BOKASHI

for Urban Soil Regeneration

Cork City Council Innovation Fund
April 2025

REPORT SUMMARY

This report relays Cork City Council's experiences fermenting food scraps from the Council canteen using 'bokashi.' It includes an overview of the importance of soil and 'organic matter,' details of the fermentation process used by Cork City Council, and the results experienced from using bokashi to improve soil structure and plant growth.

It concludes that bokashi is an effective method for recycling food scraps and has several potential applications in Irish towns and cities. Increased use of bokashi could contribute to cost savings, climate action, more biodiversity, and sustainable urban drainage. Further pilot projects and the development of supportive policies, regulations, and guidelines at the national and local levels could accelerate this process.

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1.0 WHY THIS MATTERS

1.1 The Fundamental Importance of Soil

Before talking about bokashi, it is necessary to begin with a review of soil. Most of us give soil little thought, but healthy soil is critical to the proper functioning of all our other ecosystems. For example: almost 95 percent of our food is produced in or on soil. (FAO UN, 2015); the success of any efforts to 'green' areas, increase tree cover, and support biodiversity is dependent on healthy soil. Healthy soil reduces flooding by soaking up water, sustains plants through periods of drought by holding moisture, and helps protect water quality by filtering pollutants. Soil can also sequester significant amounts of greenhouse gases.

1.2 'Organic Matter' Matters

Soil is mostly made up of a mix of very fine pieces of rock (sand, silt, and clay); however, healthy soil also contains 'organic matter'—which is anything that was once alive—as well as pockets of air and water.

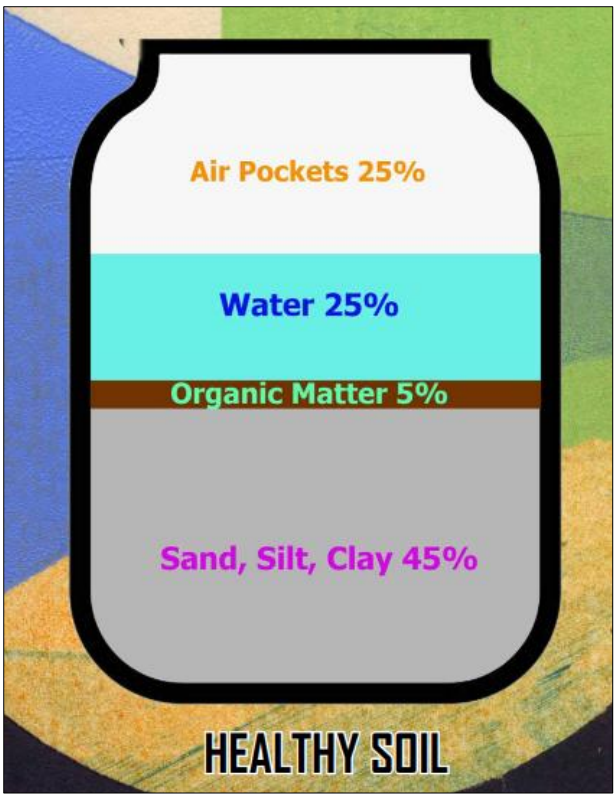


Image credit: The People's Kitchen

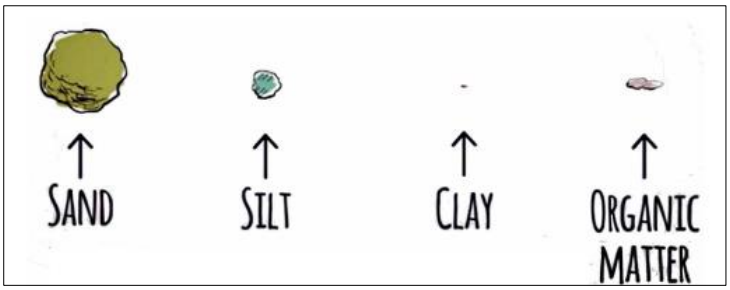


Image credit: learninggameslab.org (Science of Agriculture)

Organic matter is a critical aspect of healthy soil, as it is a key food source for the infinitesimal number of bacteria and other microscopic creatures (microbes) that live in the soil. While we sometimes think of bacteria as 'bad' and something to be eliminated, not all bacteria and other microbes are pathogens. Some microbes are our closest allies, and the health of humans, plants, and soil is dependent on them. Microbes (in addition to larger soil dwellers, such as worms) are what create soil structure, and soil structure is what makes many of the functions of soil possible. Microbes are also what break down the rocks and organic matter in a way that releases essential nutrients that plants can absorb.

Significant amounts of soil are degraded and contain very little organic matter. Adding compost or bokashi to the soil can help restore its organic matter content and increase the number of microbes living in the soil (i.e., restore underground biodiversity).

