

Pad Acidification for Improved Performance

Often times, as poultry houses age, performance can begin to slip without any truly identifiable cause. The management of the houses can still be quite good but the flocks just don't seem to perform as well as they did in the past. One reason for this can be a shift in the microbial ecology of the house over time. Because poultry houses have dirt pads rather than concrete floors, the pads will absorb ammonia from the litter. The longer birds have been raised in the house, the more ammonia that is absorbed into the pad. It isn't unusual to have 60 PPM of ammonia at bird placement on new litter due to the ammonia release from the pad itself. As the ammonia content of the dirt pad goes up, so does the pH. As the pH shifts to levels above 7.5-8.0, the type of bacteria and other microbes that make up the typical flora of the dirt pad begins to shift into ones that aren't quite so good for chickens (Table 1). Because these are the bacteria that birds are exposed to upon placement, decreases in performance can be seen.



Level of Bacterial Growth at Varying pH levels.				
pH	E. coli	Clostridium	Salmonella	Pasteurella
7.4	Heavy	Heavy	Heavy	Heavy
7.0	Heavy	Heavy	Heavy	Heavy
6.8	Heavy	Heavy	Heavy	Moderate
6.5	Heavy	Heavy	Heavy	Light
6.4	Heavy	Heavy	Heavy	Light +
6.3	Heavy	Heavy	Heavy	Very light
6.2	Moderate	Heavy	Heavy	Very light
6.0	Moderate	Heavy	Moderate	Very light
5.8	Light	Heavy	Light	Very light
5.7	Light	Heavy	Very light	ZERO
5.4	Very light	Moderate	Very light	ZERO
5.2	Very light	Moderate	Very light	ZERO
5.0	ZERO	Light	Very light	ZERO
4.8	ZERO	Light	ZERO	ZERO
4.5	ZERO	Very light	ZERO	ZERO
4.3	ZERO	ZERO	ZERO	ZERO

Table 1. Effects of pH on bacteria growth (Hardin and Roney)

In order to get the house ecology back to the way it was when the house was new, growers should shock acidify both the dirt pad and the drinker system. While this doesn't always work 100% of the time, the vast majority of growers who have tried this have done so with success and seen a return to profitable performance. Research completed at the University of Arkansas shows that treating the dirt pad with 100 lbs./1,000 sq. ft. of PLT® litter acidifier will reduce the pH of the floors to below a 3.0 and results in a 99.99% decrease in bacteria, yeasts, and molds living in the dirt pad (see Figure 1). This shifts the microbial ecology of the houses back to the way they were when new in addition

to neutralizing any ammonia trapped in the pad so that it won't be released upon heating.

	pH	Aerobic Bacteria	Molds	Yeasts
Pre-Treatment	7.17	6,732,500	21,750	6950
2 hours Post-PLT® Treatment at 100-lbs/1000 sqft	2.61	66	7	4

Figure 1. Microbial Levels Pre and Post PLT® treatment (Watkins et al 2003)

Benefits of Pad Acidification with PLT® Litter Acidifier: A Field Study of 100 Broiler Houses

In the United States, almost all poultry houses are constructed on top of a dirt pad. As more and more flocks are raised in a house, many growers notice that the performance of their houses begins to slip even under good management conditions. Many growers also observe that no matter how thoroughly they clean and disinfect a house after a disease outbreak, the disease challenges tend to linger on. This is because the dirt pad in a poultry house will absorb ammonia and the pH of the pad will increase to a level (pH 8-10) that is very favorable to bacterial and viral growth and survival. In addition, most disinfectants are very high in pH and are inactivated in the presence of organic material so they are unable to disinfect the dirt pad in the house and unable to shift the microbial ecology of the dirt pad back to one that is favorable for poultry.

slipped in performance as the farm aged or had lingering disease challenges even after a complete clean-out or in-house windrowing of litter. After a very thorough cleanout all the way down to the pad, the houses were washed down and disinfected as usual. PLT® was then applied directly to the pad at a rate of 100 lbs./1,000 sq. ft.

