

25 Questions and Answers about Composting

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1. What is composting?

Composting is a natural biological process, carried out under controlled conditions, which converts organic material into a stable humus-like product called compost. During the composting process, various microorganisms, including bacteria and fungi, break down organic material into simpler substances. Composting is an aerobic process, meaning that the microorganisms require oxygen to do their work.

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2. What can be Composted?

Composting has the potential to manage all of the organic material in the waste stream which cannot otherwise be recycled. Some examples of organic material that can be composted include food scraps, leaves and yard wastes, agricultural crop residues, paper products, sewage sludge and wood.

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3. Can composting manage all our wastes?

Since approximately 50% of the waste stream is organic matter, composting can play an important role in the integrated waste management plans of any community. However, the remainder of the waste stream (such as items made of plastic, glass, metals, ceramics and rubber) cannot be composted.

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4. Is composting compatible with other waste management systems?

Yes. Composting should be part of a comprehensive waste management system that emphasizes source reduction, reuse, composting and recycling, and proper disposal of any residual material.

Some materials (such as paper products) can be recycled or composted. While paper can be composted, clean paper is generally more valuable when recycled. Soiled paper or paper that cannot be recycled economically can be composted.

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5. What are the benefits of a successful composting program?

In addition to diverting a large proportion of the waste stream away from disposal, an effective composting program can produce a high quality soil amendment with a variety of end uses. Diverting organic wastes from landfill sites helps to conserve

landfill space and to reduce the production of leachate and methane gas (both of which add to the cost of operating a landfill).

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6. Is composting new?

No. Agricultural wastes have been composted forever. Large scale composting of other organic wastes, including municipal sewage sludge, has been a component of some municipal waste management programs since the 1950s.

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THE COMPOSTING PROCESS

7. What different types of composting systems have municipalities implemented?

Municipal composting programs can include a combination of backyard, on-site and centralized management approaches for all or a portion of a municipality's waste stream. The major differences between these approaches are described below.

- Backyard Composting

Many municipalities encourage "Home" or "Backyard" composting, where individual households compost at home.

- On-Site Composting

The industrial, commercial and institutional sectors can take advantage of larger scale on-site systems to manage their organic wastes and avoid disposal costs.

- Centralized Composting

Many organic waste generators will not be able to compost all of their

wastes on site and therefore rely on programs to collect and compost their wastes at a centralized facility.

Many municipalities have implemented programs to collect and compost leaf and yard wastes in conjunction with home composting programs.

Combined programs for the collection of organics and recyclables, known as "wet/dry" programs have been tested in several municipalities in Canada and the US. Full-scale programs are being implemented in Canada.

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8. How long does the composting process take?

A number of factors are important in controlling the composting process and the time that the process takes. These factors include temperature, moisture, oxygen, particle size, the carbon-to-nitrogen ratio of the waste and the degree of mixing or turning involved. In general, the more actively these factors are controlled, the faster the process.

The length of the process also depends on the degree of decomposition desired in the finished product. Typically, an immature compost can be produced in about a month, while a mature compost may be allowed to cure for six months to a year.

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9. What is the best location for a backyard composter?

The composter should be placed in a well drained area and where it is convenient to use. It should be placed where it can get as much sun as possible as the microbiological activity will be high. If the unit is placed in the shade, the activity is reduced and the process takes longer.

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10. Can I compost in the winter?

Yes, you can compost year-round. As the temperature falls, microbial activity decreases but it starts up again as soon as the weather warms up. To make room for your winter organics, empty the finished compost from your unit in the fall. You may also want to move the unit to a more accessible location for the winter. Also, organics can be collected in a covered container stored just outside the back door. In the spring, the collected organics can be added to your composter. Kitchen wastes are high in nitrogen so you need to add lots of leaves or something rich in

carbon to be sure that you have the right carbon-to-nitrogen ratio needed for the microorganisms to be most effective.

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11. Are there many centralized composting facilities in Canada?

There are about 162 centralized composting facilities in operation or in plan across Canada. These facilities, which include a mix of publicly- and privately-owned and operated operations, processed almost 700,000 tonnes of organic waste in 1995, an increase of 154% versus 1993.

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12. What are the different types of centralized composting processes?

There are three basic types of centralized composting processes or methods.

In the **In-Vessel Method**, the organic material is composted inside a drum, silo, agitated bed, covered or open channel, batch container or other structure. The process conditions are closely monitored and controlled and the material is aerated and mechanically turned or agitated.

The **Aerated Static Pile Method** involves forming compostable materials into large piles, which are aerated by drawing air through the pile or forcing air out through the pile. The pile is not turned.

In the **Windrow Method**, compostable material is formed into elongated piles, known as windrows, which are turned mechanically on a regular basis.

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13. Are special additives required?

In some cases, such as in the composting of grass clippings, the raw material may be too dense to allow for the proper flow of air or may be too moist. A common solution to this problem is to add a bulking agent, such as wood chips, to provide structure to material and to allow for proper air flow. The amount of bulking agent required is usually determined based on experience. Some facilities add commercial fertilizers to their composting process, but this can usually be avoided by combining different waste streams together in a specific "recipe". Inoculating the material with microbes is not normally required, since most wastes naturally contain the microbes needed for successful composting to occur.

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14. Does composting cause odours or attract rodents?

Any waste management facility, including a composting site, has the potential to generate offensive odours or to attract pests. However, experience at hundreds of composting facilities has shown that proper design and operational procedures can prevent or control these problems. Excessive or offensive odours are generally a sign that the composting process is not proceeding properly, usually because of inadequate aeration or excessive moisture. Close monitoring of these factors can usually help to minimize odours. Facilities can employ abatement systems, such as biofilters, to treat occasional odours. Preventing odours and ensuring that the site is kept clean will ensure that the site does not attract rodents or other pests.

