

Composting FACTSHEET



BRITISH
COLUMBIA

Ministry of Agriculture and Food

Order Number 382.500-13

Agdex 537/727

September, 1996

CO-COMPOSTING WITH OFF-FARM WASTES

Co-composting: Is defined as the composting of a mixture of two or more types of wastes, for example manure and yard waste.

Composting is just one of several approaches that can turn both on-farm and off-farm waste materials into a resource. As an alternative to simply applying manure to land, more and more farmers are looking at the possibility of co-composting manure with other organic materials. The finished compost is then marketed off the farm.

It should be noted that a farm composting its own agricultural wastes, or bringing in agricultural waste from another farm for use on the farm, legislatively falls under the *Waste Management Act* and *Code of Agricultural Practice For Waste Management (Code)*. Any other composting operation is subject to the *Waste Management Act* and possibly to the *Production and Use of Compost Regulation*, as described in [Regulations Affecting Composting, Factsheet, No. 382.500-12](#). Co-composting operations are regulated by the *Waste Management Act*, meaning that they may require a Waste Management Permit for any emissions to the air, or discharges of leachate or contaminated water. Municipal solid wastes and biosolids have a separate regulation governing their use. For clarification, in Bill 29-1992, *Waste Management Amendment Act*, 1992, Section (1)(b), municipal solid waste (MSW) means "(a) refuse which originates from residential, commercial, institutional, demolition, land clearing or construction sources, or (b) refuse specified by a manager to be included in a waste management plan."

Co-composting livestock manure with clean organic agricultural and non-agricultural wastes offers a number of opportunities for farmers. It can generate revenue by converting livestock manure into a stable, marketable

Soil conditioner. For some producers, it can solve manure handling and odour problems. Other recognized uses for compost are as bedding material, and as a fertilizer.

The primary advantage for using off-farm waste (for producers who have material to compost) is to aid in the creation of a proper starting mix. It is necessary to achieve a starting mixture with a Carbon to Nitrogen ratio of 20:1 to 30:1, a moisture of 40 to 60%, and a porosity of 50%. The blending and balancing sequence should satisfy the C:N ratio first, moisture second, and lastly, porosity. See [Blending Materials for the Composting Process, Factsheet No. 382.500-4](#), for more information on mixing materials. Most farms have an abundant supply of nitrogen rich composting materials, but need an outside source of carbon to achieve the correct starting C:N ratio. For instance, a turf grower with wet, high nitrogen grass clippings, needs a dry carbon source. Pork producers with very fine and wet manure solids high in nitrogen need a porous carbon source.

Composting is not a new phenomenon, and is well suited to agricultural applications. Some sources of off-farm wastes suitable for composting include:

- Yard Waste (grass clippings, prunings,)
- Hatchery Waste (mortalities, egg shells,)
- Food-Processing Waste (cleanings, trimmings,)
- Woodwaste (sawdust, shavings,)
- Fish Waste (mortalities or cleanings)
- Paper and Cardboard Waste (non-waxed)

Operations co-composting non-agricultural waste with agricultural waste would not be considered agricultural composting operations (under the *Waste Management Act*).

Yard Waste

Yard waste is vegetative matter resulting from gardening, horticulture, landscaping or land clearing operations, and includes materials such as tree and shrub trimmings, plant remains, grass clippings and chipped trees. Depending on the season, these materials (other than grass clippings) are generally high in carbon and are comprised of large particle sizes, making them useful as a carbon source or bulking agent in the initial compost blend.

Yard waste can be combined with other farm generated wastes, such as manure, to accelerate the composting process and provide an environmentally sound means of farm waste management. Composted yard wastes are converted into soil amendments or mulches for use by residents, nurseries, park services, government and private landscapers and other groups. As with other composts, composted yard waste can improve the soil's physical, chemical and biological properties. As a mulch, composted yard waste can modify soil temperatures, reduce erosion, control weeds and improve moisture retention.

Woody materials can also be ground or shredded and perhaps processed further to produce a mulch. Leaves can be incorporated directly into the soil to build up organic matter. However, since yard waste will compete with growing plants for nitrogen, composting is recommended before incorporating it into the soil.

The mass and volume of yard wastes by considerably reduced by composting. See [Composting Methods, Factsheet No. 382.500-5](#) to determine suitable methods for co-composting yard wastes with livestock manures.

The B.C. Ministry of Environment, Lands and Parks' *Production and Use of Compost Regulation* applies to facilities that produce more than 20,000 m³ of yard waste compost per year, or facilities that compost any volume of municipal solid waste. This Regulation identifies criteria relating to materials, setbacks, site design and location, storm water and leachate management, and other design criteria. For operations producing less than 20,000 m³ per year, Sections 3 and 4, Yard Waste and Prohibitions, of the Regulation apply.

