



Build a windrow 2-3 feet high and conical shaped

Definition

The mechanical, chemical, and biological treatment of poultry litter to provide for extended reuse and timing of applying nutrients to crop needs.

Resource Management System

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

This process allows for systematic partial house clean outs at strategic times rather than large volumes of litter with whole house clean outs. This will reduce manure storage needs, significantly reduce field stockpiling, allow for improved timing of manure removal to meet the nutrient needs of plants, and reduce potential off site surface and groundwater contamination.

Purpose

To use mechanical, chemical, or biological treatment processes as part of an agricultural waste management system:

1. Reducing the numbers of poultry and food borne pathogenic parasites (i.e. Salmonella spp., Escherichia coli, Campylobacter spp., Staphylococcus aureus, and parasites (i.e. coccidia) using elevated temperatures to kill microorganisms.
2. Reducing the potential of nutrient contamination of surface and groundwater sources by reducing the frequency of manure typically removed from houses and timing partial litter removals to the nutrient needs of plants. The goal is once a year to remove approximately 50% of the litter from the house annually.
3. Reduce pathogen exposure, leading to improved health and productivity.
4. Reduce litter insect populations, leading to decreased insecticide use.

Condition Where Practice Applies

Poultry production is a significant animal agricultural industry in Texas. The large quantity of litter generated from the poultry industry has presented challenges concerning how poultry litter is handled, stored, and utilized.

Bedding material has become a scarce and expensive commodity. Many poultry producers

re-use the litter for extended periods of time (i.e. 3-5 years). One of the issues with re-used poultry litter is higher disease challenges. Pathogenic microorganisms associated with continued re-use of litter can cause serious infections that may lead to death of the birds and decreased growth rate and feed efficiency.



Spreading out the windrowed pile

In-house pasteurization is a method using 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 and temperatures dropped off after about 48 hours. This is long enough to kill most heat-sensitive pathogenic bacteria and viruses.

Process

The ideal time to start windrowing is 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 insure the ideal composting temperatures with the pile can be reached in less time.

Implement the windrowing process within 2 days following bird movement. Initial litter moisture requirements should be between 25 to 35%. The combination of elevated temperatures, gases generated during the heating process (ammonia and carbon dioxide), and microbial competition aid in pathogen reduction.

Turning the windrow at least once insures temperature uniformity throughout the mass and is essential in reducing ammonia and moisture. Turning also exposed the cooler portions of the pile to higher temperatures.

Following the pasteurization process, the piles are broken down, and spread out using a skid-steer loader or tractor with blade. It is important to provide adequate ventilation in the houses, allowing ammonia and moisture to escape during the entire process.

If the amount of cake (crusts) is excessive, removing crust and allowing the house to dry out prior to the new flock arriving reduces 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.

Operation and Maintenance

1. Inspect the litter profile in each of the 3 chambers of the poultry house to verify and record litter depth and condition prior to starting a long term litter management program.
2. Manage litter depth for windrowing at a depth of 4-6 inches. When litter is over 8 inches and contains hardpans, a partial cleanout is recommended. This should be

done in the spring or fall and when there is suitable storage, land application, or other alternative litter uses. Unless excess cake exists, there is no need to crust out prior to windrowing as moisture is needed for the pasteurization process.

3. If a partial clean out is planned, this should be accomplished prior to the windrowing process. This can be accomplished by removing all litter from 50% of the floor area. Alternate litter removal from the center of the house first time, then remove from the sidewall the second time.
4. If the hardpan is encountered, use a skid steer loader to remove the hardpan. In some situations a sturdy piece of farm equipment i.e. chisel plow or row cultivator with straight teeth, may be required to loosen this hardpan before removal.
5. If you plan 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 windrows the length of the house with recommended equipment (2-3 feet high and conical shaped). All litter, including that under the windrow base, sidewalls, and corners should be turned and go through the heating process.
7. Operators shall wear a respirator with ammonia filters during this and subsequent operations.
8. If darkling beetle is a problem, apply approved insecticide at approved rates, ideally within 12 hours after pile formation.
9. Record temperatures at 3 locations per house per day using digital thermometers with 8 inch or 12 inch probes. Insert the probe at the top of the windrow pile, the full length of the probe.
10. Windrow temperatures must be maintained for a minimum of 130 F for a minimum accumulated period of 3 days.
11. Turn the pile approximately 4 days after constructing the initial pile. Completely turn the pile, include the volume to the floor.

12. When the second windrowing operation has met the desired temperature guidelines, use a skid-steer loader or a tractor with blade to level out the litter and allow additional ammonia and moisture to escape. Removing the escaping ammonia and moisture using adequate ventilation is very important. Note: Depending on ambient weather conditions, the end doors should be open, ventilation fan set on timer, or a tunnel fan set on temperature. **Ventilation to remove ammonia and moisture should be provided from the day of windrowing until chick placement.**
13. Evaluate the condition of the litter for wet crust. If significant, these crusts shall be removed.
14. Allow the litter to dry out over 4 days prior to chick placement.
15. 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.
16. Apply litter amendment at the specified rate.

Biosecurity

Equipment used for handling litter should be cleaned and disinfected after every use to reduce the possibility of spread of any disease agent or pathogen. Any equipment brought from off-site should be cleaned and disinfected before being brought into the site.

Specifications

Specifications for this practice and been developed in cooperation with the University of Delaware Cooperative Extension and Texas AgriLIFE Extension. This job sheet was prepared in accordance with the NRCS Field Office Technical Guide and the Waste Treatment practice standard (629).

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 field stacking by eliminating whole house cleanouts	<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
<input type="checkbox"/> Reduce odors associated from facility	

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 and agrees not to stockpile manure in fields longer than 14 days. Litter may be stored on-site provided that it is protected from rainfall and flooding.
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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