1.3 What is Bokashi?

Composting and bokashi making are processes that humans undertake in collaboration with our 'ally' bacteria and other microbes to efficiently break down organic materials such as food scraps and garden trimmings that we produce as part of daily living. Composting is done with microbes that live in oxygen-rich environments. Bokashi, on the other hand, involves microbes that live in low-oxygen environments. Bokashi (rhymes with toe-gosh-ee) is a fermentation process, like making sauerkraut or silage. The term 'bokashi' comes from spoken Japanese, and its translation relates to broken-down matter/fermentation.

1.4 Some Benefits of Bokashi

While both composting and the bokashi processes are beneficial, bokashi may offer advantages over composting in some circumstances. For example:

- **Options for small spaces:** Small households in urban centres that have no outdoor space for composting or for storing a brown bin for collection—such as apartments above shops in historic buildings—can keep a bokashi bin under the kitchen sink for months without experiencing any odours or other issues.
- **Meat and cooked food:** Households can add food scraps containing meat and dairy products to a bokashi bin, whereas such food scraps are not recommended for standard at-home composting.
- **Soil Fertility and Emissions:** Composting a significant volume of organic materials at once causes the microbes to reproduce rapidly, which results in high temperatures (60◦ Celsius or higher). This, in turn, can result in both nutrient loss due to heat generation and increased carbon dioxide emissions. Bokashi does not heat up, which means that it retains a higher level of nutrients, produces fewer emissions, and potentially sequesters more carbon (Agriton,2024).
- **Scalable:** Pilot projects indicate that the development of small-scale municipal bokashi facilities could be cheaper than comparable compost and anaerobic digestion facilities. This could make an increased number of small facilities economically viable (Huang, 2025).

Smaller, localised facilities could provide many benefits, including reduced waste management costs for smaller communities and lower transport emissions. Transport emissions associated with large, centralised facilities include both those generated while hauling the food scraps to the facility and subsequent emissions from hauling the resulting compost from the central facility to its final use points.

1.4 Project Purpose

While there are significant potential benefits to its use, bokashi is a relatively unused technology in Europe. With this in mind, Cork City Council conducted a bokashi trial in 2024 through the City Council's Workplace Innovation Fund. The primary purpose of the project was giving Council staff a firsthand opportunity to become familiar with the bokashi process and its potential. This knowledge will provide a foundation for understanding and supporting household, community, or larger scale bokashi projects in the future. The project also created an opportunity to consider where Council processes could benefit from locally produced soil amendments[1] and provided a platform for raising awareness of bokashi and soil health amongst Council staff and the public.

[1] Soil amendments are materials like bokashi or compost, which improve the soil's properties.

2.0 MAKING BOKASHI

2.1 People

This project was carried out by Erin O'Brien, a policy planner in the Planning and Integrated Development Directorate. However, projects such as this one are not possible without significant collaboration. Some key collaborators and supporters included:

Cork City Council	External
Workplace Innovation Fund Team	Martyn Richards, Agriton
Mike McBride and City Council Canteen Staff	Ollie Greene, Better Plants
Thomas Kane, Tree Officer, and the Glen Depot crew	Mary Murphy, Cork County Council Laboratory
Pat Dunne, Facilities Manager	Aisling Kett, Cork Zero Waste
Eilish O'Boyle, Executive Scientist	Ailbhe Cunningham and Kyrl's Quay Test Site Team
Kelly Cotel, Assistant Planner	Mal Hughes, Biome Connect
Usna Keating and Rosemarie McDonald, Biodiversity Officers	Peter McGlynn, Larkfield Pellet Products
Orla Burke, Community Climate Action Officer	
Frank Fitzgerald, Sustainable Travel Awareness Officer	
Communications Team	

2.2 Supplies and Equipment

Bokashi is a low-tech method that requires relatively minimal equipment. As shown in Figure 2.1, this project used:

- ☐ A specially designed **120-litre bokashi wheelie bin**, which includes a tap at the bottom for draining off liquid and an airtight seal in the lid to create a low-oxygen environment (€300).
- ☐ **Un-specialised containers** for alternative trials including repurposed 10 L buckets from the Council canteen (free) and a 120 L food-grade industrial drum (€40), which is being trialled at the time of writing.
- ☐ **Bokashi bran**, a specially purchased wheat bran inoculated with a specific mix of lactic acid bacteria and other beneficial microbes (around €5 of bran to process each 120 L bin)
- ☐ An **ice chopper** or square-headed shovel for chopping up large food scraps (€35)
- ☐ **Mini square shovel** for removing the bokashi from the bin (€13)
- ☐ **Hose** with spray nozzle for cleaning buckets and equipment (existing)
- ☐ **Rubber gloves**

Figure 2.1 Bokashi Making Equipment

Figure 2.2 Food scraps from the kitchenette brown bin caddies (left) are mainly fruit peels and tea bags; canteen food scraps (right) include cooked food.