Broiler Hatchery Waste

Commercial hatchery waste can also be used as co-compost with livestock manures. There is a generous supply of hatchery waste in the Fraser Valley, and some producers are looking for alternative ways of handling their waste. The mechanics of composting are straight

forward and easily carried out on any farm with a bucket loader. A covered area with a concrete floor is required for environmental reasons. A major concern with hatchery by-products is disease transmission from the waste to livestock. The composting of hatchery waste with poultry litter will produce a safe, rich organic product, at the same time removing waste from municipal landfills.

The composted end product will be free of pathogens that could jeopardize the health of humans or poultry as long as the moisture content in the compost piles is controlled and elevated temperatures are maintained.

A recent study found hatchery waste composted with poultry litter produced compost with 1% nitrogen, 2.5% phosphorus and 0.25% potassium on a dry weight basis. Additionally a calcium concentration (CaCO₃) of 60% and a full compliment of micro-nutrients was produced. Values of calcium are generally three to six times higher than composted manures.

Food Processing Waste

Food-processing waste consist of such items as reject fruits and vegetables from canning or packing plants, offal from meat processing plants, winery tank cleanings and milk and cheese processing wastes. Approvals or permits may be required for using these types of wastes. Food-processing wastes are more suited to larger-scale composting operations.

These wastes will have variable characteristics depending upon the process used to generate them. Many of these wastes are wet, and generally have a moderate to low C:N ratio. The best way to utilize these products is to combine them with dry high carbon, bulking agents, such as woodwaste, clean paper waste or straw. Moisture control can be the most difficult challenge. The addition of drier, high-carbon materials, the turning of windrows and the covering the piles are practise that help to adjust moisture levels.

Woodwaste

Adding carbonaceous material, such as sawdust, wood shavings or woodchips, is often advantageous to the composting of high nitrogen materials such as livestock manure. These materials bring up the C:N ratio to a more desirable level. Prior to composting, wet organic materials should be mixed with a dry material or bulking agent to reduce initial moisture content. Woodwastes also have the ability to absorb moisture and odours.

Bulking agents are usually necessary to increase the porosity of fine-textured materials such as poultry manure, as well as to absorb excess moisture. The amount of bulking agent needed may range from less than 1:1 (parts by volume) to more than 5 bulking agent to 1 part manure, depending on particle size and initial moisture content.

High moisture livestock manure can be dried to below 60 percent moisture content by blending finished compost or bulking agents such as sawdust or woodchips. The end product usually has final moisture content of 20 to 40 percent. Which can be recycled as a bulking agent.

Fish Waste

Fish waste is a high nutrient resource. Any type and grade of fish, mixed with a carbon source, can be turned into a high grade compost. Fish wastes are generally received and handled as a wet slurry, therefore, a relatively dry, high carbon substrate or bulking agent is required. Odour management can be a serious issue with fish wastes. Since most of the nitrogen in fish wastes are readily available, such wastes require a readily available carbon additive. Without it, the composting process will tend to generate an objectionable smell due to the release of ammonia gas. The end product of composted fish waste will be a high quality organic soil conditioner/fertilizer suitable for agricultural or residential use.

Paper and Cardboard Waste

Paper has a high carbon content and is moderately degradable. It has the ability to absorb moisture well, but has poor porosity and structure. Black inks are generally

non-toxic, but large quantities of coloured inks are best avoided because of possible heavy metal content. Paper products may need shredding and sorting for effective handling. Odours may be a problem with some paper products such as gypsum wall board. In general, paper is a good to moderate amendment depending on the original structure of the compost mix.

Cardboard is also a high carbon source with good degradability properties. Its structure provides for good moisture absorption. Some shredding, storage and sorting may be needed. Staples may need to be removed and glues in corrugated cardboard may contain high boron levels. Waxed cardboard is compostable; however, management of the compost and odours can be a challenge. Extra caution should be taken when selecting cardboard for a composting operation.

When using paper or cardboard products, other factors must be considered. Whether the pulping process uses chlorine or is mechanical may affect its co-composting properties. When wet, paper and cardboard are not friable, hence a proper moisture content and a larger particle sizes of other composting materials are required. More frequent turning may be required to break up paper 'balls'. B.C. Ministry of Environment, Lands and Parks' approval under the *Production and Use of Compost Regulation* is required to use paper and cardboard waste.

Other Non-Agricultural Wastes

At the present time there are no other wastes which are considered to be of value as co-composting materials.

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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