

OPERATIONAL REPORT

# SMALL MEAT PROCESSOR EXPERIMENTS WITH COMPOSTING

**C**HANGES in the animal rendering business have forced generators of meat scraps and animal mortalities to look for alternatives. Faced with higher charges, lack of disposal options for certain materials and an uncertain future, Jeff and Darci Gulliver looked to composting as one approach to address this challenge. Many small and mid-size meat processors face this same dilemma.

The Gullivers own Mapleton Farms Country Butcher Shop in Union Springs, New York, located between Syracuse and Ithaca in the Finger Lakes region. For seven years, they have operated a custom slaughterhouse and butcher shop on their 150-acre farm, where they also raise hay and wheat. They want the additional organic matter and nutrients from the compost for their field soils and are exploring the necessary steps to transition to certified organic production.

Mixed slaughterhouse residuals are produced daily at this and other butchering operations. This material makes up 60 percent of the live animal weight as it enters the butchering process. "Our rendering company is refusing to pick up some of the beef and pork by-products, such as blood, paunch manure and offal (miscellaneous droppings)," explains Jeff Gulliver. "This service used to be free and is now \$30/pick-up. This is due to a large decline in the market for these rendering products." Concern over Bovine Spongiform Encephalitis (BSE or Mad Cow Disease) and other factors have led to the decline of rendering services in New York and other areas. The dense, wet and putrescible nature of the mixed slaughterhouse waste makes it undesirable to store for long periods of time, and considerably expensive and difficult to dispose of through commercial hauling ser-

*Custom slaughterhouse in upstate New York mixes wood chips, leaves and manure in windrow composting trials.*

*Brian Jerose*

vices. Composting was seen as a potentially cost-effective and environmentally sound solution. The nutrients found in mixed slaughterhouse residuals are of significant concentration, particularly nitrogen. To not utilize them is inefficient considering the amount of feed, resources and energy put into raising the livestock.

The Gullivers began some trials to compost their mixed slaughterhouse residuals in 1999. The meat scraps were combined with ground leaves and wood chips from utility line clearing crews, and with bedded horse manure from neighboring stables. To improve his knowledge, Jeff attended a compost operator's training course sponsored by the Cayuga Nature Center and successfully applied for a \$53,000 award from the New York Department of Economic Development's Environmental Investment Program to conduct a research, development and demonstration project.



**Composting meat by-products requires abundant dry amendments like sawdust, bedding manure and wood chips.**



GET THE  
**Big Picture**  
 ON  
**Composting**  
 AND  
**Organics Recycling**



Best Equipment

High End Markets

Lowering Costs

Managing Woody Residuals,  
 Yard Trimmings,  
 Manure, Biosolids,  
 Agro-Industrial Residues,  
 C&D Debris, Waste Paper

Regulations And Standards

International Opportunities

**Specific Answers To Key Questions**

How can residuals be blended to add market value?

When will mobile equipment save processing expenses?

What are the best ways to control odors?

When does a low-tech method work best?

**What It Takes To Be A Successful Composter**

Creating diverse income streams

New opportunities for value-added composts

Separating, shredding and screening systems

**Building Strong Recycling Programs And Markets**

New business niches — from green buildings to scrap tire recycling

Innovative waste reduction incentives

Cost-effective collection strategies

**Recycling Woody Materials And Yard Trimmings**

Choosing the right grinding and screening equipment

Keeping C&D materials out of the landfill

Building a marketing program and revenue stream

**Biosolids Utilization**

Meeting the challenges of biosolids composting

Gaining public acceptance for high quality biosolids

Health issues in land application

**Problem Solving For Project Managers**

Managing odors through biofiltration

Preventing fires at compost sites

Evaluating organics collection options

Avoiding contaminants in feedstocks

**New Driving Forces For Organics Recycling**

Market demand for quality compost

Compost amendments for disease suppression

**New Solutions For Agricultural Waste**

Best ways for managing manure and other farm residuals

Making quality compost from poultry and dairy manure

Anaerobic digestion and methane recovery

**Food Residuals**

New projects at prisons, universities, supermarkets

Best diversion methods

Creating compost partnerships

**Research Findings**

Blending nutrients in organic feedstocks

Monitoring bioaerosols

Vermicomposting advances

**Policy And Product Standards**

Landfill directives to ban organic residuals

Certification standards for quality compost

Financing initiatives

**Business Developments In Organics Recycling**

Investing in biomass facilities

Mergers and acquisitions

Commercial infrastructure for innovative technologies

Discover how thousands of landfill owners, waste companies, solid waste authorities, farmers and food processors are profiting from new techniques.

