

Bin2Bean

Practice abstract 21

SCAN ME!

Transformation of organic waste to soil improvers #2

Final products

The success of biological waste treatment is ultimately defined by the quality and value of its outputs, which elevate waste from disposal to resource recovery. The main products are compost, produced through aerobic treatment, and digestate, the nutrient-rich liquid or solid derived from anaerobic digestion. Both serve as effective soil improvers or fertilizers and must undergo laboratory testing to verify their nutrient levels and suitability for agricultural application.

Biogas generated during anaerobic digestion is itself a marketable energy product. After cleaning, it can be used on-site in combined heat and power (CHP) systems or upgraded to biomethane for injection into the natural gas grid. However, raw biogas contains water vapour and harmful impurities, especially hydrogen sulfide (H_2S) and siloxanes, that must be removed. H_2S causes rapid corrosion of engines and pipelines and must be reduced to very low levels (typically <200 ppm). Siloxanes form abrasive silica deposits during combustion, damaging equipment.

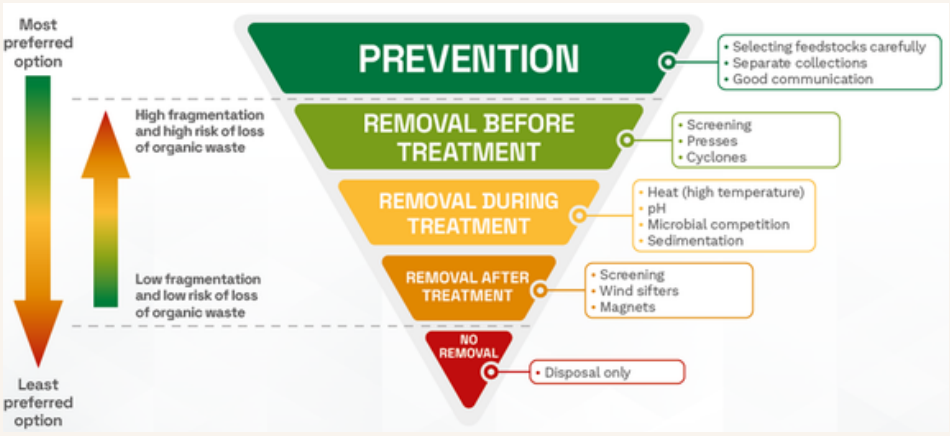
Emission control

Biological waste treatment facilities must tightly control air and water emissions, especially NH_3, VOCs, and CH_4, and manage odour impacts. Compliance is guided by the Waste Treatment BREF and its binding BAT-AELs, which set strict limits for pollutants (e.g., 5-40 mg/Nm³ for VOCs and 5-25 mg/Nm³ for NH_3). Anaerobic digestion plants must prevent methane losses through highly efficient biogas capture and use. Under the Industrial Emissions Directive, facilities must regularly monitor key emissions and meet wastewater limits such as 1-25 mg/L total nitrogen.

Separation of impurities and contaminants

To ensure a high-quality soil improver, both anaerobic and aerobic treatment plants require thorough pre- and post-separation steps.

The main objectives are to separate bio-waste fractions according to their suitability for composting or anaerobic digestion, and to remove all impurities and non-biodegradable contaminants.



The contaminant management hierarchy

Project partners

Consorzio Italbiotec · WAGENINGEN UNIVERSITY & RESEARCH · N3 NACHHALTIGKEITSBERATUNG DR. FRIEGE & PARTNER · RUOKAVIRASTO Livsmedelsverket • Finnish Food Authority · euroquality A WARRANT HUB COMPANY · HITCE SHAPING THE CIRCULAR ECONOMY · STADTREINIGUNG.HAMBURG · etaflorence renewableenergies · AMS AMSTERDAM INSTITUTE FOR ADVANCED METROPOLITAN SOLUTIONS

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