

PROJECT REVIEW – CANADIAN FOOD INSPECTION AGENCY (CFIA) MANITOBA COMPOSTING EXERCISE**OVERVIEW:**

Nordevco was invited to participate in a Canadian Food Inspection Agency (CFIA) composting exercise by the CFIA Manitoba Team. The purpose of Nordevco's participation was to evaluate the impact of BactiDomus® Technology on the composting process specifically related to achieving and maintaining temperatures appropriate for the inactivation of the pathogen responsible for avian influenza. The exercise took place at a layer barn in southwestern Manitoba on August 27, 2007.

COMPOSTING PROCESS:

The compost was created by mixing spent layers, poultry manure and straw in a total of nine batches (eight untreated and one treated with BactiDomus® Technology). A Supreme Environment Processor 700T was used to mix the layers, manure, and straw before spreading the resultant compost mix on the concrete floor of the manure storage shed located behind the layer barn.

COMPOSITION OF COMPOST PILES

	Average Untreated Pile	Treated Pile
% Straw	13.3	12.7
% Manure	14.3	15.9
% Chickens	72.4	71.4
Chicken/Straw Ratio	5.44	7.87
Chicken/Manure Ratio	5.07	6.3
Straw/Manure Ratio	0.93	0.80
Chicken (lbs)	8,227.5	3,600
Straw (lbs)	1,512.5	640
Manure (lbs)	1,622.5	800

The resultant untreated compost pile was 64 feet long by 14 feet wide and approximately six feet high while the pile treated with BactiDomus® Technology was 12 feet by 7 feet

All data regarding the composition of the piles is based on data collected and provided by the CFIA Manitoba Team.

Once the compost piles were created probes were inserted into the piles to monitor temperatures. A total of 16 probes with two temperature readings per probe (32 temperatures) were inserted into the untreated compost pile. The probes were placed three feet from the end of the compost pile and then every 20 feet along one side of the pile. The probes were placed parallel to the floor at heights of one and a half and three feet up from the floor. Duplicate probes were placed one foot away horizontally from the other side of the pile.

Because the treated pile was significantly smaller, only four probes with two temperature readings per probe (eight temperatures) were used. These probes were distributed evenly through the untreated pile.

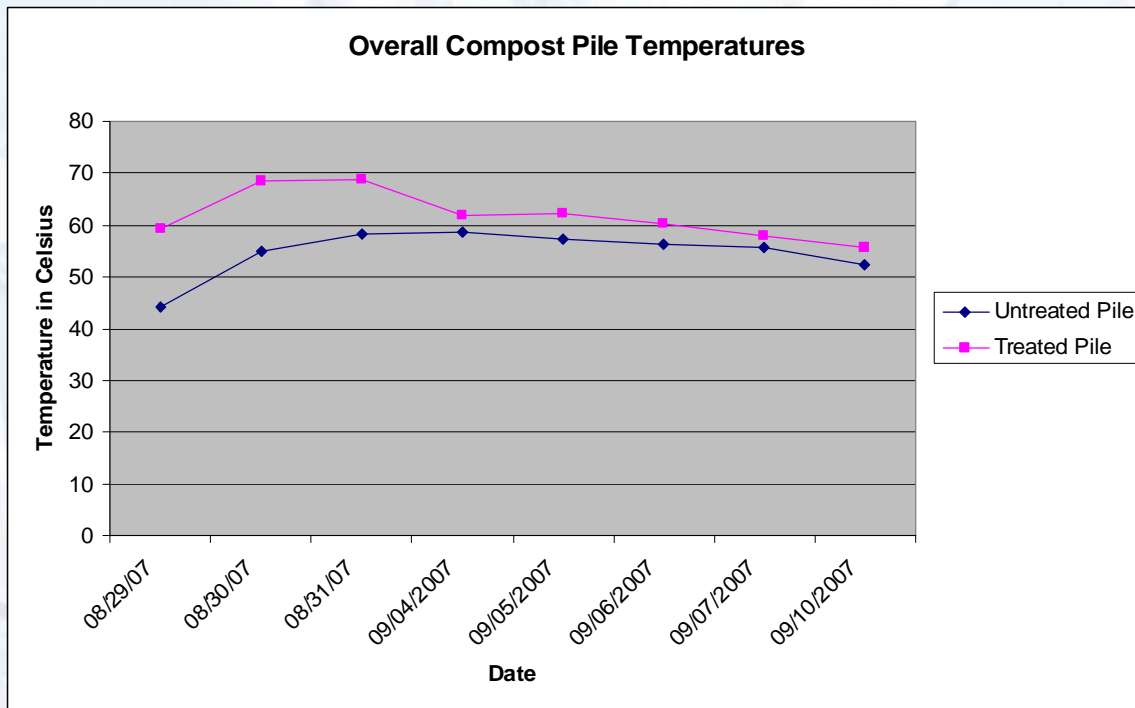
One probe was left outside of piles in the manure shed to measure the ambient air temperature.