Get BioCycle and you'll get inside information...

**BIOCYCLE**  
 Journal Of Composting & Recycling

419 State Avenue • Emmaus, PA 18049 • 610-967-4135 • www.jgpress.com • biocycle@jgpress.com

**Subscription Form**

YES, enter my subscription to BioCycle, Journal of Composting and Recycling, for the term checked below:

- One year subscription (12 issues): \$69
- Two years subscription (24 issues): \$113
- Charge:  Visa/ MasterCard  American Express

Card No. Exp. Date \_\_\_\_\_

- Check enclosed, payable to BioCycle  Send Invoice

Name \_\_\_\_\_

Affiliation \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_

Zip Code \_\_\_\_\_





# 2002 International Symposium COMPOSTING AND COMPOST UTILIZATION

**COMPOST**  
SCIENCE & UTILIZATION

MAY 6, 7, 8, 2002 COLUMBUS, OHIO, USA

## Organizing Committee

**Harry Hoitink**  
**Fred Michel, Jr.**

The Ohio State  
University

**Jerome Goldstein**

**Nora Goldstein**

**Robert Rynk**

Compost Science  
& Utilization

BioCycle

**John Walker**

United States  
Environmental Protection  
Agency

**Patricia Millner**

United States  
Department  
Of Agriculture

## Contact Information

### Composting 2002

The Ohio State  
University  
1680 Madison Avenue  
Wooster, OH 44691  
330-263-3848

### Composting 2002

Compost Science  
& Utilization  
419 State Avenue  
Emmaus, PA 18049  
610-967-4135

### Website

[www.composting2002.org](http://www.composting2002.org)

### Email

[symposium@composting2002.org](mailto:symposium@composting2002.org)

## Current Cosponsors

BioCycle,  
Journal of Composting  
& Organics Recycling

U.S. Environmental  
Protection Agency

U.S. Department of  
Agriculture

U.S. Composting Council

Composting Council  
Of Canada

## CALL FOR PAPERS AND ABSTRACTS

THREE DAYS of technical sessions and poster presentations will offer data and provide discussion on the most significant findings that are critical to a clearer understanding of the composting process and end product value. Particular emphasis at 2002 International Symposium will be on the relationship of composting and compost to environmental issues such as resource creation from residuals, nutrient management, soil and water quality, pathogen control, climate change and bioremediation impacts.

AUTHORS are invited to submit abstracts in English (250 word limit) by August 31, 2001 that describe new and original research for oral presentation (see Proposed Program Topics).

ABSTRACTS for posters (200 word limit) that present original research are due by November 15, 2001.

### SCHEDULE FOR ABSTRACT SUBMISSION

#### Oral Presentations:

Deadline for abstract submission —  
**August 31, 2001**

Notice to authors of acceptance or rejection of proposed papers; Instruction to accepted authors for manuscript preparation —  
**October 31, 2001**

Deadline for manuscript submission —  
**December 31, 2001**

Notification of results of peer review of accepted manuscripts —  
**February 28, 2002**

Deadline for receipt of revised manuscripts —  
**March 31, 2002**

#### Poster Presentations:

Deadline for receipt of abstracts for poster presentations —  
**November 15, 2001**

Submit abstracts to  
[symposium@composting2002.org](mailto:symposium@composting2002.org); or mail to  
Composting 2002, The Ohio State University,  
1680 Madison Ave., Wooster, Ohio, 44691, USA.

Symposium proceedings and poster abstracts in electronic form will be made available as part of the registration. A hard copy of the proceedings will be published at a later date. Selected chapters of the proceedings will be published in Compost Science & Utilization.

## PROPOSED PROGRAM TOPICS

### Process Biology, Engineering and Management

- Microbial ecology of composting and compost utilization
- New molecular tools for compost analysis
- Role of microorganisms in organic matter conversion
- Design and optimization of composting systems
- Novel systems and feedstocks, blended products
- Odor measurement, characterization and management, biofiltration
- Nitrogen and phosphorus dynamics
- Economic viability of composting
- Extraterrestrial composting

### Composting in Context of the Global Environment

- Public health, fate of pathogens (including emerging pathogens)
- Effects of composting and compost use on climate change
- Bioremediation of contaminated soils, ecological engineering
- Role of composting in modern landfills
- Animal manure composting/nutrient management and sustainability
- Soil quality and productivity; erosion control

### Compost Quality and Utilization

- Compost contaminants; heavy metals, xenobiotics, plastics
- Biodegradable plastics and other polymers
- Stability standards, nutrient availability
- Spectroscopic techniques for compost quality
- Plant and animal disease suppression
- Impact of composts on plant and food quality
- Organic agriculture



The learning objectives of the project are first to determine the costs and savings through on-site composting of mixed slaughterhouse residuals when using commonly available feedstocks, bulking agents, farm equipment and facilities. Second is to identify the best mixing ratios, operational procedures, equipment and handling methods to accomplish cost-effective and nuisance-free composting of mixed slaughterhouse waste in outdoor windrows.

