

Photo Protocol Bokashi

17. November 2022: Building the Bokashi buckets

Volunteers Lina Saleh and Theresa Jäger built three Bokashi buckets. For that, six buckets and three lids needed to be cleaned. We reused buckets, that were gifted to Giacche Verdi by a local company. On three buckets GV staff Riccardo Samperi attached drains. Into the other buckets Lina and Theresa made multiple little holes to create a sieve. Afterwards the buckets were stacked into each other, in a way that under the sieve a little gap forms, in which liquids can accumulate and be released through the drain. The upper bucket is closed airtight with a lid.



17. January 2023: Starting the Bokashi

We started to fill the Bokashi buckets. Over the last few days, we cut our organic waste into small pieces and collected it. We mixed the waste and filled it equally into the three buckets. We pressed it down to reduce the air inside, since the fermentation is an anaerobic process. In one bucket we put some EM. In another bucket we filled some yogurt. In this way we added bacteria to those buckets. The third bucket serves as a comparison and is left without additional bacteria. In the end, we covered the surface of the waste with foil and weighted it down with stones. We closed the lid.



20. January 2023: Filling the Bokashi

We continued to fill the buckets. We removed the foil and the stones. We repeated the same steps as before. First, we mixed the waste. This time it also contained some cooked leftovers. We put the new waste on top of the old one and pressed it down. Again, we added EM and

yogurt into the same buckets as last time. Then we covered everything with the foil and stones, in order to keep the air exposure minimal.



25. January 2023: Taking the Bokashi juice

We extracted the Bokashi juice through the drains. We used three different glasses to compare our results. From the first bucket, where we added nothing, we got a lot of juice. The colour was a light, cloudy orange. It smelled a bit sour. From the second bucket, with the EM, we got less juice. It had a cloudy brown colour. The smell was similar to the other one, but less intense. From the third bucket, with the yogurt, we could not extract any juice. The different findings can have many reasons. First, the content of each bucket is slightly different to each other. Although we try to reduce the differences, by mixing the waste, we cannot guarantee that the content is the same. Depending on the content, it is normal to have a varying juice development. Another aspect could be the sieve, which is a bit different in each bucket and the drains. An influence of the EM and yogurt could be imaginable, especially because the EM is added as a liquid.



From left
to right:

- 1 normal
- 2 EM
- 3 Yogurt



30. January 2023: Continuing the Bokashi

First, we took the Bokashi juice. The results were similar to the last ones. Noticeable was that the normal and EM juice had some white particles on the surface. This time we could also extract Bokashi juice from the third (yogurt) bucket. The liquid was clear and had a similar

colour as the first (normal) one. All three juices had a similar smell. After that we filled the buckets with new waste, in the same way as before.



From left
to right:
1 normal
2 EM
3 Yogurt



05. February 2023: Continuing the Bokashi

We did the same as before. This time we got more Bokashi juice than previously. The amount of juice of the EM and yogurt was almost the same. The normal one developed slightly more. The EM juice had the most white particles and the less intense smell. In addition, we filled the Bokashi with new waste.



From left
to right:
1 normal
2 EM
3 Yogurt



11. February 2023: Continuing the Bokashi

We filled the buckets and took the Bokashi juice. Noticeable was that the EM juice had a lighter colour than usually and just on the surface the colour was darker.



From left
to right:
1 normal
2 EM
3 Yogurt



26. February 2023: Continuing the Bokashi

We did the usual. Since we skipped one filling due to illness, we had a significantly higher amount of Bokashi juice.



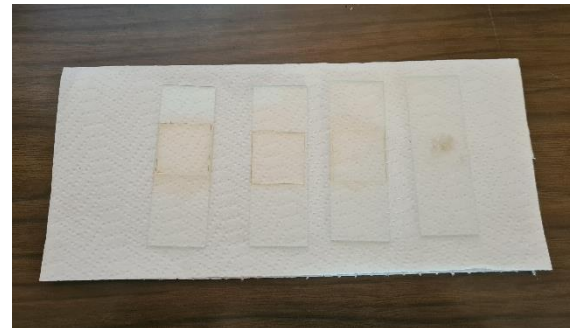
From left
to right:

- 1 normal
- 2 EM
- 3 Yogurt



27. February 2023: Analysing the Bokashi juice

We used a Microscope to examine the Bokashi juice. Unfortunately we were not able to discover any differences between the samples. The available object lens, which provided a magnification of 2,5x, was not enough to discover new findings. We were hoping to detect the EM organisms. In addition, some sources suggested the formation of yeast fungi. Both were not detectable with the given material. The white particels might be plant cells.



