COMPOSTING DEAD POULTRY

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INTRODUCTION

All good things must come to an end. Unfortunately for a few, the involvement in an intensive industry may end sooner than intended. Before any explanation of this somewhat macabre introduction, some background is required.

I have been involved in the NZ pork industry for the last 4 years as their Environment Officer. This position has involved helping producers out with resource consents, helping councils out with producers and vice versa, writing submissions on government policies, facilitating the review of their environmental code of practice and writing an Environmental Management System. These activities have allowed me to gain an insight into the trends at both a micro and macro level in terms of on-farm management of environmental issues.

It seems fair to say that there are a large number of people with some sort of stake in the rural sector. Between these groups, conflicts of interest tend to result in either compromise (lose/lose) and/or with one unfortunate individual or group assuming some sort of added cost. When a management strategy provides a win-win situation however, although rare as hen's teeth, this should be disseminated not just to producers but also those responsible for implementing legislation such as the Resource Management Act.

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Which, quite nicely, brings us back to untimely ends. Poultry that is, not the council enforcement officers. There are a number of ways of disposing of stock that have died for reasons other than preparation prior to the presentation at the supermarket. Among those, offal pits are perhaps traditionally the most common. Other options include incineration, burial and off farm rendering. All have their pros and cons, as does composting.

Experience over the last few years has suggested that the general community, including council officers are initially very wary about the idea of composting carcasses. Most of their concerns however, are almost always based on preconceived ideas about what the process entails and what the risks are, usually focussing on the spreading of pathogens. However, with a system that is well designed and managed, these concerns couldn't be further from the truth. The discussion below gives a brief overview of the management and design to successfully compost poultry.

THE RECIPE

Carbon/Nitrogen Ratio

It is vitally important to get the ratio between carbon and nitrogen within the acceptable parameters. The C:N ratio should be between 20:1 to 35:1 to result in a composting process that generates little odour, yet offers an environment where micro-organisms can flourish (http://www1.agric.gov.ab.ca, 23 August 2006). ensure a good bacterial population. The best form of carbon to use is *untreated* sawdust; due to its small particle size, ease of handling, absorbency qualities, and high carbon content. Straw can also be used but expect longer composting times. Run off of liquids from the composting mass may also be more of a problem than with sawdust. Sawdust will either shed and/or absorb liquids sufficiently so that leaching and drainage from the pile is minimal. There should be enough nitrogen produced by the carcasses but it is perfectly acceptable to use spent litter in place of some of the sawdust to improve the balance.

Water

The pile should be 45-60% moisture to encourage bacterial growth and rapid composting. This is a fairly critical component to get right. Either too much or not enough moisture will stop the required bacterial growth and thus reducing the temperature of the pile. While optimum moisture is critical to the composting process, experience shows that water does not need to be added to litter that has normal moisture levels as well as the moisture from the carcasses.

A rule of thumb for correct moisture is that the mixture should hold it's shape if you squeeze some in your hand (without dripping). Field experience has also shown that the material that has gone through the compost cycle can be partially substituted for the litter (Carter et al. 1996,). Reusing some compost will also help to 'seed' the required bacteria and thus help to speed up the process.

