



# **BOKASHI: PRODUCING SOLID FERTILISER**

Fast, balanced, and nutritious for the soil





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Fast, balanced, and nutritious for the soil



**José Oswaldo Landaverde Carranza** is the owner of the finca Las Maravillas, in the Galingagua canton (Municipality of San Agustín, department of Usulután, El Salvador). Landaverde went from being a civil servant to becoming a farmer, so he really knows the process. He shares his wisdom with us:

“I got my land because the countryside was calling to me, and even though I didn’t know anything about farming, I decided to invest. It was really hard at first because I would lose all the crops,

everything would dry up. The saplings would survive the rainy season, but once the dry season started, it was a whole other story. I was disappointed, frustrated, and my family kept telling me to just dump everything.

“What did you get yourself into?” they’d complain. I had all my compensation money invested into the farm, but the love for what I’d worked so hard for and the desire to achieve something didn’t let me give up. ‘Dear God,’ I said, ‘I just gotta achieve something first.’





I met the Friend Network and COMUS (Coordinating Association of United Communities in Usulután) by way of the coffee harvests, and they started giving us training.

I was frustrated with farming, but when I learned about these techniques in 2015, like making bokashi and the biointensive method, that same day right after the training I set out to buy the pitchfork and started my very first biointensive bed..."

### **Purpose of producing solid fertilisers like bokashi**

Part of the quest for innovation is to obtain healthy, safe and higher quality products, while at the same time improving crop return so as to contribute to food security.

An additional aim is to increase a farmer family's income through access to new markets.

Making fermented organic fertilisers is the process of decomposition of organic waste by microorganisms in controlled and favourable conditions. This produces a stable material known as bokashi (organic fertiliser), able to fertilise plants and nourish the earth at the same time.

Bokashi making comes from Japan, where it matures faster and is ready to apply in just 25 days. Bokashi means "soft fermentation" and "vapour-cooking fertiliser materials" by using the heat generated by fermentation. It's useful because it's fast.

## Materials and tools needed to make bokashi

- ✓ Ground rice or coffee husks speed up the decomposition and make the fertiliser looser, making it easier to distribute in crop rows. Additionally, it gives volume, porosity and aeration to the soil. You can also use straw, corn cobs or husks, or well-ground sorghum and pulverised sugar cane chaff.
- ✓ Poultry and cow manure are the most important component when it comes to nitrogen input.
- ✓ Lime and carbon (charcoal) can be substituted for rock flour or pulverised rock powder.
- ✓ Cane honey or molasses can be substituted for the popular panela, solid blocks of unrefined cane sugar derived from boiling and evaporating sugarcane juice.
- ✓ Mountain or forest floor microorganisms begin the fermentation process and decompose organic matter.
- ✓ Dry cow manure is a source of minerals.
- ✓ Fertile soil increases the volume of the fertiliser.

## Inputs

- ✓ 26 bags of poultry manure
- ✓ 75 bags of fertile soil
- ✓ 35 bags of cow manure
- ✓ 30 bags of coffee husks
- ✓ 40 bags of sawdust
- ✓ 30 bags of ashes
- ✓ 1 bag of lime
- ✓ 1 pound of baker's yeast
- ✓ 3 barrels of liquid mountain microorganisms
- ✓ 8 barrels of water

## Tools

- ✓ 1 machete
- ✓ 1 shovel
- ✓ 1 large wooden pestle or log
- ✓ Sacks or bags
- ✓ 3 metres of heavy plastic
- ✓ 1 metal pitchfork
- ✓ Plastic buckets
- ✓ 1 thermometer
- ✓ Dust mask
- ✓ Boots