2.3 Feedstock

For this project, the feedstock (i.e. the organic materials to be processed) came from two sources:

- The kitchenettes on each floor, where brown bin caddies contain mostly fruit peels and tea bags
- The canteen, where food scraps include kitchen prep waste, leftover/unused food, and plate scrapings. These include meat and dairy products.

Unlike composting, fermentation does not require carbon-rich or 'brown' materials, such as cardboard, newspaper, leaves, or wood shavings. However, the inclusion of a small amount of 'browns,' such as serviettes and paper tea bags, does not negatively impact the process.

2.4 Fermenting Space

The fermentation process can take place outdoors; however, it works more effectively in warmer environments. Given this, the bokashi bin used in this process was kept in a small, indoor under-the-stairs closet (see Figure 2.3). This closet was simply chosen because it was the nearest space to the outdoor brown bin storage.

Figure 2.3 The fermenting process and equipment storage took place in a small under-the-stairs closet in City Hall.

2.5 Processing Capacity

A single 120 L bin can process around one tonne (up to 1,560 L) of food scraps annually. The Council canteen produces over four tonnes (some 6,240 L) of food scraps annually, so the pilot project only processed a portion of the food scraps produced by the canteen, with the rest being taken away by the regular brown bin service. Four bins would be required to process all the canteen food scraps.

2.6 Steps in Bokashi Making Process

Given this was a temporary trial, the project was fitted in around existing Council processes. If bokashi were to become the permanent food scrap processing system at Cork City Council, efficiencies in the process would be possible. The steps in this pilot project were as follows:

2.6.1 Prepare the Scraps

1) Retrieve food scraps from the standard brown bin. This was done at the end of the week, and the bokashi bin was filled in a single session. In a permanent system, it would be easier to collect food scraps in sealed 20 L buckets to await processing rather than placing them in the brown bin for retrieval.
2) Remove 'contamination,' i.e., non-compostable objects that ended up in the brown bin such as plastic jam packets, foil butter wrappers, and cling film. As shown in Figure 2.4, the amount of contamination can be considerable. This could be reduced through awareness training (Melta, 2022).

3) Chop any larger food scraps into smaller pieces using the spade or ice chopper. Chopping is

particularly important for meat scraps (cooked meat should be in no larger than 2.5 cm pieces; raw meat no larger than 1 cm pieces). Chopping is also important for any scraps that may create an air pocket (such as a curved melon rind), as air pockets could interfere with the low-oxygen environment. Given the textured nature of the paving in the area (see Figure 2.5), food scraps were chopped on a piece of cardboard retrieved from the recycling bin to prevent the scraps from sticking in the paving joints.

4) Adjust the moisture content of the food scraps if necessary. Most food scraps can be added as is. However, if a particular batch of food scraps is on either end of the spectrum in terms of moisture content, being either too dry (e.g., spilt flour) or too soupy (saucy curry leftovers), they may need to be mixed with other food scraps to balance out moisture levels. Alternatively, a carbon-rich material such as paper serviettes can also be added to soak up excess moisture.

2.6.2 Fill the Bin

5) Add a 5 cm layer of food scraps to the bin. Tip: Some find it easier to measure by volume. For example, the bin used in this report is 40 cm square. So, a 5 cm layer in a bin of this size has a volume of 8 L (40 cm x 40 cm x 5 cm = 8,000 cubic centimetres or 8 L.) This volume of material can be gauged using a 10 L bucket.
6) Compress the scraps to remove any air pockets by pressing them down. Some use specialised equipment; this project just used the bottom of a plastic bucket for this purpose.

Figure 2.4 Plastic and other non-compostables that were removed from one batch of canteen food scraps before starting the bokashi process.

Figure 2.5 Erin O'Brien filling the City Council bokashi bin.

7) Sprinkle a handful of bokashi bran evenly over the food scrap layer. Use more bran for food scraps that contain a higher fat or protein content. Several sources recommend around one tablespoon of bokashi bran for each litre of food scraps (including Flood, 2023).

8) Repeat this layering process until the bin is full.

9) Rinse the bucket and chopper and return the bin and equipment to the storage closet.

The Bokashi-Making Process Summarised

Collect, dump, squish, sprinkle, close—and be mindful of size and moisture.

—Todd Veri (author of the book *Better Bokashi…better Earth)*

2.6.3 Monitor the Fermentation Process

10) Every 3-7 days, use the tap in the bottom of the bin to drain off any liquid ('leachate'). Dilute the liquid for use as a plant fertiliser or put it down the drain as a drain cleaner.

