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Management Guidelines For In-House Composting Of Litter

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During the past few years there has been rapid adoption of composting the litter between flocks with a primary goal of reducing the pathogen load in litter. The term for this procedure goes by different names; composting, windrowing and pasteurization. Implemented properly, this biological heat treatment reduces many heat-sensitive bacteria, viruses, parasites such as coccidia and darkling beetles. This litter treatment program has been a successful intervention strategy in reducing or eliminating many common poultry diseases such as dermatitis, necrotic enteritis, and runting and stunting syndrome. It is also been used to treat litter following a viral challenge such as laryngotracheitis. With some disease challenges the severity of infection decreases with each consecutive flock that is windrowed. Although some have implemented in-house composting as a means of reducing bedding replacement costs or as a waste management reduction/treatment strategy, it is often the improvement in production efficiency and bird health that drives adoption of this practice. Often the greatest benefit of in-house composting is from poultry farms having the poorest production cost and health.

The merits of this litter management technique *will not* be realized if the program is not implemented properly! Windrows can be formed with grader blades on tractors, skid-steer loaders or specially-designed windrowing equipment. Each windrowing method has advantages and disadvantages. Many have opted using the windrowing equipment since it pulverizes the litter, cake and hardpan; aerates, re-conditions the litter and forms desirable size windrows in the two-foot height range. Windrowers also turn piles more effectively than blades or skid-steer loaders. When using windrowing equipment on farms having a significant disease challenge it is important to incorporate all litter from along the sidewalls and corners into the piles for heat treatment. Depending on house width and litter depth, two or three windrows should be formed within two days following bird movement. The goal is to achieve 130^{o} F or greater temperatures within the first two to three days and to maintain these windrow temperatures for a cumulative period of time of three to five days. Turning the piles is important in assuring pathogens throughout the litter mass are exposed to the elevated temperatures. Litter moisture of 25% or more is often needed to achieve these temperatures. When the litter becomes dry and powdery following years of reuse and fails to heat properly, it may be advantageous to supplement it with wet bedding materials for added carbon, porosity and moisture. If time permits, allowing piles to heat for a total of 7 to 10 days is considered ideal. Equally important in this process is proper and timely re-spreading the piles and getting the litter base leveled back uniformly. A minimum of 4 days should be allowed between leveling the piles and chick placement. Table 1 depicts a typical schedule of events for a 14-day layout between flocks.

Proper implementation and in particular, managing ammonia is often key to the success of this program. Factors to minimize elevated ammonia levels with in-house composting include the following. Ideally, in-house composting should start the first flock following a total cleanout. Starting the program the first time on built-up litter releases *excessive* ammonia! When starting

on built-up litter it is important to begin during warm or moderate weather in order to more cost-effectively ventilate the house for ammonia control. It will also require at least a 25% increase in the rate of litter amendment for ammonia control, especially during cold weather. Managing litter depth in a range of 3 to 6 inches not only aids in reducing ammonia, it also enhances the windrowing process. At minimum, a partial house cleanout should be done annually as a means of managing litter depth. All hardpan should be removed during these partial cleanouts. Another key factor is to maintain constant ventilation after forming the windrows and following pile leveling. This is a necessary step to remove the ammonia and moisture that is released from the litter during the heating process. Turning windrows also facilitates the release of ammonia and moisture. Piles should be turned at least once. If time permits and resources are available, some of the more successful growers turn piles two or three times. There is a delicate balancing act between having enough moisture to get desirable windrow temperatures and avoiding excessive ammonia. If caking is excessive, it may be advantageous to remove the cake prior to windrowing particularly during cold weather. Tilling or removal of cake fragments after re-spreading may also aid in reducing ammonia and moisture. To avoid excessive ammonia challenge it may be best to skip composting for a flock if the layout is less than 10 days or in extremely cold weather with wet litter. Repeated composting over consecutive flocks conditions the litter and reduces the initial burst of ammonia of release often seen when starting this program. There may be another challenge with ammonia when re-starting the composting process after skipping multiple flocks.

Finally, in-house composting involves more cost and labor, and poses scheduling challenges during layout. For those farms having to deal with many types of diseases, when implemented properly and done repeatedly, in the majority of cases in-house composting improves performance and health. The benefits for these heath-challenged farms far exceed the added costs and labor. There are a number of factors to consider in determining if in-house composting is a program that should be adopted by average or above average growers and the frequency in which it should be done during the year. In Virginia, NRCS has recently approved in-house composting of litter between flocks for cost share assistance under the waste treatment standard #629.

Table 1. Proposed in-house composting schedule of events with a 14-day layout.

Day	Process	Day	Process
0	Catch	7	Secondary Heat
1	Form Piles	8	“
2	“	9	Level Piles
3	Heat Production	10	“
4	“	11	Aerate Litter
5	Turn Piles	12	Apply Litter Treatment
6	“	13	“
		14	Place Chicks