### Step by step: making bokashi

- 1 Measure the amount of each ingredient.
- 2 Layer and mix all ingredients until uniform.
- 3 Little by little add the water needed to moisten the mixture.
- 4 Pass the mixture from one place to another with the shovel three times. On each pass gather the mixture and moisten with the diluted water and yeast mixture.
- 5 Check the humidity by doing the **fist test**. Take samples from several places and squeeze them. If the sample crumbles it's too dry, if it drips it's too wet. But if you can feel the dampness and it keeps its shape when you let go, it's ready.
- 6 14 hours after preparation the fertiliser should reach temperatures between 50 and 70 degrees Centigrade (°C). Measure the temperature with a thermometer or by doing the **machete test**. If you stick the machete in the pile and it comes out really hot, turn the pile twice a day, morning and evening, for seven days, and moisten a bit. If the fertiliser is too cold, add fertile soil, bokashi, or vermicompost to reactivate the fermentation process.
- 7 When the fertiliser begins to stabilise, the materials that are hardest to decompose remain. From this point on the fertiliser enters the second phase, or maturation stage. It means that the decomposition of the remaining organic materials is slower, with a temperature of 50 °C, and it is advisable to turn it once a day. After 21 days it will be ready to apply.

## Costs and difficulties

### Costs of preparing bokashi solid fertiliser

Inputs	Unit cost	Total cost
26 bags of poultry manure	\$3.00 USD	\$78.00 USD
75 bags of fertile soil	\$ 0.25 US	\$18.5 USD
35 bags of cow manure	\$0.50 USD	\$17.5 USD
30 bags of coffee husks	\$0.50 USD	\$15.00 USD
40 bags of sawdust	\$0.25 USD	\$10.00 USD
30 bags of ashes	\$0.50 USD	\$15.00 USD
1 bag of lime	\$3.50 USD	\$3.50 USD
3 barrels of liquid mountain microorganisms	\$5.00 USD	\$15.00 USD
8 barrels of water	\$0.40 USD	\$3.20 USD
<b>Total</b>		<b>\$175.95 USD</b>

Note: The total cost does not include labour, as this is provided by the family.



#### Among the difficulties are:

- ✓ Needing to buy most ingredients and giving little use to resources on the farm.
- ✓ Not knowing how to calculate humidity and making it too wet.
- ✓ Not knowing how to control the temperature during the fermentation process when it goes above 70 degrees centigrade.
- ✓ Leaving the fertiliser in the sun, rain or wind.
- ✓ Not covering the bokashi with a layer of soil after applying.

## Recommendations

- ✓ Some materials are hard to obtain, which is why it's important to find substitutes and not rely on just one kind of fertiliser.
- ✓ Wood charcoal can be replaced by burnt coffee husks. Burn the chaff to charcoal, not to ashes, because ash ruins the bokashi. The original recipe uses wood charcoal so as not to have to use rice chaff or coffee husks. Burnt chaff absorbs bad odours and retains nutrients.
- ✓ Do not exceed 15% ash when preparing Bokashi, and ensure the ash is from natural wood (untreated). Too much ash can lower bacteria and other microorganism activity, and impede the release of nitrogen.
- ✓ When using yeast, use granulated yeast because it preserves easier.
- ✓ Make piles no more than 60 centimetres high to avoid heating.
- ✓ Use bokashi mixed with sifted soil and pulverised charcoal to prepare vegetable nurseries and for the trays. This way it won't burn the seedlings, which is a risk you run when using unmixed fresh bokashi.
- ✓ Apply before planting to increase yield.
- ✓ The amount of organic fertiliser applied on crops is conditioned by several factors, such as original soil fertility, climate, and nutritional demands of the plants of each crop. According to test results, doses vary between 50 and 100 grams per vegetable seedlings.
- ✓ In fields that have been processed with organic fertiliser, apply 4 pounds per square metre: 15 days before planting, when transplanting, or during the development of the crop. In terrain where bokashi has never been applied, the dose is larger: 10 pounds per square metre. Basic grains, cassava and sugarcane need a second application, between 15 and 25 days after seed germination, with a dose of 2 pounds per square metre.
- ✓ For fruit trees, you apply a pound per plant at the time of planting and three applications of one pound per year during the first two years. When they go into production they'll need two pounds, three times a year.
- ✓ Bokashi should not be kept for more than six months.

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