11) Allow the bin contents to ferment. Batches containing meat or dairy products require four weeks of fermentation; batches with no meat and dairy require only two weeks.

    At the end of the process, the top layer will likely be covered with white mould (see Figure 2.8). This is a good sign of a successful fermentation process. Most of the food scraps will still look the same, in the way that a pickle still looks like a cucumber. However, giving the food scraps a poke with a trowel will show that the internal structure is gone, and the scraps have become somewhat mushy or—as one bokashi maker described them— 'zombified.'

    The bokashi has a distinct odour that is slightly vinegary and often a bit sweet. Some observers at the Council compared the smell to vinegar, barbeque sauce, a brewing smell, or the last bits of wine left at the bottom of a bottle. If the food scraps smell rotten or like sewage, this means that they have putrefied rather than fermented, and the process was not successful. Black or green mould, rather than white mould, is another indication of putrefaction. 'Bad' batches are best sent to be hot composted, which will ensure any potential pathogens present are killed off..

    Bokashi can be used as soon as fermentation is complete, or it can be kept for several months before use if it remains in an airtight container/low oxygen environment.

Figure 2.6 A full bin ready to begin the fermentation process.

Figure 2.7 A jar of bokashi leachate, about to be used as drain cleaner.

Figure 2.8 A fermented bin of food scraps with white mould on top

Figure 2.9 A sample jar of bokashi which shows the swirling microbe patterns that developed within it over a few months.

2.6.4 Dig It In

There are several ways to break down bokashi and add it to soil. The key method used in this project is outlined below.[2]

12) Dig a trench that is 30 cm (12 inches) deep and the width of the shovel (around 25 cm). Lengthwise, the trench will be around 30 cm for every 10 L of bokashi being trenched in.

[2] This bokashi is being dug into soil with very low organic matter where existing soil structure disturbance is not a significant issue. Alternative techniques exist for the use of bokashi in established no-dig systems.

13) Dump the bokashi into the trench.
14) Shovel some soil on to the bokashi and then mix this soil and the bokashi to introduce the soil microbes into the bokashi.
15) Once some soil is mixed in, cover the bokashi ('cap it off') with about 15 cm (6 inches) of soil. This will deter dogs and wildlife from digging in the bokashi and will also prevent any noticeable odour as it breaks down. (While sometimes popular with dogs, several sources suggest that bokashi is not favoured by rats, who dislike the fermented taste.)
16) The bokashi is quite acidic at first (reported average pH around 5), so it should be kept away from sensitive plant roots. It is generally recommended to wait two weeks before planting in the spot where it has been dug in to allow the pH to balance out. Once in the ground, the bokashi can break down and be undetectable in as little as two weeks, or the process may take a few months based on the City Council trial. The rate of break down depends on several factors including the nature of the soil, the content of the bokashi, and the outdoor temperature.

Figure 2.10 Ailbhe Cunningham prepares trenches for bokashi at Test Site on Kyrl's Quay.

3.0 RESULTS

3.1 Pathogen Testing

Hot composting uses the high temperatures (60◦ C or higher) created by microbial activity to kill off any potential pathogens that may be in the food scraps. Bokashi uses an alternative approach, killing off pathogens through fermentation, which creates an acidic, low-pH environment. The growth of pathogens in bokashi is further stifled by the low oxygen conditions and by natural antibiotics formed by some fungi that grow during the fermentation process (Merfield, 2012).

The Cork County Council Veterinary Food Safety Laboratory tested a sample of bokashi that was produced by the City Council project. No Irish/EU standards currently exist in relation to food scrap fermentation. However, as shown in Figure 3.1, the sample complied with the recommended standards set out in *Development of Quality Standards for Compost and Digestate in Ireland.* (Foster and Prasad, 2021 as published by the EPA). See Appendix A for full details of the test and testing methodology.

Figure 3.1 Lab Results

Pathogens	Quality Standard	Cork City Council Bokashi Test Results
Salmonella spp. (cfu/25 g) *	Absent in 25 g	✓
Escherichia coli (cfu/g fresh mass)	<=1000	✓ <10

*cfu= colony forming unit

In-Depth Testing of Bokashi and Pathogens

Melta, an Icelandic start-up, is currently scaling up to provide municipal-scale food scrap recycling facilities for small Icelandic communities. As a step toward this development, Melta conducted in-depth testing on pathogens and bokashi (Melta, 2022). In one trial, Melta deliberately added *E. coli* to food scraps until the food scraps contained 330,000 cfu of *E. coli* per gram of organic matter. The contaminated food scraps were then fermented. They were tested again after the fermentation process was complete, and the levels of *E. coli* were negligible (<10 cfu/gram). This and similar trials conducted by Melta have led to bokashi being approved as an 'authorised alternative transformation parameter' by the Icelandic Ministry of Fisheries and Agriculture.[2]

[3] Per Zoom meeting with Björk Brynjarsdóttir, co-founder of Melta, on 18 February 2025.

