



by JONES-HAMILTON CO.

SPRING 2021



It's Not Your Grandma's Litter Anymore

Anyone who has been in the chicken business for at least 15 years can tell you just how much things have changed: different housing, different chickens, different feed programs.

“Back in the day, our chickens were little and our litter was fresh”

- Solid sidewalls and not curtains
- Tunnel ventilation rather than sidewall ventilation
- Radiant brooders replaced forced air heaters
- Large, straight-run birds rather than small, split-sexed birds
- Antibiotic-free rather than ionophores
- The list goes on

One thing that's rarely mentioned is that just as we aren't raising your Grandma's chicken any more, it's not your Grandma's litter either. **So why haven't many of our litter amendment programs kept pace with the increases in ammonia load in the litter?**

LITTER AMENDMENTS ARRIVE ON THE SCENE

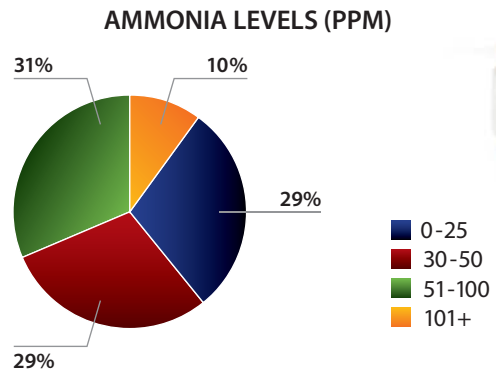
In the 1990s, when litter amendments like PLT® were first introduced, many growers and integrators were cleaning their litter out after every flock. Only a few areas, like Delmarva, used built-up litter and rarely for more than a year. Chicks huddled tight because using forced-air heaters meant floors were cold, so ascites was common and ammonia release was minimized. Everyone de-caked if they were going to re-use litter and ammonia levels without a litter amendment only exceeded 100 PPM about 10% of the time with most “bad” houses between 40-80 PPM.

The ammonia challenge within a house was relatively low and easily neutralized back then. Applying 50 lbs./1,000 sq. ft. of PLT got ammonia levels back to zero in no time and levels stayed low for several weeks. Probably 90% of birds were boosted in the field for Newcastle and Bronchitis so removing ammonia with PLT meant better vaccine reactions and fewer airsac condemnations in the plant.

Over the next decade, our housing improved tremendously with solid sidewalls, tunnel ventilation, radiant brooders and computer controllers. This allowed the industry to grow bigger birds, even in the summer, and greatly reduce litter caking due to improved directional air flow and warmer floors. Radiant brooders dramatically improved brooding conditions, but the

higher litter temperatures also meant that ammonia was being released from the litter at a faster rate.

The use of litter amendments allowed for greater litter re-use. De-caking was now easy and annual clean-outs became the norm. In 2000, bird size, though, was still small with 68% of birds less than 5-lbs and “big birds” only averaging 6-lbs. Ammonia levels started creeping up and impacted performance. Housing changes, larger birds and re-used litter meant summer ammonia levels were higher than previously thought and growers and integrators were beginning to realize a need for year-round usage of litter amendments.



Average ammonia levels (PPM) in houses in the 1990s

As average bird size increased, so did ammonia and with it the necessary rate of PLT to control it.

	1990s	2000s	2010s	2020s
'BIG' BIRD SIZE	5 lbs	6 lbs (average)	7.5 lbs	9 lbs+
HIGHEST AMMONIA (no litter amendment)	40-80 PPM	150-180 PPM (winter)	150-180 PPM (summer)*	???
PLT RATE	50 lbs	50-70-100 lbs	100-125 lbs	125-150 lbs+
LITTER MANAGEMENT	Cleaned out	De-caked	De-caked / Windrowed	Windrowed

*By the 2010s, it was very difficult to find an untreated house except in the summer.