The improvements seen on these farms compared to their previous performance was conclusive. Farms saw a 12 point improvement in feed conversion, a 4% improvement in livability, and a cost improvement of \$0.0065 per lb (Figure 2) in the three flocks after treatment compared to the flocks the year prior to treatment. Growers were able to pay for the cost of the PLT® application and make a substantial profit from the improved performance. The average pH of the houses before treatment was 7.8 while the average pH after PLT® treatment was 1.8. This low pH makes the dirt pad very hostile to bacterial, viral, and fungal pathogens. In one study completed by the University of Arkansas (Watkins et al, 2003), the use of PLT® for pad acidification reduced the bacterial counts in the dirt pad by six logs, a 99.999% reduction in bacteria (Figure 3).

One way to combat these problems is to use the same litter acidification techniques you use before bird placement on the dirt pad itself. One hundred broiler houses on 25 farms in five complexes were selected to test the field efficacy of PLT® litter acidifier in reducing pad pH and improving broiler performance (Donald, 2003). Farms were selected that had

	PLT	pH	Difference from Standard	ADG	% Mortality	FC	% Condemn
Average	No	7.8	(0.0034)	0.1057	7.76	2.08	1.1938
	Yes	1.8	0.0031	0.1081	3.70	1.96	0.8080
Improvement			0.0065	0.0024	4.06	0.12	0.3858

Figure 2. Performance improvements with PLT® pad acidification. 100 houses in 5 complexes (Donald et al 2003).

House	Pre Application	24 Hours Post-Application	48 hours Post-Application
Control	8,525,000	22,380,000	28,250,000
PLT® Treated (100-lbs/1000 sqft)	6,732,500	91	22

Figure 3. Bacterial counts on the floor of a poultry house treated with PLT® litter acidifier (Total APC CFU/ Sample) (Watkins et al 2003)

More recently, integrators have been using a modified pad acidification technique in houses with long-term Clostridial challenges. After the houses have been properly cleaned-out and all the litter removed, the floors are treated with 175 lbs/1000 sq. ft. of PLT® litter acidifier. After the PLT® has been spread, the houses are sprayed with 5-gallons of a water solution to immediately activate the PLT® and facilitate acid absorption into the pad enhancing the shock effect.

Proper Steps to Pad Acidification:

1. Wash down or blow down the ceilings and side walls of the house.
2. Spray the ceilings, sidewalls, and equipment with a disinfectant, preferably one that is acidic.

Pad Acidification During In-House Litter Composting for Microflora Manipulation

In today's economic environment, many growers find themselves unable to do a complete cleanout and are turning to in-house litter composting in order to manipulate the litter microflora and reduce pathogens after a disease outbreak or to improve performance. Acidifying the pad with PLT® while simultaneously composting the litter is important to fully break the cycle of disease in these houses. The following steps will help you to properly acidify the dirt pad:

1. After the litter has been fully windrowed for the first heat cycle, completely clean and scrape the area of the pad not covered by the pile. Be certain to completely remove the tarry, black layer just above the pad prior to acidification. This layer is high in anaerobic pathogens such as Clostridium.
2. Put the entire black layer you remove from the pad onto the piles so that it may be composted as well.
3. On the areas of exposed pad, evenly apply PLT® at a rate of 100-150 lbs./1,000 sq. ft.
4. Once the first heat is complete, turn the piles onto the treated area of the dirt pad.
5. Repeat steps 1-3 on the newly exposed areas of the dirt pad.
6. Continue to repeat all steps until the entire pad has been treated.

3. Completely clean out all the old litter from the house down to the dirt pad.
4. Remove all litter from the corners and under fans. Sweep around footings if necessary.
5. Make sure that absolutely no litter remains in the house.
6. Be certain to completely remove the tarry, black layer (hardpan) just above the pad prior to acidification.
7. Apply PLT® litter acidifier evenly to the whole floor at a rate of 100-175 lbs./1000 sq. ft.
8. Let the acidifier sit for several days before spreading new litter in the house.

References

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