Figure 3.2 Heavy clay soil from a public planter before (left) and after (right) bokashi treatment.

3.2 Soil Comparison

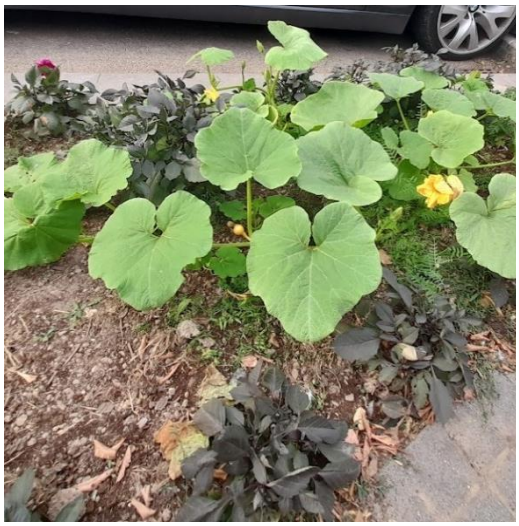
As part of the Cork City Council trial, bokashi was dug into some soil from a planted public verge along a city centre street. The original soil, as shown on the left in Figure 3.2, is a heavy clay with little organic matter. The image on the right shows the same batch of soil with a single bokashi treatment. The increase in organic matter is evident. Due to the increase in organic matter, the sample retains moisture for considerably longer than the control batch of soil.

3.3 Growth Trials

As part of this trial, it was intended to use the bokashi in the Spring 2024 tree planting programme, but in the end, the bokashi was only used in one tree planting trial. In this trial, no 'control' trees were planted without bokashi to allow for quantified comparison in tree growth. However, the Tree Officer stated his observation that the trees that received bokashi were experiencing very positive growth. Some informal tests were also conducted in a planting bed/verge in the City Centre. While not scientific in its approach, observed plant growth indicated benefits from the bokashi, both for flowers and tree seedlings (see Fig 3.3).

[4]Per Zoom meeting with Björk Brynjarsdóttir, co-founder of Melta, on 18 February 2025.

Figure 3.3 Informal Growth Trials



September 2022

These dahlias were originally planted on the street verge in the Summer of 2021 in heavy clay soil. This image shows the dahlias in September 2022, just over a year after planting. The plants are small, with few blooms.

October 2024

In April 2024, bokashi was dug into the bed, and one of the original dahlias from the bed was replanted in the bokashi-enriched soil. Six months later, this single dahlia plant is significantly larger than in previous years and has over two dozen blooms/ buds.

May 2024

A peach seedling is (temporarily) planted on the street verge in bokashi-enriched soil.

October 2024

The seedling has reached 60 cm.

3.4 Public Adoption

While public outreach was not the key focus of this initiative, there were still opportunities to highlight the project. These are summarised in Appendix B. At various presentations, individuals, commercial businesses, and institutions expressed interest in bokashi. The overall impact of the project is not fully known. To date, two members of the public have informed the Council that they have purchased and are using bokashi bins because of this project (see Figure 3.4).

Figure 3.4 A bokashi bin in use in an 'above-the-shop' apartment in Cork City Centre because of this project.

3.5 Mistakes/Lessons Learnt

Some of the best learning in the project came from mistakes. Here are three lessons learned to date:

3.5.1 **Ensure moisture levels are correct in all layers of food scraps in the bin.** The first batch of bokashi was only a partial success. While the top layer fermented well, the lower layers were putrefied (rotted) rather than fermented. The key factor seemed to be that some of the lower layers were too dry, due to the inclusion of a large amount of flour. The lack of moisture prevented the fermenting bacteria from traveling through the food scraps. Secondly, it is also possible that more bokashi bran should have been used.

3.5.2 **Communicate clearly; ensure those who use the bokashi understand that it is very different from standard compost.** In the tree trial, instructions on to how to use the bokashi got lost in translation, and the grounds crew used the bokashi like standard compost, adding it directly in the planting holes rather than trenching it well below the root system or beside the tree. The bokashi was also not fully capped off and was rapidly discovered by dogs.

3.5.3 **The use of bokashi in planters requires the right conditions.** As an experiment, a thin layer of bokashi was mixed into the soil in the bottom half of two deep planters prior to planting. The intention was that the bokashi would break down before the roots of the plants reached it. However, two problems arose. In one planter, leachate from the breaking down materials ran out the bottom of the planter onto the paving below. The second planter became blocked and

Figure 3.4 The wrong approach to the use of bokashi in a planter led to waterlogging after the planter was filled (right).

waterlogged from rain (see Figure 3.4). The planters should have been covered during the breaking down process to keep out excess moisture and/or more drainage holes were required in the bottom of the planters. (There was only one small drainage hole, which became clogged.) The bokashi layer had to be removed.

