Bin2Bean

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Practice abstract 20

Transformation of organic waste to soil improvers #1

The choice of processing method depends on both the desired end product and the characteristics of the input material. Soil improvers can be produced through composting alone or through a combination of composting and anaerobic digestion. The technical systems used for the treatment processes are outlined briefly in the following section.

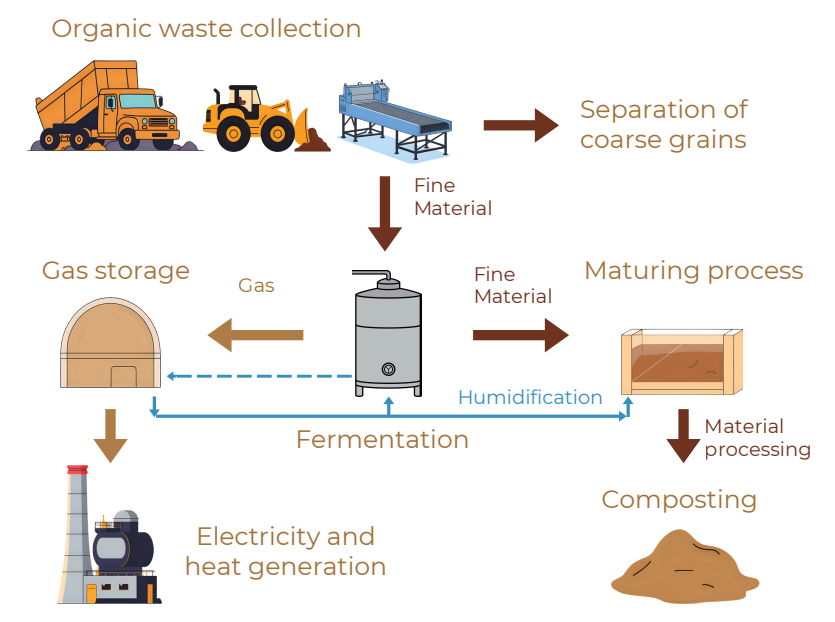
Aerobic treatment (composting)

Composting is an aerobic process that depends on a continuous supply of oxygen (O_2) to support a diverse microbial community that transforms organic waste into a stable soil improver. The biological degradation follows a characteristic temperature cycle: it begins with a mesophilic phase, during which moderate temperatures support the rapid breakdown of organic acids, and then shifts to a thermophilic phase, 55-65 °C, for several days. This high-temperature stage is essential for hygienisation.

Anaerobic processes (fermentation)

Anaerobic digestion is the microbial breakdown of organic matter in the absence of O_2, primarily yielding methane (CH_4)-rich biogas and nutrient-rich digestate. The process is defined whether the feeding and discharge are continuous, and whether the feedstock is "wet" (slurry) or "dry" (solid).

Hygienisation: essential pre- or post-treatment step that ensures compost and digestate are safe for agricultural use. Separation of impurities is necessary before and after the sieving step. Under the EU Fertilising Products Regulation (FPR 2019/1009), compost must reach 70 °C for 2–3 days, while digestate from thermophilic anaerobic treatment must undergo 55 °C treatment followed by composting or pasteurisation at 70 °C; longer durations are required if these temperatures cannot be achieved. For sensitive materials such as animal by-products waste must be shredded to 12 mm and heated to 70 °C for at least one hour to eliminate pathogens such as Salmonella and E. coli.



Organic waste treatment processes

Maturing: final stabilisation phase for compost and solid digestate, ensuring the product is safe for crops and does not harm soil.

Project partners

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