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15. Does composting pose a health risk to workers or to those located near a facility?

Some people have expressed a concern that certain microbes present at composting facilities and the compounds they produce, may become airborne and endanger the health of site workers and those located downwind of a composting facility. Studies of concentrations of fungal spores and other airborne materials at and near composting sites show that concentrations are higher around some composting operations, such as turning and screening, and the levels drop to background levels within a short distance.

While airborne concentrations of fungal spores and other microbes at composting sites are higher than background levels, studies of long time compost site workers show no negative health effects.

Wherever decaying organic matter is present, certain microbes occur naturally. Spores of the fungus *Aspergillus fumigatus* are commonly cited as a source of concern. *Aspergillus fumigatus* is one of the most widely distributed microorganisms on earth is known to exist in almost every interior and exterior environment. People are routinely exposed to low levels (and occasionally high levels) of *Aspergillus fumigatus* without consequence.

The conclusion reached by health and environmental agencies in the US and Europe is that normal, healthy individuals suffer no increased health risk by either working at, or living near, a compost facility. However, some individuals may be more sensitive to microbes at a composting facility (because of a reduced resistance resulting from drugs or disease). These individuals should not work at composting facilities.

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ECONOMICS AND SITING A FACILITY

16. What is the cost of a composting facility? How does composting compare to other waste management activities?

Unfortunately, there is no simple answer to this question - in part, because of the wide variety of local circumstances that influence the cost of waste management. An accurate estimate of the cost of a composting facility requires detailed knowledge of project specific criteria such as location, site conditions, waste composition, facility size and level of technology. The cost of collecting and composting organic wastes should be evaluated as a component of an integrated system of waste management since increased diversion through composting will result in lower costs for collection and disposal of garbage.

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17. How much space is required?

The amount of space required for a composting operation depends greatly on a number of factors including the quantity of waste to be handled, the composition of the waste, the system design and operating conditions, and the length of time that the material will be on-site. For example, an on-site, in-vessel composter in an institutional setting can take up a minimum of space, especially if the compost is moved elsewhere for curing. Conversely, windrow facilities can range in size from about 1 acre to more than 20 acres.

18. What approvals and siting issues can I expect to encounter when planning a centralized composting facility?

Most provincial governments regard composting sites to be waste management facilities which require formal approvals or licenses. Some provinces have exempted some types of composting (such as leaf and yard waste facilities) from the full approval process, but still require that they be properly sited and operated. Municipal governments should also be consulted about by-law and other siting requirements. Most jurisdictions are concerned about issues such as the distance to neighbours, local soil conditions and potential impacts on local water and groundwater. Proponents of composting facilities are strongly advised to consult the provincial environmental department early in the planning stages to discuss siting and other approval requirements.

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19. What is the best way to collect organic wastes?

This question continues to generate considerable debate, despite growing experience with the collection of organic wastes. Determining the "best" method in any circumstance will require tradeoffs between the conflicting objectives of low cost collection and low cost processing. For example, the use of plastic bags may lower collection costs, but may increase the cost of processing to remove unwanted plastic. Conversely, the use of curbside collection containers makes processing easier, but requires more capital expenditure for collection equipment.

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COMPOST QUALITY

20. What makes a good quality compost?

Exactly what makes a good quality compost is usually best determined by the requirements of the end user of the material. However, there are a number of important criteria which are normally used to judge compost quality. Among these are maturity, organic matter content, the presence of physical contaminants (such as glass, metal or plastic), pH, particle size, nutrient content, moisture content and trace element content.

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21. Are there regulations or standards for compost quality?

Compost produced in Canada may be subject to regulation by the federal and the provincial governments. Several provinces have guidelines and standards which determine the suitability of the material for use on a regulated or unregulated basis. Agriculture and Agri-Food Canada regulates compost offered for sale in Canada through the federal Fertilizers Act. The Canadian Council of Ministers of the Environment (CCME) has worked to establish national guidelines for compost quality.

In addition, the Bureau de normalisation du Québec (BNQ), a member of the Standards Council of Canada, has developed voluntary industry standards for compost quality. Compost which meets this standard will be able to bear a BNQ label as an indication of its quality.

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22. What steps can be taken to ensure that a facility produces high quality compost?

The most important step in producing a high quality compost is to control the quality of the material entering the process. This is most often achieved through source separation. Source-separated organics are those organic wastes which have been separated from potential contaminants prior to collection. Other contaminants can be removed through a pre-processing stage or by screening the final compost. Finally, the composting process itself can determine some characteristics of the final compost, such as maturity and particle size.

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END USES FOR COMPOST

23. Are there markets and end uses for compost?

Compost can be used in many applications depending on the quality produced and the quality of the product. High quality compost is being used in agriculture, horticulture, landscaping and home gardening. Medium quality compost can be used in applications such as erosion control and roadside landscaping. Even low quality compost can be used as a landfill cover or in land reclamation projects.

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24. Is compost a fertilizer?

Compost can contain varying amounts of nutrients such as nitrogen, phosphorus and potassium. However, the concentrations of these nutrients in compost are usually lower than those found in common fertilizers.

Compost is more properly described as a soil amendment or soil conditioner which returns valuable organic material to the soil. In addition, compost does benefit the soil by improving soil structure, aeration and water retention.

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25. How can I get more information about composting?

For additional information about composting, please write **The Composting Council of Canada** at **16 Northumberland Street, Toronto, Ontario M6H 1P7** or Email us at info@compost.org. Specific information about the composting initiatives in your community may be obtained by calling your local municipal recycling and composting.