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LEAF AND YARD TRIMMING MANAGEMENT: COMPOSTING VERSUS RESIDENTIAL BURNING

As greater numbers of municipalities and states ban the disposal of yard trimmings in landfills, the likelihood that residents may turn to burning leaves and other yard trimmings increases. At least 21 states across the nation have already imposed complete or partial bans on the disposal of yard trimmings in landfills. The U.S. Environmental Protection Agency (EPA) is concerned that residents faced with the dilemma of what to do with their yard trimmings may resort to burning. Leaf burning leads to air pollution, potential health problems, and fire hazards. An attractive alternative for managing yard trimmings is composting. Composting is a process whereby organic matter is converted into a humus-like material. Proper composting is a safer and more environmentally responsible method for managing leaves and other yard trimmings. Composting is a form of recycling that may be practiced in backyards or at community centers.

What are the facts about yard trimmings?

An EPA study conducted in 1992 reveals that leaves and other yard trimmings, such as grass clippings, brush, and weeds, account for approximately 20 percent of the municipal solid waste (MSW) stream. This percentage varies depending on the season and geographic region of the country.

Why not landfill yard trimmings?

As existing landfills near their capacity limits and fewer new landfills are opened, states and local governments are looking for innovative ways, such as composting, to reduce the volume of landfilled materials.

The decomposition of yard trimmings in landfills adds to the existing problems of methane gas generation and acidic leachate. Methane is a colorless, odorless gas that is produced as microorganisms decompose organic materials under oxygen-poor conditions such as those found in landfills. The presence of uncontrolled methane gas at landfills can cause explosions. In addition, methane can contribute to global climate change through the "greenhouse effect." Yard trimmings decomposing inside a landfill also contribute acidity that can make other waste constituents more likely to leach out, possibly adding to environmental harm.

Why not burn leaves and other yard trimmings?

Although some people consider leaf burning to be a fall ritual, it can lead to air pollution and health problems, and can contribute to higher incidences of home and forest fires. The associated property loss, need for increased fire protection, and cleanup costs associated with soiling of personal property are additional negative factors to consider.

Air pollution from leaf burning is affected by moisture content, density, leaf species, and ignition location of the leaf piles. When leaves are burned, three primary pollutants are emitted: particulate matter, carbon monoxide, and hydrocarbons. Wetter leaves

usually increase emissions of all of these pollutants. On average, 1 ton of leaves will emit 38 pounds (lb) of particulate matter, 112 lb of carbon monoxide, and 26 lb of hydrocarbons. Each of these pollutants is described below. The addendum to this publication provides further details on pollutant emissions data and potential health effects (EPA publication number EPA-452/F-93-012).

What is particulate matter and why is it a health concern?

The smoke from leaf burning is composed of tiny particles known as particulate matter. These small particles are thought to be responsible for adverse health effects, such as changes in pulmonary function, due to their ability to reach the deep regions of the lung. Asthmatics and others with compromised lung function, such as children and the elderly, are especially susceptible to these adverse health effects. The visible smoke from leaves consists mainly of submicron particles (less than 1 micron in diameter) that can effect the entire respiratory tract and that are capable of reaching the deep regions of the lung. These particles may be retained in the deep lung for periods of months to years.

What is carbon monoxide and what are its health effects?

Carbon monoxide is an invisible gas that is emitted during the burning of leaves. After carbon monoxide is inhaled, it is absorbed into the bloodstream through the lungs, where it combines with red blood cells and inhibits oxygen from being carried in the red blood cells at normal levels. Body tissues are starved of needed oxygen, and heart and respiratory tract diseases can result. Unborn children, newborn infants, smokers, the elderly, and persons with heart and chronic lung diseases are more susceptible to the effects of carbon monoxide than the general population.

What are hydrocarbons and why are they harmful?

Hydrocarbons are organic chemical compounds that exist as gases or are adsorbed onto solid particles. Hydrocarbons are found naturally in leaves. If the leaves are burned, the hydrocarbons are released into the atmosphere. Included among the hydrocarbons found in leaf smoke are a number of polycyclic aromatic hydrocarbons (PAH's). Some PAH's have been identified as carcinogens. Other hydrocarbons emitted from leaf burning, such as aldehydes and ketones, can cause irritation of the eyes, nose, throat, and lungs.

What is composting?

Composting is a biological process in which microorganisms gradually break down organic materials such as leaves and other yard trimmings into a humus-like product called compost. Composting can be practiced at home or at a community compost site. It is easy to start a compost pile in your own backyard. Composting helps the environment by diverting organic materials, such as yard trimmings from landfills, reducing pollution emitted during leaf burning, and returning vital organic materials and nutrients to the soil.

How can compost be used?