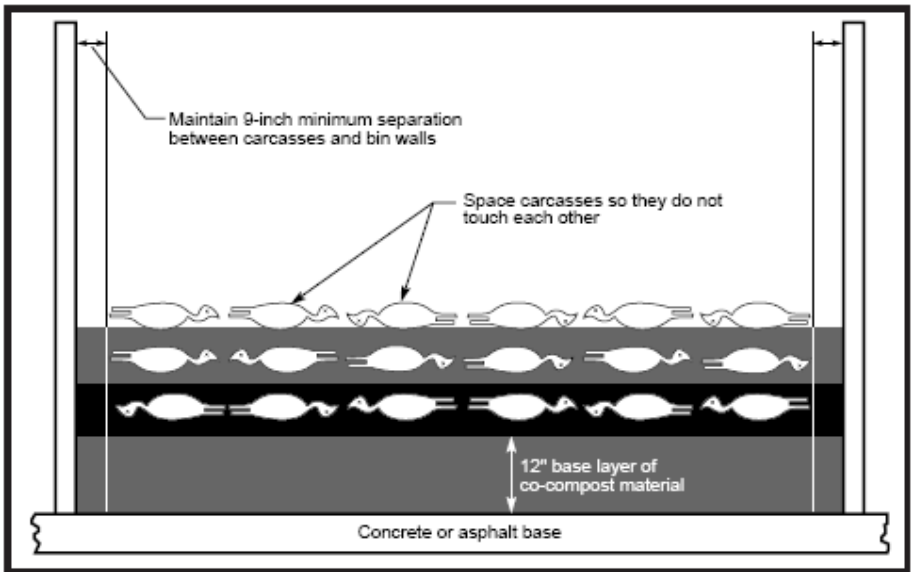
Temperature

The best and easiest way to knowing whether or not the C:N ratio and moisture levels are within acceptable limits, is to record the temperature. The highest rates of decomposition occur for temperatures in the range of 43 - 66°C. Achieving a constant heat over 55°C over three days will also kill parasites, and faecal and plant pathogens within the pile. However, great care should be taken that the temperature does not go above 66°C as microbial activity declines rapidly (Adams et al., 1996). To ensure this optimal temperature it is necessary to have a layer of inactive sawdust or straw to act as insulation. This also ensures that the pile will remain aerobic (hot air rises out of the top and draws in cold air from the sides and bottom).

Lay, not stir

So far, the composting requirements discussed could apply to the bin used for the neighbours' grass clippings. A distinction needs to be made as the reality is that the pile is an inconsistent mixture with carcasses providing a localised anaerobic decomposition process – until they are well 'advanced'. A good schematic of how the carcasses should be layered in the pile can be seen in Figure 1. One description of the process that would sum it more accurately would be: *"above ground burial in a bio-mass filter with*

pathogen killed by high temperature." (http://www1.agric.gov.ab.ca, 23 August 2006). For this reason, it is important to avoid turning the pile until the mortality is fully decomposed. This decomposition should take no longer then three months.



Source: Glanville (1999).

Figure 1. Layering Carcasses to ensure optimum composting

THE RESULTS

So the composting system has worked and in three months there pile is now a rich humus-like material. Aside from the benefits of disposing of dead poultry in an environmentally friendly way, the end product is also a highly valuable product as a fertiliser and soil conditioner. See Table 1 for a breakdown of the compost.

Table 1. Composition of dead poultry compost

Analysis	Amount
Moisture, percent	46.10 +/- 2.19
Nitrogen, percent	2.20 +/- 0.19
Phosphorus (P2O5), percent	3.27 +/- 0.23
Potash (K2O), percent	2.39 +/- 0.13
Calcium, percent	1.33 +/- 0.15
Magnesium, percent	0.82 +/- 0.10
Sulfur, percent	0.40 +/- 0.02
Manganese, parts per million	122.00 +/- 18.00
Zinc, parts per million	245.00 +/- 32.00
Copper, parts per million	197.00 +/- 28.00

Source: Collins, Jr (1996)

Another key result is that bacteria, commonly referred to by council officers such as Salmonella, coliform bacteria, Newcastle and infectious Bursal disease viruses are destroyed as part of the heating process within the pile.

CONCLUSIONS

Composting carcasses, when done correctly can be claimed to be a sustainable management system. It is an almost completely closed loop system, with the valuable humus being used to grow the next carbon source. As long as good management ensures no pests or leaching occurs, there are also little or no negative effects on the environment at all.

There are a couple of areas, however, that appear to have so far ensured a limited use of this system in New Zealand. Firstly, the management required involves more time and more expertise than the traditional offal pit option. As with most things in life, expertise comes from experience, and a bit of patience may be required by the producer, council officer and possibly the neighbour while the process is being perfected. Secondly, the supply of the carbon source, with regards to both availability and price makes investment in this process and riskier prospect when compared to the

offal pit. This should be off set however, by the ever increasing costs of compliance with regional and district plans. Sustainable management strategies such as carcase composting provide just about the only avenue for producers to either reduce their compliance costs or at least maintain them at current levels.

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