All probes were connected to data loggers and all temperature readings were logged and monitored by CFIA Manitoba Team members.

RESULTS:

		COMPOST PILE TEMPERATURES															
		08/29/07	08/30/07	08/31/07	09/04/07	09/05/07	09/06/07	09/07/07	09/10/07								
AMBIENT AIR TEMP		25.0	14.4	22.8	12.3	18.2	14.3	16.6	16.4								
DAYS AFTER BEGINNING		1	2	3	7	8	9	10	13								
		UT	TP	UT	TP	UT	TP	UT	TP	UT	TP	UT	TP	UT	TP	UT	TP
Bottom		37.	56.	33.	64.	49.	69.	51.	61.	52.	61.	51.	59.	51.	56.	51.	54.
Deep		2	8	3	6	1	0	0	5	6	1	7	6	8	9	0	2
Bottom		40.	63.	46.	71.	55.	71.	54.	62.	55.	63.	54.	61.	53.	57.	50.	56.
Middle		7	5	0	3	2	1	7	6	4	0	8	0	8	6	1	9
Top Deep		49.	58.	68.	74.	68.	69.	73.	66.	65.	64.	64.	63.	63.	62.	58.	58.
		6	8	9	5	8	5	6	4	3	8	5	8	4	2	7	1
Top		48.	57.	55.	63.	60.	65.	55.	56.	56.	59.	53.	56.	53.	55.	50.	52.
Middle		9	8	9	7	5	3	6	8	2	6	9	7	5	1	2	9
Overall		44.	59.	55.	68.	58.	68.	58.	61.	57.	62.	56.	60.	55.	58.	52.	55.
Average		1	2	1	5	4	7	7	8	4	1	2	2	6	0	5	5

Notes: UT – Untreated Pile; TP – Treated Pile; All temperatures in Celsius



CONCLUSIONS:

According to “Animal Carcass Composting Techniques, Basic Guidelines” (C Kranendonk B.Sc (Agr), DVM, Dip.VM, Diagnostic & Training Co-ordinator National Center for Foreign Animal Disease, Canadian Food Inspection Agency, Winnipeg, Manitoba) the advantages of carcass composting are that the composting can be done on-site, temperatures generated are lethal to most pathogens contained in the carcass and the compost material can be recycled. In addition, it is a process that every producer has the potential to implement on their own farm provided that the composting is carried out in an approved manner and location. Furthermore, temperature is critical both for and as a result of microbial activity. The rule of thumb is that the warmer the compost pile the greater the microbial activity taking place. A temperature of 48.9 Celsius is too low and will result in limited activity. The optimal temperature range is 54.4 C to 65.6 C.

It is important to note that for the purpose of this trial the goal was to achieve and maintain a minimum temperature of 37 C for five days at all probe locations within the compost piles.



Based on the temperature data provide by the CFIA, both the treated and untreated piles reached overall average temperatures in excess of the 37 C minimum the first day. On day two, the average temperature for the Bottom Deep probes in the untreated pile registered a temperature drop to 33.3 C. This may be explained in part by probe placement that resulted in the end of a couple of the probes extending into the straw base below the pile as the pile settled. With changes in the placement of the probes to ensure that they were parallel with the base, the temperatures recorded were more appropriate. At no time did any probe in the treated pile register a temperature below the 37 C requirement for avian influenza pathogen inactivation.

While the necessary threshold for success in this study was a minimum of 37 C for five consecutive days – achieved by the treated pile in the first five days and in six days for the untreated pile – it is clear from the data that the treated pile reached higher temperatures than the untreated pile and maintained those higher temperatures longer than the untreated pile.

To quote the “Manitoba Exercise August 2007 Manitoba Disposal Team Objectives and lessons learned” report:

“This looks promising (use of the BactiDomus® Technology compost accelerator). Temperature probing results of the compost piles would indicate that the innoculum (BactiDomus® Technology compost accelerator) pile did achieve higher temperatures a few hours sooner and the temperatures in the pile may have been more consistent. Unfortunately, the pile was a smaller pile so we only had four probes with two temperature readings (8 temperatures readings) vs. 16 probes with two temperature readings (32 temperatures) in the non-innoculant pile. Two other variables were that there may not have been the exact same ration of straw/manure and birds or one pile could have been mixed more than the others.”

A CFIA Manitoba Team member also confirmed that given the smaller size of the treated pile it may have been expected to loose heat more rapidly than the larger pile given its significantly smaller thermal mass.

Nordevco acknowledges the CFIA conclusion that this was a single limited trial and that further tests are warranted. Nordevco has committed to exploring further testing with the CFIA.

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