Compost can be used for a variety of gardening projects. It can enrich gardens, improve the soil around trees and shrubs, and be used as a soil additive for houseplants and planter boxes. Compost can enhance soil texture, increase the ability of the soil to retain air and water, decrease erosion, and reduce the use of chemical fertilizers and peat moss. The following are some other uses for compost:

- Farmers use compost for enhancing crops and for sod production.
- Nurseries use compost for enhancing plant and forest seedling crops in reforestation projects.
- Landscapers use compost as a soil amendment and landscape cover at residential and commercial properties, golf courses, and athletic fields. Landscapers also use compost to cover landfills and carry out soil reclamation projects.
- Public agencies use compost for landscaping highway median strips, parks, recreational areas, and other public property.

What materials can be composted?

All yard trimmings can be composted, including leaves, grass clippings, remains of garden plants, and brush. Weeds can be composted too, although weed seeds may sprout and grow in the compost. Woody yard trimmings such as branches should be chipped, shredded, or broken into small pieces so they will decompose more quickly. Household organic materials that may be composted include vegetable and fruit peelings, coffee grounds, and sawdust. Meat, fats and oils, and dairy products should not be composted because they take longer to decompose and can cause odors and attract pests.

What does the composting process involve?

Naturally occurring microscopic organisms, including bacteria, actinomycetes, and fungi, live and feed on leaves, grass clippings, and other organic materials. When nutrients, such as carbon and nitrogen, and oxygen and moisture levels are present in the right amounts, the microorganisms feed and grow rapidly, producing heat, carbon dioxide, water vapor, and, eventually, compost.

How can I set up a compost pile?

Composting is easy. You can set up a compost pile in a corner of your yard with few supplies. Choose a level spot about 3 feet square near a water tap and preferably out of direct sunlight. Clear the area of sod and grass. If you build a composting bin, be sure to leave enough space for air to reach the pile. Materials such as chicken wire, scrap wood, or cinder blocks can be used to build the bin. One removable side makes it easier to tend to the pile.

Place coarse brush at the bottom of the pile to allow air to circulate into the pile. Then add leaves, grass, and such into the pile. You may also layer the yard trimmings with soil. Keeping the pile moist and turning it every few weeks or so will help speed up the natural decomposition process and prevent odor formation. Turning the pile also ensures that the temperature inside the pile does not get so high that the microorganisms are killed. In dry weather, sprinkle water on the pile, but do not allow it to become too soggy. Do not be surprised by the heat of the pile, or if you see worms, both of which are just part of the composting process. In most areas of the country, the compost is ready for use within 3 to 6 months, or when it becomes a dark, crumbly material that is uniform in texture.

Can Christmas trees be recycled?

Many communities have developed programs to recycle Christmas trees each year after the holiday season. Christmas tree recycling diverts millions of trees from being discarded in landfills or along roadsides and produces mulch for use in residential and community landscaping projects. In the weeks after Christmas, trees are either picked up at the curb or collected at established drop-off sites. The trees are chipped using chipping or grinding machines, and the chips are used as mulch in landscaping. To prepare your tree for reuse, carefully remove the ornaments, especially strands of tinsel, and any plastic wrapping or other materials used to transport the tree. You can chip the tree yourself and use the mulch in your own yard.

Is composting practiced at the community level?

Many local governments are initiating community composting programs. Composting is viewed by many solid waste managers as a valid and beneficial MSW management option. Currently, there are well over 2,200 community-scale yard trimming composting programs across the nation. The compost that is produced may be used by local and state governments, sold to residents, utilized for park service projects, or sold to plant nurseries or golf courses as landscape mulch.

How can I learn more about composting?

The EPA has developed several publications related to composting. A booklet entitled *The Consumer's Handbook for Reducing Solid Waste*, Publication No. 530-K-92-003, describes how to set up a backyard compost pile and contains over 75 practical tips for reducing and recycling solid waste. Fact sheets available on composting include *Environmental Fact Sheet: Recycling Grass Clippings*, Publication No. 530-F-92-012, and

Environmental Fact Sheet: Yard Waste Composting, Publication No. 530-SW-91-009. Another publication, the *Decision-Maker's Guide to Solid Waste Management*, Publication No. 530-SW-89-072, devotes an entire chapter to composting. This *Guide* is targeted at local government decision-makers, and contains solutions to many solid waste management problems.

With the exception of the *Guide*, these publications are available at no cost through the Resource Conservation and Recovery Act (RCRA) Hotline. Call Monday through Friday, 8:30 am to 7:30 pm eastern standard time (EST). The national toll-free number is (800) 424-9346. For the hearing impaired, the number is TDD (800) 553-7672. Copies of these publications can also be obtained by writing:

RCRA Information Center, U. S. Environmental Protection Agency, Office of Solid Waste (OS-305), 401 M Street SW, Washington, DC 20460.

Another report for decision-makers, *Yard Waste Composting: A Study of Eight Programs*, is available for a fee from the National Technical Information Services (NTIS). Call (703) 487-4650 and ask for publication number PB90-163 114.