02. March 2023: Continuing the Bokashi

We filled the new waste into the buckets and took the Bokashi juice. We mixed the juice with water and gave it to the plants in our garden.



From left
to right:

- 1 normal
- 2 EM
- 3 Yogurt



09. March 2023: Continuing the Bokashi

We filled the buckets. They are now almost full. We also had a lot of Bokashi juice.



From left
to right:

- 1 normal
- 2 EM
- 3 Yogurt



13. March 2023: Continuing the Bokashi

For the last time we filled organic waste into the buckets. We will leave the Buckets closed for the next weeks, so the content can ferment. During the time we will only release the Bokashi juice.



19. March 2023: Releasing the Bokashi juice

We released the Bokashi juice. The Bucket with yogurt produced the most this time.



From left
to right:

- 1 normal
- 2 EM
- 3 Yogurt



01. April 2023: Releasing the Bokashi juice

We released the juice. Although we waited longer than usual, the amount was not significantly higher than before which indicates that the content becomes increasingly dry. The lack of new material might also reduce the amount of Bokashi juice.



From left
to right:

- 1 normal
- 2 EM
- 3 Yogurt



05. June 2023: Burying the Bokashi

The Bokashi is now finished. We buried it in the garden. It will take a few weeks till the Bokashi is decomposed.

All the buckets had a white layer on top. This could be mould, which would be a bad sign or yeast, which would be a good sign. But we have no way to find out which one it was. The content had a strong smell. The control bucket was okay, but the yogurt bucket smelled unpleasant. The EM was in between.

We cleaned the empty buckets for the next use.



27. July 2023: Checking the Bokashi

For the end of this project, we checked how the Bokashi has changed since last month. The Bokashi was mostly decomposed. There were no big differences between the tree tries.

Already before digging it up, it was evident that something has happened to the Bokashi because the soil had lost some volume and was slumped down a bit. The signs were almost completely buried.

The soil was crumbly and mostly dry. Only where the Bokashi was not fully decomposed it was humid. All of them had lost their smell. It seemed like the control Bokashi was the most decomposed and the EM Bokashi the least. Since we do not have a method of measuring this, this is only an impression.



Control Bokashi



EM Bokashi



Yogurt Bokashi



Overview

Evaluation:

All in all, it can be said that all methods were successful. None of the differences we observed indicated different qualities.

We saw some differences in the amount of Bokashi juice. But the differences varied each time. It was not always the same bucket that had the most/least Bokashi juice. Therefore, it is difficult to say, if EM or yogurt had an influence on the juice development. It is more likely that the differences were caused by the slightly different content. The experiment was done in a household setting rather than a laboratory. Thus, there could be differences in amount and composition of the content. In the beginning we recognised a significantly darker colour of the EM juice. This could be caused by the dark liquid of the EM culture that we added. Other colour differences were not consistent, which leads us to the assumption that those were also content related.

The appearance of the Bokashi itself was fairly similar as well as the decomposition. Observed differences of the decomposition could be caused by the differences in the location. One may have gotten a bit more sun and the next a bit more water.

In conclusion, our experiments were successful. We discovered that the Bokashi process functions in a lot of different ways. Our goal was also to determine if the Bokashi is suitable for households that can not realize composters. We can recommend Bokashi. It is an easy method and does not require a lot of space. However, it does take a bit more maintenance than a bin or a composter. But the reward is definitely worth it. The Bokashi provides a free, ecological, environmentally friendly fertilizer. That can be used for the own plants in the house or the garden or given away to someone who can use it. The juice can also function as a pipe cleaning product due to its pH value. The Bokashi brings organic matter back in the soil and it is therefore kept in the natural cycle. Plants provide from the soil improving qualities of the Bokashi.

For households we recommend finding a Bokashi bucket with a reasonable size. We used three big buckets simultaneously. Hence it took some time to fill them up. If the white layer was mould, the time factor could have favoured its development.

The Bokashi is a great way to realize climate protection in everyday life and contributes to a safer environment. We can encourage everybody to give the method a try and see if it fits with one's customs.

Perspectives:

Our experiments focused on the process of making Bokashi. Future experiments could examine the effects on plant growth of the Bokashi juice as well as of the Bokashi. Bokashi is also supposed to work in combination with Biochar. One could also try a more scientific approach and measure e.g. the pH during the process, explore the effects on the soil in more detail or do further analyses of the composition of the Bokashi juice.