IN-HOUSE LITTER COMPOSTING BETWEEN FLOCKS

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Composting litter between flocks has become an accepted method for reducing microbial loads in broiler houses during times of the year when removing and replacing litter is inconvenient or infeasible. Recently, replacement litter (bedding) materials have been in short supply, increasing replacement cost in addition to making bedding unavailable at times. Poultry companies and growers alike are embracing the concept of in-house windrow composting as a way to improve bird performance and reduce the likelihood of disease spread when total cleanout is not a good option. As this management tool gains support, techniques to get the most out of in-house composting are being fine-tuned by the growers and equipment manufacturers that support them.

The benefits of composting as a method of dead bird disposal have been known and practiced for several decades (Murphy, 1988, Brodie, et al., 2000). Monitoring of compost of this type tells us that bacterial and viral pathogens are eliminated or greatly reduced. Others have composted litter to reduce pathogens and produce consumer-friendly fertilizer products (Anderson, 1990). During the last few years, broiler producers have refined methods of in-house litter composting with the intent of using this technique to reduce bacterial and viral loads between growouts and allow the reuse of litter for an extended period of time.

In most cases, growers have used a box blade or compost turner to create two long windrows in each house to most effectively allow the litter to go through a heat. Creating windrows will require several hours of work per house. Respreading litter after composting will take a similar amount of time. Cake may be removed or may be left in to provide enough moisture for the bacteria to proliferate if litter moisture is low. Practical trials run by Theresia Lavergne at LSU (Lavergne et al., 2004) suggest that 30% moisture is necessary for best results, while most broiler houses show less moisture than this (20-25% moisture). Temperatures of 130 F or greater are created to reduce bacterial numbers and kill or reduce most viral pathogens. If in-house composting is used to reduce microbe numbers after a flock has shown disease problems, the house temperature may be heated to 100 F as the composting is completed to further reduce microbe numbers. Obviously, this would be easier to accomplish in the summer than during other seasons.

Auburn research shows that maximum temperatures (130 – 140 F) are reached within 36 hours of windrowing and temperatures typically begin decreasing after about 48 hours. This is long enough to kill many pathogenic bacteria and viruses and reduce the overall litter microbial load (Macklin et al., 2004, Macklin et al., 2006, Macklin, et al., 2008). Based on this, a three to five day in-house composting program between flocks would be a useful way to reduce viral and bacterial organisms and improve bird performance. Downtime between flocks needs to be 10-14 days to allow growers to complete the

composting and still have time to prepare for chick delivery. A period of 5-7 days following respreading of the litter after in-house composting will allow the litter to cool down and release ammonia before preparing for the arrival of the next batch of chicks.

Although this technique has been shown to be useful in times of disease challenge to reduce the risk of disease in the next batch of birds and to reduce disease spread as litter is removed from the house, windrow composting also makes sense from an economic standpoint. Reduced levels of the more fragile microorganisms such as LT and campylobacter would help to insure optimum bird performance and reduce human food safety concerns (Macklin et al., 2008). Reduced loads of other harmful bacteria and viruses allow birds to use feed for growth and performance rather than for fighting off mild (and often unseen) disease challenges. As importantly, litter ammonia levels should be appreciably reduced prior to placing the next batch of birds if sufficient time is given for ammonia to dissipate prior to placement of chicks. Each of these results allows for the continued use of litter such that cleanout and bedding replacement are not necessary unless convenient for the grower.

For many poultry growers, frequent litter cleanout is a poor option because of seasonal limitations on litter spreading and limited availability of new pine shavings. For this reason, in-house composting of litter allows growers to boost performance and health. Although improvements in performance from litter composting between flocks may not mimic total cleanout and sanitation, health and performance improvements should be substantial and yield measurable dividends. Adopting this technique may allow growers to reduce microbes periodically if total cleanout is not convenient.

Many poultry producers are moving toward extended use of litter to reduce the cost of replacement bedding materials over time. In-house windrow composting does not reduce the amount of litter that accumulates and, ultimately needs to be removed, but it does allow the farmer to remove that litter when farming practices or economic incentives dictate. This, in turn, allows for more prudent use of litter as a fertilizer, either locally or regionally. Litter mineral levels generally build up over time (consecutive growouts), with the exception of nitrogen (Lavergne et al., 2004). Due to this, the ratio of nitrogen to phosphorus and potash decreases with time, unbalancing the nutrient levels in an unfavorable direction. Windrow composting allows for the removal of ammonia prior to brooding for chick health. Unfortunately, this technique can reduce litter nitrogen levels even further (Lavergne et al, 2004). On the other hand, litter reuse may lead to humus production as the litter decays, tying up some portion of the minerals in the litter. This would reduce the amount of mineral runoff after land application and provide mineral nutrients over time as the humus is incorporated into the soil (Lavergne et al., 2004)

In conclusion, in-house windrow composting can be used to reduce disease load in litter, extending litter life well beyond what poultry growers have experienced in the past. This technique can allow growers to reuse litter in such a way that cleanout can come when a favorable market exists for the litter and when replacement bedding materials are available. Unfortunately, both extended reuse of litter and windrow composting tend to reduce the ratio of nitrogen to other agronomically-important minerals.

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