#### STATUS REPORT

The project is now half complete as three piles have been constructed for comparison. Each eight-foot-high pile consists of a blend of mixed slaughterhouse residuals, ground leaves and wood chips, and horse manure. The mix ratio was five cubic yards (cy) meat scraps (with wash water) to ten cy combined horse manure, leaves and wood chips; that was placed on top of two cy of recycled compost. The first pile is turned with a bucket loader once a month, and the second every other month; the third is a passively aerated static pile with perforated pipe laid 12 inches off the ground every eight feet apart. Labor requirements, compost process efficiency, odors, vector attraction and appearance for each design are being monitored. A secondary evaluation consists of examining the suitability of the finished product in terms of nutrient analysis, characteristics and potential for land application as a soil amendment on fields.

The results to date have been promising, with the Country Butcher Shop avoiding \$8,500 in pick up charges in the first year. It has diverted over 120 tons of meat scraps from less desirable disposal options and used an additional 100 tons of ground leaves and wood chips and 150 tons of horse

The results have been promising, with the Country Butcher Shop avoiding \$8,500 in pick up charges in the first year.

manure. The project is calculating the new expenses of compost site management and tractor use. Using equipment that is capable of performing multiple tasks on the farm helps spread out the cost of the tractor. Furthermore, the farm has a secure means of disposal and will be able to apply compost on its fields this spring. Nutrient analyses of semimature compost conducted at the Dairy One Forage Lab in Ithaca, New York have indicated total nitrogen levels of over three percent. This is considerably higher than analyses for most yard trimmings, manure and food residuals composts. Total phosphorus levels are less than one percent.

Horse manure has continued to be accepted from neighboring stables. Ground leaves and wood chips have been received from utility line crews on a continuous basis as well. The Cayuga County Soil and Water Conservation District has additional wood chips available. The abundance of dairy farms in the area makes it likely that additional manure would be available if necessary. For ease of delivery and drop-off, incoming loads of these materials have been tipped on the shale pad that was prepared in fall 1999. While the field soils have been sufficiently dry and stable (even with heavy rains), stockpiling on the pad is preferable.

Previously, horse manure and ground leaves and wood chips were stockpiled adjacent to each other and then combined in the piles with the meat scraps. Since June, 2000, horse manure and wood chips have been mixed to some degree. As the loads are delivered, the bucket loader pushes the new feedstocks into the larger pile and turns it. Anaerobic odors from the wet, dense horse manure bedded with sawdust are abated by this mixing step. Temperatures in the storage pile have been observed from 100° to 140°F. The coarser particles of the wood chips improve pile structure, passive aeration and available carbon. Furthermore, adding meat scraps to actively composting materials facilitates their decomposition and helps to minimize nuisances.

#### ODORS AND VECTORS

The Gullivers have done well with avoiding excessive odors and vectors, considering the potential for negative conditions. Ensuring adequate levels of carbon and mixing offal and meat scraps into actively composting materials have been effective. "We had some odors one day during the turning of a pile in the early spring," recalls Jeff. "Since then, we have layered additional horse manure and ground leaves and wood chips on the surface of the windrows, trying to place the meat scraps a minimum of 12 inches from the top and sides of the pile. I use more carbon and am conscious of the wind conditions when I turn the piles."

Crows have been the only vectors observed near the composting area. Initially, they had kicked off the wood chips on the surface of the pile and were pecking at the

## MEAT SCRAP COMPOSTING WORKSHOP

THE team involved in the Mapleton Farms composting trial is conducting a workshop on April 27 at the farm on composting of meat scraps with agricultural residuals. This is a project component funded by the New York State Environmental Management Investment Group. Cornell Cooperative Extension of Cayuga County is helping to organize this event and provide outreach to interested groups, farmers and individuals. Site tours, presentations by local composters and a question and answer panel is planned. For more information about the workshop or the project, contact Kelly Sevier at (315) 255-1183 or the Gullivers at (315) 252-1019, or visit [www.onfarmcomposting.com](http://www.onfarmcomposting.com).

meat scraps. The shotgun death of one bird eliminated the interest of the others. Routine maintenance includes covering any exposed areas with the mix of horse manure and ground leaves and wood chips.