3.6 Key Outcomes

Cork City Council's initial bokashi trial has demonstrated that

- the bokashi-making process is straightforward;
- fermentation can successfully prevent pathogen growth during food scrap recycling; and
- informal tests indicate that bokashi has had a positive impact on soil health and plant and tree growth.

4.0 NEXT STEPS

4.1 Regulatory and Guidance Framework

Ireland currently has no regulations related to organic matter treatment by fermentation; while it is possible that such regulations may exist in other EU countries, none have been successfully identified at the time of writing. The only international example identified was New York State (USA), which addresses fermentation broadly in regulations. As noted in Section 3.1 of this report, Melta has set a precedent in relation to Animal By-Products legislation, having earned approval of bokashi as an 'authorised alternative transformation parameter.' Melta is currently working through issues related to bokashi's end-of-waste status.[5]

4.2 Ideas for Further Trials and Pilot Projects

The best regulations and guidelines are often built from the ground up based on experience. Such experience could come from doing further trials within government or supporting non-governmental actors who are willing to do so. In addition, there may also be opportunities to harness some of the benefits of bokashi within the existing organic recycling framework. Some ideas are set out below.

4.2.1 Use in Local Authority Projects

Further Local Authority pilot projects could provide one avenue for testing and developing bokashi-supportive systems. For example, Cork City Council could scale up the current project, fermenting all food scraps from the Council canteen for one year and using the resulting soil amendments in tree planting and sustainable urban drainage projects. As highlighted earlier in this report, the soil currently used in many public realm projects lacks organic matter. The quality of this soil has an impact on the health and longevity of new planting, which in turn impacts both the costs and the long-term success of public realm and greening projects. Improved soils could also be significant for the success of sustainable urban drainage ('SUDs'). While SUDs tests to date have focused more on compost rather than bokashi, studies indicate that compost immobilises and degrades hydrocarbons, solvents, and other contaminants in urban storm water, filtering out 60-95% of these pollutants. (Bell and Platt, 2014)

4.2.2 Over-the-Shop Apartments Pilot Programme

Bokashi may offer a viable option for providing a food scrap recycling service for urban apartments with no private outdoor space or any ancillary space with the potential for brown bin storage. For example, a simple programme could provide bokashi bins and a nearby monthly collection point where bins could be emptied, with the fermented food scraps being sent for

[5] Per Zoom meeting with Björk Brynjarsdóttir, co-founder of Melta, on 18 February 2025.

secondary composting treatment (to ensure regulatory standards are met, given the multi-point sources of the fermented food scraps in this proposed scenario).

4.2.3 Promotion to Other Private Households

Bokashi could also be promoted as an alternative (or complement) to composting for private households with gardens or other outdoor space. One online retailer estimates that a household would require around €60 of bran annually to process food scraps,[6] with smaller households requiring less. Two household-sized bokashi bins cost around €65 in total. (Two bins are required to allow one batch to ferment while the second bin is in use). Bins are available in sizes ranging from 5-30 L. As noted previously in this report, the Cork City Council project also successfully used free repurposed 10 L buckets. Such 'upcycling' could further reduce the cost of household fermentation (see details in Appendix C).

4.2.4 Integration into Brown Bin Collection

Further research could be conducted to determine whether the bokashi process has the potential to reduce costs, emissions, and traffic movements associated with brown bin collection. Specifically, bokashi-treated food scraps could be kept longer in the bin without becoming putrid before collection. In addition, the 'pre-treatment' process in the brown bin could potentially reduce the potential for pathogens and accelerate/support the decomposition process once the materials reach existing composting and anaerobic biodigester treatment plants.

4.2.5 Commercial and Institutional On-Site Treatment

Businesses and schools with sufficient curtilage could use the bokashi process for the on-site treatment of organic materials. Two examples from cafés (in Canada and Amsterdam) are shown in Figure 4.2 and further references are provided at the end of this report. Support and guidance from government for some initial pilot projects could contribute to the development of a useful model for others to follow and could also help develop and refine requirements for the permitting process.

Image credit: *Times Chronicle*

Image credit: Eszter Jámbor

Figure 4.2 Bokashi in use at JoJo's Café, British Columbia (left) and Mediamatic, Amsterdam (right).

[6] betterplants.ie

4.2.6 Larger-Scale Municipal Treatment

As touched on in Section 3.1, the Iceland company Melta is currently making plans to trial a bokashi processing plant that would serve a community with a population of 20,000 (Huang, 2025). Melta hopes to set a precedent in Iceland that can be replicated by other small European communities. They are considering the potential of an EU project and are open to exploring opportunities in other regions as they continue to validate the environmental benefits of their system, including carbon sequestration and soil restoration.

