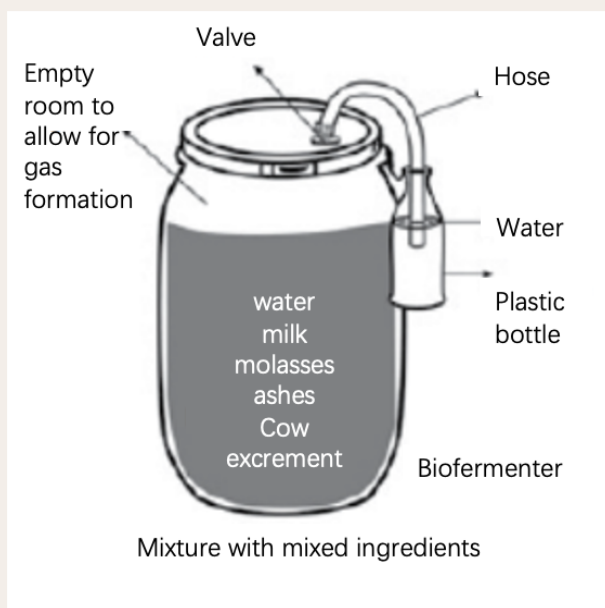


2nd step: In the plastic bucket, dissolve 10 liters of uncontaminated water, 2 liters of raw milk or 4 liters of whey along with 2 liters of molasses and add them in the 200-liter plastic container, where previously the cow shit has been mixed with the wood ash. Stir the mixture constantly.



Step 3: Fill the total volume of the plastic container containing all the ingredients with clean water to 180 liters of its capacity and keep stirring.

4th step: Hermetically cover the container for the start of the anaerobic fermentation of the biofertilizer and connect the gas evacuation system with the hose (water seal), as shown in the pictures below:



5th step: Place the container containing the mixture to rest in the shade at room temperature, away from sun and rain. The ideal temperature would be that of the rumen of polygastric animals, such as cows, around 38 °C to 40 °C.

6th step. After allowing minimum 20 to 30 days for anaerobic fermentation, open the lid and verify its quality by checking smell and color before use. Neither should it have a rotting odor, nor should it be violet blue in color. The characteristic odor should be that of fermentation, otherwise it should be discarded. In very cold places, fermentation time can take from 60 to 90 days.

Preparation of the second stage: Mixture for application to crops

The concentration of its application in foliar treatments is from 5% to 10%, meaning that 5 to 10 liters of biopreparation are used for each 100 liters of water applied on crops. Do not forget to filter the biofertilizer before applying it with a fine cloth. Another measure for application is to use 1 to 1 1/2 liters of biofertilizer for each 20 liter pump.

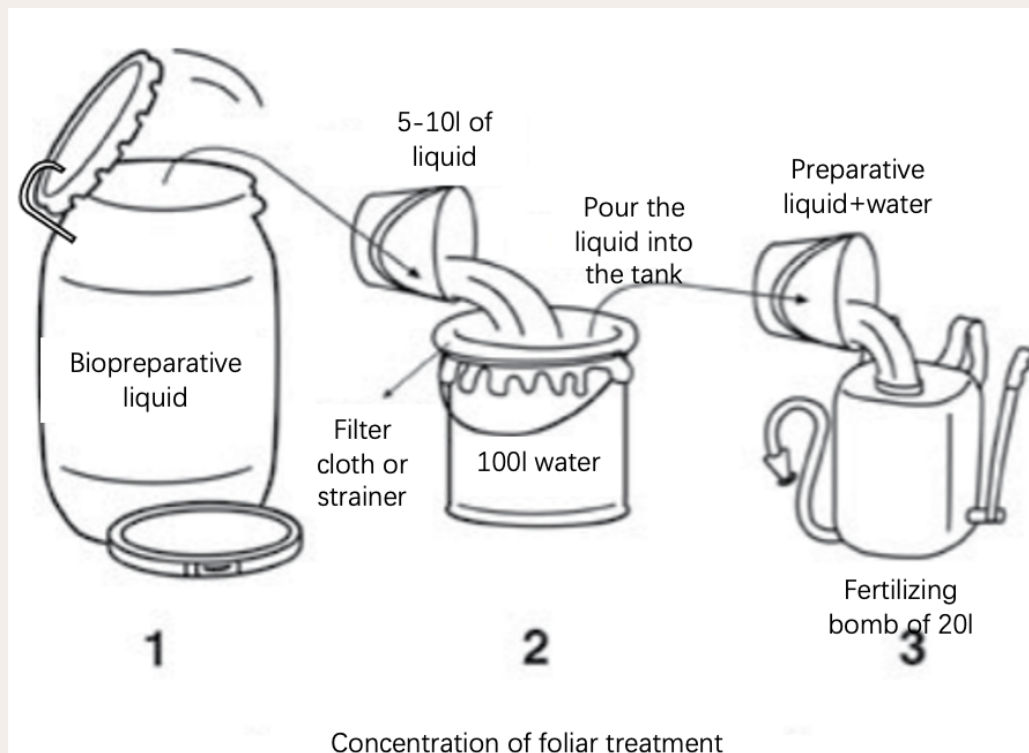




Photo: Containers of biofertiliser in fermentation



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