

# Composting FACTSHEET



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## COMPOSTING

### ◆ ENVIRONMENTAL CONCERNS ◆

Composting organic material has many benefits. Organic wastes are diverted from landfill or other disposal sites. Composted material can be used as a soil amendment or nutrient source. Composting stabilizes some of the nutrients in wastes so that they are not as readily leached out. This decreases the potential for ground and surface water contamination. The use of compost on low organic matter soils results in improved moisture and nutrient retention, decreased soil erosion, reduced surface crusting, suppression of plant diseases and improved soil tilth. Composting of organic wastes kills weed seeds, pathogenic bacteria and viruses.

There are environmental risks associated with composting and compost use. Some risks are inevitable, but others are related to improper compost production or improper use. Ground and surface water pollution can occur as a result of improper use of compost. Air pollution can also occur when composting. See [Regulations Affecting Composting, Factsheet No. 382.500-12](#), for more information on regulation.

### ENVIRONMENTAL CONCERNS DURING PRODUCTION OF COMPOST

#### Water Quality

Composting of organic wastes must be performed only in locations where leaching of pollutants from the operation is minimized. The leachable pollutants in agricultural waste include bacteria (some pathogenic), phenolic compounds, ammonium nitrogen, nitrate nitrogen, potassium, and water containing a high biochemical oxygen demand. Potential pollutants from composting municipal or industrial wastes include heavy metals and petrochemical compounds.

Composting wastes must be protected from rainfall that can leach pollutants. Composting should be performed on an impervious surface, such as a concrete pad. Facilities to contain runoff in order to prevent leaching and diffusion of pollutants into the soil and/or groundwater must be provided. No runoff can be discharged without a permit from the B.C. Ministry of Environment, Lands and Parks. See [Site Selection for Composting, Factsheet No. 382.500-6](#), for an example of a runoff and leachate collection system.

#### Air Quality

Composting of organic wastes also results in the formation of products that affect air quality such as: ammonium; NO<sub>x</sub>; methane, and of other potential harmful organic compounds. Odours are typically generated as well.

**Odour:** Odour is often the most noticeable air quality concern. Most organic wastes will generate some foul odour during the composting process. Foul odour increases when the composting material is allowed to become anaerobic. Therefore, odours can be minimized with proper aeration. Prevailing wind direction and proximity to residential areas are important factors to take into consideration in selecting sites for composting. Biofilters are an option with aerated static pile composting, or if the compost facility is enclosed within a building.

**Ammonia (NH<sub>4</sub>):** Ammonia acidifies rain, contaminates surrounding areas with excess nitrogen (N) and causes foul odours.

Ammonia loss is inevitable in most composting facilities. However, those with low C:N ratios wastes will result in the greatest ammonia losses. Addition of wastes with high C:N ratios may reduce ammonia loss only if the carbon (C) is easily degradable. Thus, addition of high carbon woodwastes is not very effective because carbon in such products is released slowly.

**Nitrous Oxide and Other NO<sub>x</sub> Gases:** During intense microbial activity, as occurs in the compost process, there is significant loss of nitrogen as nitrous oxide and other NO<sub>x</sub> gases, particularly nitric oxide (NO). Nitrous oxide (N<sub>2</sub>O), for example, is 240 times more harmful than CO<sub>2</sub> in contributing to global warming. It is a stable gas and diffuses to the stratosphere where it destroys ozone. At present, there is little research on the management of these gases during composting.

**Methane (CH<sub>4</sub>):** There is some indication that the diversion of organic wastes away from landfills will reduce the production of anthropogenic (produced by human activities) methane. While this diversion of wastes will reduce methane emissions, unfortunately there may be increased NO<sub>x</sub> emissions as a result.

## ENVIRONMENTAL CONCERNS ASSOCIATED WITH THE USE OF COMPOST

### Water Quality

Although many of the nutrients in compost have been stabilized during the composting process, they can contribute to leaching over the long term. Heavy applications of compost may release more nitrogen than can be utilized by the crop, with subsequent risk of groundwater pollution.

Therefore applications of compost should be based on the availability of mineralizable nutrients such as nitrogen for crop requirements. See **Using Compost**, Factsheet No. 382.505-15, for discussion on proper use of compost.

### Disease and Weed Transmittance

If composted properly, potentially harmful bacteria, viruses, and weed seeds, are destroyed by high temperatures of 55° to 60 °C (130° to 140 °F) for three days. Achieving these temperatures should therefore be a priority. Potential users will be reluctant to utilize compost if they have experienced disease or weed infestations resulting from improper management.

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This is one of a series of Factsheets on Composting. A list of references used in producing this series is included in the Composting Factsheet "[Suggested Reading and References](#)."

#### COMPOSTING FACTSHEET SERIES PREPARED BY:

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