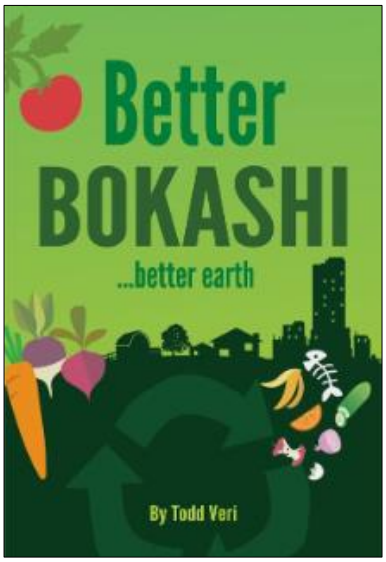
In addition, Agriton (Netherlands division) have conducted several experiments in relation to industrial-scale fermentation of garden trimmings, grass clippings, and autumn leaves that may also have considerable potential for Irish urban organics recycling (see Figure 4.4 below).

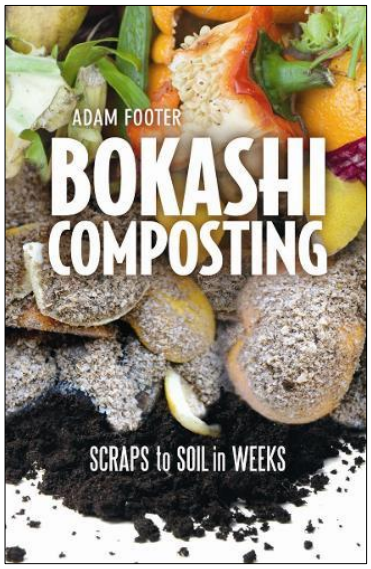
4.3 Conclusion

This report has presented the findings of Cork City Council's experiment with bokashi, which entailed fermenting food scraps from the Council canteen and using them to support better soil health. In essence, this small project has proved nothing new. However, it has provided a documented Irish experience that corroborates positive bokashi results reported from larger, more formal trials in other countries. It has also established a practical foundation for further exploration of how bokashi could be better used in Ireland to help meet our national climate, biodiversity, water quality, and circular economy objectives.

Figure 4.4 Autumn leaves undergoing bokashi treatment in Apeldoorn, Netherlands (see video clip).

REFERENCES and ADDITIONAL RESOURCES





- agriton.co.uk: Includes household instructions; small commercial applications; trials of garden trimmings and autumn leaves; and detailed results of large-scale green waste trials
- melta.is: municipal scale bokashi start-up in Iceland
- vokashi.com: Household bokashi collection service in New York City
- Webinar on Using Bokashi in Community Composting — What, Why, How, Who (islr.org, USA)
- My favourite way of composting food at home (Catherine Cleary, *Irish Times,* 2021)

Restaurants/Cafés

- Beaten by a Whisker Bakery (Walthamstow, London)
- Mediamatic, Amsterdam
- Indie Ecology, London (collected food scraps from 'more than eighty top restaurants' from 2011-2022)
- JoJos Cafe, British Columbia, Canada (Changed ownership 2024)
- Mudbrick Restaurant, New Zealand (including YouTube clip)
- Bokashi World blog: 'Bokashi a hit in restaurants and offices in New Zealand'

EU Projects

InterReg Europe, including • Bokashi: upgrading local organic residues • Innovative biowaste treatment solutions: key learnings	Cities 2030/Net Zero Mission City • Food waste bio composting in Lahti, Finland

Bokashi for Trees, Horticulture, and Agriculture

- Impacts of Bokashi on survival and growth rates of *Pinus pseudostrobus* [Smooth Bark Mexican Pine] in community reforestation projects (P.F. Jaramillo-López, et al. (2015), Journal of Environmental Management
- Treating food preparation 'waste' by Bokashi fermentation vs. composting for crop land application: A feasibility and scoping review. Merfield, Dr Charles N. (2012) The BHU Future Farming Centre. (*Excellent non-technical literature review of both technologies*)
- Review: Bokashi technology as a promising technology for crop production in Europe Margit Olle, (2020): The Journal of Horticultural Science and Biotechnology
- Is Bokashi the alternative to compost? (Green waste bokashi trial in agriculture, Netherlands)
- Soil improvement in orchards through use of bokashi (Netherlands)
- Bokashi Trials with Farmyard Manure

