



Definition

The biological treatment of poultry litter to provide for extended reuse and to improve timing of nutrients applications to meet crop needs.

Resource Management System

In-house litter pasteurization, litter amendments, and other management practices are all part of a system to reduce pathogens and air emissions, improve bird health, and reduce waste generation and storage issues.

Purpose

Use in-house pasteurization to:

1. Reduce the potential for nutrient contamination of surface and ground water sources by reducing the volume of manure removed from houses. Partial litter removals can be timed to meet the nutrient needs of plants. This would decrease the amount of litter storage needed and could potentially reduce the need to handle the litter multiple times. The goal is to remove less than 50% of the litter from the house annually.

2. Reduce the numbers of poultry and food borne pathogenic parasites (i.e. *Salmonella* spp., *Escherichia coli*, *Campylobacter* spp., *Staphylococcus aureus*), and other parasites (i.e. coccidia) using elevated temperatures to kill microorganisms.
3. Reduce litter insect populations, leading to decreased insecticide use.

Condition Where Practice Applies

The large quantity of litter generated from the poultry industry has raised concerns with environmental regulators about how poultry litter is handled, stored, and utilized.

In the past, the typical house was cleaned out in the winter to avoid ammonia and pathogenic microorganism issues. However, this meant that large volumes of storage were required because the litter could not be land applied at that time. Disposal of large volumes of litter also was an issue because the available nutrients exceeded the amount of land available for application.

In addition, bedding material has become a scarce and expensive commodity. Many poultry producers re-use the litter for extended periods of time (3-5 years). One of the issues with re-used poultry litter is higher disease challenges.

Pathogenic microorganisms associated with continued reuse of unpasteurized litter can cause serious infections that may lead to death of the birds and decreased growth rate and feed efficiency. Pathogenic microorganisms can be a potential source of food borne illness in humans.



Spreading out the windrowed pile

In-house pasteurization is a process that uses elevated temperatures to kill microorganisms. Research at Auburn University showed that maximum temperatures (130°F to 140°F) are reached within 24 hours of windrowing litter. When these temperatures are attained for 5 days, most heat-sensitive pathogenic bacteria and viruses are killed.

Process

The ideal time to start windrowing is after the first flock following a total cleanout. If starting with built-up litter, it is best to implement during warm or moderate weather. Warmer outside air temperatures helps ensure that ideal composting temperatures within the pile can be reached in less time.

Implement the windrowing process within 2 days following bird removal. Initial litter moisture requirements should be between 25 and 35%.

Turn the windrow at least once to ensure temperature uniformity throughout the mass. Turning is essential for reducing ammonia and

moisture. It also exposes the cooler portions of the pile to higher temperatures.

Following pasteurization, use a skid-steer loader or tractor with blade to break down the piles and spread the litter. It is important to provide adequate ventilation in the houses during the spreading process to allow ammonia and moisture to escape.

If the amount of cake (crusts) is excessive, remove the crust and allow the house to dry out prior to adding the new flock to reduce moisture and ammonia levels. The use of chemical litter treatments to lower pH in the litter and bind ammonia early in the brood cycle is essential.

A minimum 10 day layout is needed to implement the windrowing procedure. Windrowing should be avoided if there is inadequate layout time or in extremely cold weather that does not allow adequate conditions for moisture and ammonia removal.

Safety Requirements

Operators shall wear a respirator with ammonia filters during all operations.

Ventilation to remove ammonia and moisture should be provided from the day of windrowing until chick placement.

Operation and Maintenance

1. Inspect the litter profile in each chamber of the poultry house to verify and record litter depth and condition prior to starting a long-term litter management program.
2. The optimum litter depth for windrowing is 4-6 inches. When litter is over 8 inches and contains hardpans, a partial cleanout is recommended. Unless excess cake exists, there is no need to crust out prior to windrowing as moisture is needed for the pasteurization process.
3. The partial cleanout should be completed prior to the windrowing process. This can be accomplished by removing all litter from

a portion of the floor area. Alternate litter removal from the center of the house the first time, then remove from the sidewall the second time.

4. If a hardpan is encountered, use a skid steer loader to remove it. In some situations, a chisel plow or row cultivator with straight teeth may be required to loosen the hardpan before removal.
5. If it is necessary to wash down the house, complete this process prior to windrowing litter.
6. Form windrows on each side of the house. Create two or more conical windrows which are the length of the house and are 2-3 feet high. All litter, including that under the windrow base, sidewalls, and corners, should go through the heating process.
7. If darkling beetle is a problem, apply approved insecticide at approved rates, ideally within 12 hours after pile formation.
8. Record temperatures at 3 locations per house per day using digital thermometers with 8 to 12 inch probes. Insert the full length of the probe into the top of the windrow pile.
9. The average temperature in the windrow must reach 131°F or greater for at least 3 full days during the first phase.
10. Turn all of the material in the pile after the required temperatures have been reached.
11. During the second phase, the windrow must achieve the minimum temperature of 131°F for at least 2 full days.
12. After the required temperature has been achieved, use a skid-steer loader or a tractor with blade to level out the litter and allow additional ammonia and moisture to escape. **Adequate ventilation is very important. Depending on ambient weather conditions, the end doors should be open, and there should be a ventilation fan set on a timer, or a tunnel fan set on temperature.**
13. Evaluate the condition of the litter for wet crust. If significant, these crusts shall be removed.
14. Allow the litter to dry for 4 days prior to chick placement.
15. Apply litter amendment at the specified rate to control ammonia.

In House Pasteurization – Job Sheet

Landowner _____

Planner Certification
Planner certifies they have reviewed the Operation and Maintenance section of this job sheet with the producer
Planner: _____ Date: _____

Purpose (check all that apply)	
<input type="checkbox"/> Reduce volume of litter and associated nutrients	<input type="checkbox"/> Reduce use of anti-microbial chemicals and insecticides
<input type="checkbox"/> Improving water quality by timing partial manure removal to the nutrient needs of crops and reduce crusting	<input type="checkbox"/> Extend the re-use of litter, reducing cake removal and storage
<input type="checkbox"/> Improve poultry health and productivity	<input type="checkbox"/> Reducing harmful pathogen levels

Client must make a statement regarding the depth and condition of the litter prior to beginning this practice
Depth of the litter: _____
Age of litter (report either # flocks or years since last total cleanout: _____
Amount of cake and wetness of litter: _____
Any hardpans found: _____
Hardpans removed: _____

Producer to record litter removed and destination
Crust out: Date _____ Tons _____ Destination _____
Crust out: Date _____ Tons _____ Destination _____
Partial clean out: Date _____ Tons _____ Destination _____
Partial clean out: Date _____ Tons _____ Destination _____

Certification
Producer self-certifies windrowing has been completed according to plans and specifications.
Producer: _____ Date: _____

Temperatures Records							
Temperatures of Initial Windrow Event	House__	House __	House__	Temperatures of Second Windrow Event	House__	House__	House__
Day 1 section 1				Day 1 section 1			
Day 1 section 2				Day 1 section 2			
Day 1 section 3				Day 1 section 3			
Day 2 section 1				Day 2 section 1			
Day 2 section 2				Day 2 section 2			
Day 2 section 3				Day 2 section 3			
Day 3 section 1				Day 3 section 1			
Day 3 section 2				Day 3 section 2			
Day 3 section 3				Day 3 section 3			
Day 4 section 1				Day 4 section 1			
Day 4 section 2				Day 4 section 2			
Day 4 section 3				Day 4 section 3			

Additional Specifications and Notes:

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