The bucket loader tractor has been effective and versatile in implementation of the project. It is capable of collecting meat scrap barrels and butcher shop residuals, forming and turning piles and maintaining feedstock stockpiles. It also will be capable of pulling a spreader to land apply the finished compost. The one-cy bucket on the tractor is sufficient for this scale of operation. The four-wheel drive was extremely useful during winter and any wet and muddy periods of the year. The tractor had enough traction to turn piles well and move heavy materials.

The equipment has been easy to maintain. Cleaning it has been important because feedstocks and their odors can cling to the tires. In particular, some of the fats liquefied during the hot composting phase can escape the wood chips and fall on the ground. This portion of the waste stream is odorous, sticky and had to be cleaned off the equipment. We have attempted to avoid this problem by providing a thicker base of recycled compost and combined horse manure/wood chips below any meat scraps in the piles. This trapped and contained liquids, fats and blood. Production of viscous fats after hot composting was the primary factor in raising the passively aerated static pile's perforated pipes 12 to 18 inches off the ground. In an earlier trial, fats entered the perforated pipes and then solidified, blocking airflow and making a real mess.

Jeff acquired a tanker trailer for spreading liquid manure on a custom basis. This also will be used to irrigate the windrows, as they tend to dry out during warmer months.

#### SITE CONDITIONS

The shale pad has worked well for stockpiling materials and was used for some meat scrap composting before the three comparative trials began. The surface held up well and was easy to drive on during conditions of snow, mud and moisture. It is currently used for stockpiling carbon sources and bulking agents.

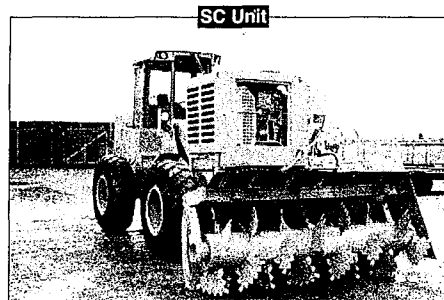
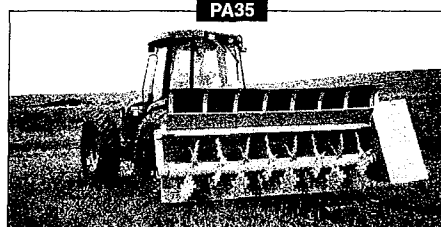
The active meat scrap piles are in a section of a field previously used for hay. The surface has been compacted by the tractor during forming and turning of the piles. The site has not exhibited rutting or muddy areas. The soil directly beneath the piles is soft, but dries out after they have been turned.

From a cost and performance perspective, use of the field soils for composting has been more than adequate for the scale of the operation. Long-term questions about the possible impacts on groundwater cannot be answered yet. It is very likely that at this scale of operation, the possible load of nutrients is minimal and probably less than conventional agricultural practices related to manure spreading and fertilization. At a larger scale of composting, it is recommended that either an impermeable liner be used for all of the site or for the initial feedstock mixing and processing, or that the compost site be rotated to different fields. It should be noted that composting on field soils is site-specific and that not all operations will have suitable slope, stability, drainage and separation distance from surface water, groundwater and other resources.

The Gullivers are exploring higher end uses of the slaughterhouse residuals, including production of bone meal and blood meal, and the use of fats for biodiesel fuel. These components could be segregated easily in the butchering operation, and are some of the more difficult feedstocks in the compost mixture to decompose. ■

*Brian Jerosé is research coordinator for Environmental Fertilization Corporation based in Enosburg Falls, Vermont. He is on the project team working with Mapleton Farms.*

## COMPOSTING FLEXIBILITY

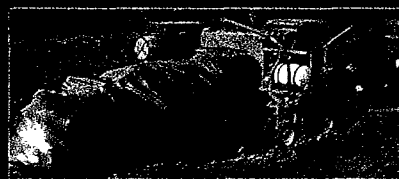


Brown Bear machines provide flexibility for your projects and your budget whether used for composting, dewatering or bioremediation. Attachments and self-propelled transportable units are available for your smallest to largest projects.

**BROWN BEAR**

Brown Bear Corporation  
P.O. Box 29 • Corning, Iowa 50841 • (641) 322-4220 • Fax (641) 322-3527  
[www.brownbearcorp.com](http://www.brownbearcorp.com)

## Composting Made Simple



- Control Odor
- Control Leachate
- Flexible & Easy-to-Use
- Space Efficient
- Cost Effective Solution

**AG-BAG**  
environmental

1-800-334-7432

[compost@ag-bag.com](mailto:compost@ag-bag.com)

<http://www.ag-bag.com>