Municipal/Large-Scale Applications

- 'Brewing Fertilizer from Food Waste' Huang, Robyn, (2024). *Stanford Social Innovation Review* (An introduction to Melta)
- *Bokashi Fermentation in Rangárvallasýsla*. Melta/Jarðgerðarfélagið & Co (2022)
- Leaf composting Bokashi: from bio waste to soil improver | CityLoops Apeldoorn

Sustainable Urban Drainage and Bioremediation

The information noted below focuses more on compost than bokashi, however, it is still useful/relevant to the bokashi discussion:

- Using Compost in Stormwater Management (US Composting Council)
- "Laboratory based experiments to assess the use of green and food based compost to improve water quality in a Sustainable Drainage (SUDS) device such as a swale" Abstract available from sciencedirect.com
- Building Healthy Soils with Compost to Protect Watersheds. Bell and Platt (2014)
- Compost has been shown to be effective in degrading or immobilising several types of contaminants, including hydrocarbons, solvents, and heavy metals. This 2022 literature review, *Composting and its application in bioremediation of organic contaminants* provides a summary of current research.

For further information on the Cork City Council project, contact erin_obrien@corkcity.ie, Planning and Integrated Development Directorate, Cork City Council

APPENDIX A: LAB TESTING DETAILS

Methodology

The sample was derived by taking a few teaspoons of bokashi from five different layers within the bin. The layers are indicated by the dots on the bin in the image below. This batch included several animal-based products including sausages, rashers, chicken breasts, and eggs.

Dots on the bin indicate the locations of the five layers where samples were taken.

Bokashi sample provided to Cork County Council Laboratory.

Detailed Results of Testing

Test	Laboratory Method	Result
Detection of *Salmonella* spp.	TM-7	Not Detected in 25.10g
Detection of *Listeria monocytogenes* and of *Listeria* spp.	TM-8	Not Detected in 25.99g
Enumeration of β-glucuronidase-positive *E. coli* using Petrifilm™ Select *E. coli* Count (SEC) Plates.	TM-26	<10 cfu/g
Detection of Shiga Toxin-Producing *E. coli* (STEC) in Foods, Swabs and Water Samples by Enrichment, Real-time PCR Screening, IMS Isolation and Real-time PCR Confirmation.	TM-27	Not Detected in 25.10g

Source: Cork County Council Environment, Veterinary Food Safety Laboratory

APPENDIX B: PUBLIC OUTREACH

December 2023	World Soil Day display outside Council canteen
March 2024	FEEL (Frugal cities through Energy Efficiency and Low-tech communities) EU Project Study Visit Presentation
April	Lifelong Learning Festival/Community Climate Action 'Every Action Matters' Event
May	Presentation at Cork City Council Learning at Work Day
June	Presentation at Cork Zero Waste Festival
July	*Evening Echo*: 'We can convert our food scraps into a resource': City Hall trial food bokashi soil supplement scheme' and Virgin Media TV News clip
August	Panel talk at Altogether Now Festival 'Grub Circus' Tent
November	South Parish Community Climate Action Presentation
February 2025	FEEL EU Project web presentation to a project partner

TUE, 09 JUL, 2024 - 07:10

'We can convert our food scraps into a resource': City Hall trial food bokashi soil supplement scheme

Every week, the canteen in City Hall produces approximately 120 litres of food scraps, and, since Christmas of last year, rather than all of that waste going into the brown bin, a portion of it is diverted into something called bokashi.

Erin O'Brien, Cork City Council executive planner, and Kelly Cotel, asistant planner, part of the council's bokashi pilot scheme.

DONAL O'KEEFFE

A pilot scheme currently running in Cork City Hall sees the council canteen's waste food each week transformed into a soil supplement used around the city.

APPENDIX C: USING FREE BUCKETS TO MAKE BOKASHI

There are several instructions for making a 'DIY' bokashi bin out of two stacked 20 L buckets. However, some bokashi experts (Veri, 2013) recommend against this approach, stating that stacked buckets can be awkward to use and can lead to unpleasant odours from the leachate. Instead, he recommends using a single bucket with an absorbent layer in the bottom of the bucket to soak up any leachate.

Any organic material that could break down in soil could be used as the absorbent layer. The Cork City Council trials to date used a layer of raw wool to soak up leachate (see image below). The wool worked well, but the clumps take time to break down in the soil. Wool pellets, which will break down faster, are currently being trialled. Shredded paper or cardboard could also be used, and biochar[7] would likely be an excellent additive to this absorbent layer.

Figure 4.1 Repurposed 10 L bucket used as a bokashi bin (left) with resulting ferment flipped out of the bucket shown on the right. (The ferment is inverted, so the raw wool that soaked up leachate in the bottom of the bucket appears as the top layer in the photo.)

[7] Biochar is a charcoal-like material created by heating wood, agricultural green material, or animal manure in a controlled, oxygen-limited environment.