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DEAD ANIMAL COMPOSTING FACILITIES WITH A ROTATING DRUM SYSTEM ON-FAM EXPERIENCES AND PRACTICAL APPLICATIONS

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Abstract

Since 2007, the Quebec Ministry of Agricultural and Food and the Ministry of Environment allows the use of a rotating drum system for composting of dead animals. Numerous farms has installed these systems for swine, poultry and small slaughter plants.

Each site collects data on the mortalities, the quantity and type of carbon source as well as on temperatures and general operations. Compost fertilizer data are collected and presented.

Practical aspects of rotating drum composting facilities are reviewed.

Introduction

In Quebec, disposition of mortalities has been done by on farm burial, recuperation by rendering plants or incineration. However, with the recent health and safety issues associated with animal by-products, the rendering option is commonly very expansive to agricultural producers.

In 2002, the government of Quebec has launched a policy requiring to reduce by 60 % the total amount of bio-degradable garbage and disposable materials sent to traditional landfills. Consequently, the direct re-use of food waste, agri-food industry waste and others are land-spreaded with or without treatment.

For sanitation purposes, aerobic or anaerobic treatments are considered. The composting option is very well known and documented. Choinière (2006) presented the results for a rotating drum composter used for swine mortalities.

Tentative proportion of wood shaving mixed with mortalities were presented to initiate the composting process as well as maintain the necessary temperatures.

In brief, a rotating drum composter provides the space for 7 to 14 days of process. During this short phase, the intent is to decompose the carcass, reduce the bones to particles less than 2 cm. The composted material could be then transferred to a maturation plate-form for 2 to 6 months. A's well, certain producers sent these solids directly in their manure storage for conventional land spreading. The application with swine is well known and applied on more than 20 farms.

New composter design

During the 2004-2006 experiments, Choinière (2006) reported the difficulties to compost large sow carcasses in a 1.2 m diameter rotating composter. Subsequently, a 1.8 m rotating drum has been developed with the following characteristics :

1. 1.8 m diameter (6' diameter).
2. Lengths of 4.8 m, 6m or 7.2 m (16', 24' or 32').
3. Adjustable timer and gear box to control the rotation speed and frequency.
4. Enhanced compost outlet design to prevent snow infiltration, protect from direct wind and allow easy unloading of the compost.
5. Enhanced door mechanism for carcass entrance in the composter.
6. Increase by 2 to 2.5 times the composting capacity versus a 1.2 m diameter composter.

On farm trials

During the fall of 2006, the initial 1.8 m diameter composter has been installed on a farrow to finish swine farm. The same wood shaving mixed with mortalities recipe has been used.

For the initial 14 days, only new wood shaving with mortalities is used. When temperatures are well managed and stable between 50°C and 60°C, recycled compost is added to the mixture. This process help to complete the composting of large bones or meat parts witch would passed out to rapidly, to use the non-degraded carbon left in the wood shaving and reduce the operating cost.

Although the process is now well known, the main difficulties are related to the followings :

1. The absence of precise measurement of the weight of the mortalities.
2. Excessive disposition when a disease outbreak occurs or heat wave.
3. Insufficient quantity of wood shaving in the initial mix.

In realty, the main problems encountered are related to human management. The non-respect of the basic recipe caused the loss of control of the process. Addition of wood shaving could recuperate the process or, the worse case scenario, the composter has to be emptied and restarted.

Winter start-up has been successful by the addition of exhausted warm air from the barn pushed in the composter by the winter fans. Small in flow of 100 to 200 cfm is sufficient to maintain the heat, prevent cold air infiltration and initiate the composting process.

Composting mortalities and market development

Following the positive use of the rotating drum composter, poultry producers shown the interest to use the facility. The first trials were done with broilers to obtain data relative to the wood shaving and mortalities mixes in order to decompose the carcass and feathers.

Four poultry farms are successfully using the rotating drum composter. Similarly to the swine units, human factors are associated with starting and operating problems.

The following list summarizes the current installation of the rotating drum composter.

Operation	Units in operation
Swine	10
Poultry (broiler)	3
Poultry (turkey)	1
Road kills, vet. Clinic.	1
City of Montreal	1
Organic gardens	1
Septic solids	1

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