Integrators started putting their complexes on litter amendment programs just like they would choose a bronchitis vaccine or cocci control program. But birds were still fairly small, litter was still young and 50-75-lbs. of PLT was appropriate for most.

As time went on, Americans started eating fried chicken sandwiches and boneless wings by the millions, and stopped roasting whole birds at home. The industry took further processing up a notch and bird size along with it. By the end of 2020, only about 40% of broilers were under 5-lbs. The average size of a “big bird” program is now over 9-lbs.

Crude protein in diets has increased tremendously both to push breast yield and to meet amino acid requirements on all-veggie diets, causing a 20-30% increase in ammonia excretion in the manure. Coupled with the fact that a 10-lb bird program adds about 183,000 lbs of manure to a house each flock, compared with only 66,000-lbs of manure in a 4-lb bird flock, and the ammonia load in a house today is magnitudes higher than it was even a five years ago. Plus, that litter is staying in the house for many years, allowing an extended period of time for bacterial digestion of that protein into ammonia gas.



The rate at which ammonia leaves the litter and enters the air is dependent on temperature and surface area

ADDED CHALLENGE OF WINDROWING

To top it off, windrowing has now displaced de-caking in many complexes. Why is that a big deal in terms of ammonia challenge?

The rate at which ammonia leaves the litter and enters the air (where the chicks can inhale it) is dependent on temperature and surface area.

When litter is windrowed, it's like death by a thousand paper cuts from an air quality perspective. Ammonia gas an inch deep in the litter bed has increased from levels under 150 PPM in the decaked houses of yesteryear to 800-2000 PPM in the windrowed houses of today!

All of which leads to the question: why would we expect 100-lbs. of PLT/1,000 sq. ft. to still be enough to neutralize such a large load of ammonia? It can't. That's like expecting the same amount of sugar you use in a gallon of sweet tea to be enough to make 5-gallons of sweet tea taste good. It just can't.



De-caking minimizes surface area which decreases ammonia release

THE AMOUNT OF LITTER AMENDMENT YOU USE NEEDS TO BE MARRIED TO THE SIZE OF THE CHALLENGE IN YOUR LITTER

As the litter ammonia challenge increases, the amount of litter amendment must increase with it. It seems obvious when you lay it out, but it is often a forgotten element in setting up a litter amendment program. Would you ask a grower to raise an 8-lb chicken but only deliver enough feed for a 6-lb bird program so as not to increase feed cost per flock? Of course, not. Asking your litter amendment to do the same job with 4-5 times the amount of ammonia to neutralize would be kind of the same thing.

Evaluating the ammonia challenge in a complex in order to select a rate of PLT application that best fits a specific operation is fairly simple to do. An air quality survey that looks at brood chamber, off-chamber and deep litter ammonia readings on 10 or so farms with chicks 3-days old or less can provide all of the information needed to assess an appropriate litter amendment rate for a complex. The improvement in ammonia control when using a litter amendment at the most appropriate rate for the litter challenge will pay off immediately in better weights, feed conversions and respiratory health.

For example, a recent evaluation of windrowed litter at a complex that historically used a PLT rate of 75-lbs./1,000 sq. ft. versus the appropriate rate for the litter challenge of 150-lbs./1,000 sq. ft. illustrates the point pretty clearly. Birds placed at the correct rate of 150-lbs for the challenge weighed 7.37-lbs versus 6.99-lbs for the birds raised on the complex's "program" rate of 75-lbs. The birds on the correct rate had a feed conversion 5 points lower than the "program" birds!

Today's litter has an ammonia challenge we could have never imagined 25 years ago when PLT was first introduced. Therefore, it's important to evaluate our litter amendment programs as an industry to make sure our ability to control ammonia has kept pace with those changes.

Schedule your air quality survey today to make sure that your bird performance isn't being hampered by insufficient ammonia control. After all, it's not your Grandma's litter any more.



Today's litter has an ammonia challenge we could have never imagined 25 years ago

