

Truth or wishful thinking?

24-hour compost

There is an international trend towards simplified methods of producing compost: super-high-speed composting, dehydration, flash composting, fermentation, and whatever other miraculous names are meant to suggest a miracle. Now we need to make one thing clear right from the start: There are no miracles in composting – unless, of course, one chooses to describe the work of microorganisms as a small miracle of nature in itself.

But the fact is that the various cultures of bacteria and fungi, some of which cannot even develop alongside one another, won't be told what to do – neither in terms of the quality nor the speed of their work. And that is final! Of course, that did not stop us from putting it to the test.



The 24-hour composting trial begins with food waste at the Compost Systems office in Gars am Kamp.



So, on a well-known online platform, we opted for the best-rated model and wasted no time in investing € 400–500 in a high-speed composter from the “kitchen appliance” category. Actually, we had to return the unit right after the first attempt because it was defective, but the replacement we were sent did allow us to carry out a proper practical trial. So, we put the usual kitchen biowaste into the unit and got to work.

First of all: This involved an input weight of exactly 545 g of biowaste. After a 24-hour treatment cycle, the weight on reweighing was 326 g – a weight reduction of no less than 42%! In the process, we consumed almost exactly 1 kWh of energy.

With that in mind, let's take a look at the energy balance. Assuming that the amount of CO₂ or other substances lost during the process is negligible, the loss in weight must be due to water being driven off. To be precise, that means 229 g of water evaporated during the test.



Let's do the maths: Purely in energy terms, 144 Wh would have been needed to evaporate 229 g of water, but our meter showed electricity consumption of almost exactly 1,000 Wh. Our express composter therefore has an efficiency of just 14.4%! Next, let's look at the electricity bill. Now let us imagine a proud homeowner deciding to switch a four-person household over to this wonderful new express system. Assuming 150 kg of biowaste per person per year (children somewhat less, as they are not so keen on vegetables), that would mean dealing with around 500 kg of biowaste annually. Of that amount, as established in the above test, 42% – in other words 210 kg of water – would be evaporated. Scaled up to household level, that would correspond to a total additional energy consumption of 1,458 kWh. Incidentally, that is roughly equivalent to the electricity consumption of 15 to 20 sauna evenings with friends.

In hard cash, at today's electricity prices of 25 cents/kWh including grid charges, that would amount to € 364 per year. Of course, we can also convert that to a per-tonne figure, which would yield treatment costs of € 729 per tonne of biowaste.

If we were to apply this system across the whole of Austria and process the country's roughly 1.5 million tonnes of biowaste in this way – biowaste that is currently upgraded at professional composting plants – this would result in electricity consumption of around 4.4 terawatt-hours. That is roughly the same as the Austrian Federal Railways' electricity consumption for all rail traffic over a period of 18 months. If every household drove a Tesla, the 24-hour composter would consume roughly as much electricity as driving 8,000 km in a Model 3.



After 24 hours, the biowaste had indeed been transformed into a peat-like product. In the process, around 42% of the weight was lost in the form of water. At an electrical efficiency of 14%, however, that water loss came at quite a price. Treating one tonne of biowaste in the machine costs more than € 700.





These figures would not be a real source of concern if the electricity came from the household's own solar system and the compost itself was sound. So we took another look at the product itself.

What was immediately noticeable was this: It had lost its original appearance and gave the impression of coarse, dry peat. To find out whether the product had in fact undergone biological stabilisation, our test batch was watered again. The microscope images then showed heavy fungal growth in the product and a slight temperature increase of around 5 °C above ambient temperature. The smell was rather musty – not exactly the favourite smell of the modern homemaker.

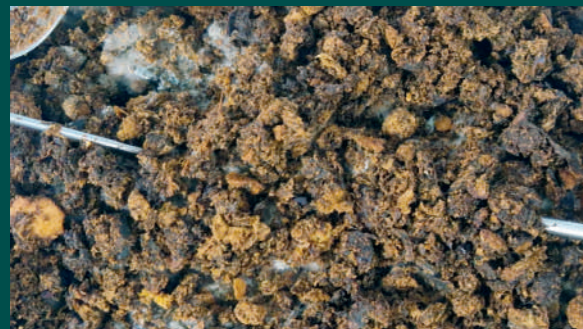
After an observation period of 28 days of “curing”, we took a closer look at the product once again and unfortunately had to stop the trial abruptly at that point. A heavy culture of black mould had developed in the vessel and, thanks to an ample food supply, was clearly doing a magnificent job of producing spores. That brought the ordeal of our biowaste trial to an abrupt end, and due to serious sanitary concerns, it ultimately ended up back in the biowaste bin.

Anyone who would like to have some fun working with 24-hour composting processes is very welcome to do so. Perhaps others will have more success with it. We were obviously not clever enough to get the system running properly.

One final point worth noting is that the 24-hour composter is equipped with an activated carbon filter intended to prevent unpleasant odours in the kitchen. Incidentally, the effect is genuinely noticeable during the first few runs. Unfortunately, the filter became saturated after only a few cycles, and the smell then hit the surrounding area in full. Apart from the little flies we normally associate with the biowaste bin in summer, hardly anyone found the smell attractive. And in the end, the cost of replacement filters completely wiped out any remaining motivation for 24-hour compost production.



Unfortunately, after 24 hours of composting, the product was not stable and began to heat up again after being remoistened.



During the 28-day maturation period, the material developed heavy fungal growth and began to smell musty.



Conclusion

Unfortunately, our original suspicions had been confirmed. There is no such thing as 24-hour compost – at least not in the sense in which we understand compost. The costs from electricity consumption alone are absurdly high and far beyond anything that could be considered an acceptable energy balance. If anything, this practice is actually more harmful to the environment than it is “eco”. The electrical efficiency was just 14 %. Based on one year and a four-person household, the cost of treating one tonne of biowaste comes to € 729 in electricity alone. After 24 hours of treatment, the biowaste looked relatively fine – but only in appearance. As soon as it was remoistened, the product immediately started working (again). At the same time, however, black mould developed in the substrate, which can be highly problematic for both humans and animals. In summary: A CLEAR FAIL.



In the end, the material turned into one large mouldy clump.



The development of black mould, regarded by hygiene experts as highly concerning, marked the beginning of the end of the trial.



The 24-hour composting trial met its abrupt end in the final resting place of the biowaste bin.