

## **BIOSOLIDS AND COMPOSTING – FAQs**

### **1. WHAT ARE BIOSOLIDS?**

Wastewater generated by residential, commercial, institutional and industrial sectors must be treated prior to discharge into receiving water bodies to minimize negative impacts on the aquatic environment. During wastewater treatment, solids are settled out of the wastewater stream. The solid fraction contains suspended and dissolved organic matter, insoluble trace elements and nutrients. After the solids have undergone secondary treatment, they are known as biosolids, the treated and stabilized organic residuals derived from wastewater treatment.

### **2. WHAT ARE THE BENEFITS OF BIOSOLIDS?**

Biosolids are rich in both organic matter and essential plant nutrients and can be utilized as a soil amendment and fertilizer. Biosolids act as a soil amendment through the contribution of organic matter. Increased organic matter improves soil physical properties including moisture holding capacity, aggregation, porosity and tilth. Improvement of these properties facilitates transport of air, water and nutrients throughout the soil, benefiting the establishment and growth of vegetation.

Biosolids serve as a fertilizer by providing essential micro (e.g. zinc, copper and iron) and macronutrients (e.g. nitrogen, phosphorus and potassium) that increase vegetation growth and productivity. The stabilized biosolids provide a slow release source of nutrients that can be utilized by plants for several years following application. The slow release of nutrients prevents leaching of excess plant available nutrients and possible contamination of ground and surface water.

### **3. HOW ARE BIOSOLIDS USED?**

Biosolids are used in a variety of ways. Directly as a soil amendment and fertilizer, they are used in:

- land reclamation;
- mine reclamation;
- agricultural land fertilization; and
- forest fertilization.
- erosion control;
- horticulture;
- slope stabilization; and
- roadside aesthetic improvements.

Indirectly, biosolids are used as feedstock in the fabrication of value-added products such as:

- compost;
- soil amendment mixes; and
- fabricated soils.

#### **4. HOW IS BIOSOLIDS USE REGULATED?**

In Canada, biosolids are regulated provincially. Biosolids regulations typically stipulate limits on constituents relevant to environmental and human health protection including trace elements and pathogens. Biosolids are normally classified as high or low quality based on meeting prescribed trace element and pathogen quality criteria as well as process requirements for pathogen and vector attraction reduction. Biosolids quality impacts the range of end uses for the material, land use following biosolids application, and the requirement for post-application monitoring. Quality criteria are also specified for the receiving soil before and after biosolids application. Regulations also commonly include management requirements such as setback distances for stockpiles from surface water and wells, and special management considerations for areas with elevated precipitation.

#### **5. IS BIOSOLIDS USE IN COMPOST REGULATED?**

Biosolids are considered a feedstock in composting, and are regulated within respective composting regulations. However, compost feedstock may influence regulatory requirements. For example, compost that incorporates feedstock other than untreated and unprocessed wood and yard waste (e.g. biosolids) may be subject to more stringent process and quality criteria. These criteria may include meeting pathogen reduction limits, compliance with required sampling and analysis protocols, and the maintenance of compost temperature and retention time records. Furthermore, composts incorporating feedstock other than untreated and unprocessed wood and yard waste may be subject to land application and distribution restrictions.

#### **6. ARE THERE ANY CHALLENGES WHEN USING BIOSOLIDS IN COMPOST?**

Education of stakeholders continues to be one of the largest challenges in biosolids recycling. Stakeholders can include biosolids generators, land owners and neighbours, private citizens, government representatives, and non-government organizations. Each stakeholder group has specific concerns which must be addressed individually in a professional and conscientious manner.

A large proportion of the population has a natural antipathy towards biosolids. Knowledge of the origin of biosolids is often sufficient to confirm the laypersons' negative opinion of it. Stakeholder consultation is a powerful method of increasing knowledge and promoting acceptance of biosolids. The acceptance of biosolids use by stakeholders is an integral part of the development of a successful biosolids reclamation program.

#### **7. HOW DO BIOSOLIDS AND COMPOST COMPARE?**

Biosolids quality is dependent on the composition of wastewater entering the treatment plant and on the wastewater treatment process. Therefore, biosolids quality varies significantly between generators. Compost quality is dependent on feedstock characteristics and the composting process. Generally, biosolids have a higher nutrient concentration than compost that is made with biosolids because of the addition of low nutrient wood waste feedstock material as a carbon source. As well, some nitrogen is lost during the composting process.

Consequently, biosolids are generally regarded as a soil fertilizer, while compost is typically used as a soil amendment.

#### **8. CAN BIOSOLIDS BE COMPOSTED?**

Biosolids are compostable. Several physicochemical characteristics make biosolids a desirable composting feedstock. Biosolids can be used to balance moisture requirements and can be used as a nitrogen source. In areas that conduct cold weather composting, biosolids are often used as the primary nitrogen source in the absence of adequate volumes of green waste. Additionally, composting of biosolids is an approved “Process to Further Reduce Pathogens (PRFP)” specified in the United States’ federal biosolids regulation, the USEPA’s 40 CFR Part 503, as well as in many Canadian regulations.

Co-composting of biosolids with other waste materials has been done successfully throughout Canada. At the City of Edmonton’s Waste Management Centre, approximately 22,550 dry tonnes of biosolids are co-composted annually with 200,000 tonnes of municipal solid waste, producing approximately 80,000 tonnes of compost. The City of Kelowna composts biosolids and wood chips and markets the finished compost as Ogogrow, which is used as a soil amendment by nurseries, landscapers, orchardists and residential customers. Carney’s Organic Recycling in Squamish, BC composts organic residuals, including biosolids. The compost is marketed as an amendment, or used as a feedstock in the production of fabricated soils.

#### **9. HOW ARE BIOSOLIDS AND COMPOST USED TOGETHER?**

An innovative use of biosolids and compost together is their inclusion as feedstock in the development of fabricated soils. Fabricated soils generally consist of a nutrient source, a structural source and a carbon source. Biosolids and compost have been incorporated into fabricated soils as the nutrient and carbon sources respectively in combination with a structural source such as washed pit sand. In addition to providing carbon, compost also improves the aesthetic appeal of the soil, giving it a dark, rich appearance and an earthy, organic fragrance. These high value, high quality soil products have been used successfully on a trial basis in residential and horticultural applications. Ongoing work is being conducted to refine fabricated soil mixtures and to identify markets in hopes of producing these products on an operational scale.

*For more information on biosolids and biosolids treatment and use, including composting, please contact:*

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**Photograph 1:** Biosolids can be uniformly applied using conventional farm equipment, such as the tractor and rear-discharge manure spreader pictured here.



**Photograph 2:** Fabricated soil containing biosolids, land clearing residuals and fill sand applied at a mine site near Victoria, BC.



**Photograph 3:** Open house events educate stakeholders on the beneficial uses of biosolids and other organic residuals.



**Photograph 4:** The City of Abbotsford, BC uses biosolids and composted fir bark in their Val-E-Gro product. Pictured are several soils fabricated during the initial product development phase.



**Photograph 5:** A demonstration garden at the Greater Vancouver Regional District's Annacis Island Wastewater Treatment Plant was established using soil fabricated with biosolids and compost.