

Significant Profit Losses Seen From Ammonia-Caused Performance Decline

Ammonia is the most common cause of performance loss on broiler and turkey farms in terms of body weight gain and feed conversion. Extensive research has shown that ammonia levels as low as 25 PPM can cost growers at least 19 points of weight per bird which equates to a loss of \$209 per house. Performance is greatly reduced by exposure to 50 PPM, but birds do not show signs of blindness

until ammonia exceeds 100 PPM. Unfortunately, many growers and live production personnel do not respond to ammonia until they see blind birds. However, by the time blind birds are present, the damage has already been done in terms of performance. Prevention of ammonia release through proper litter management is the best way to prevent financial losses.

The Source of Ammonia Troubles

Aggressive litter handling during down-time or tilling during the grow-out increases surface area increasing ammonia levels. This is why houses with fine, dusty litter can have such high ammonia concentrations at bird level. It is important to keep litter moisture and other litter characteristics in the middle of the bell curve (not too dry and not too wet) in order to reduce the speed at which ammonia is released from the litter surface. Ammonia levels an inch beneath the litter surface are an indicator of what the litter will release over

the next few days. Very fine, dusty litter often has deep litter ammonia concentrations over 600 PPM, whereas properly de-caked litter with a larger particles rarely exceeds 150-200 PPM of deep ammonia. Excessive moisture within a house or improper de-caking and litter handling will encourage ammonia production and release. Proper litter management, litter amendment use and ventilation to maintain ammonia levels below 25 PPM should be followed at all times to prevent performance losses.

Male broiler response to low levels of atmospheric ammonia

NH ₃ (ppm)	BW ¹ (g)	Weight depression		Feed/gain ¹	Mortality ¹ (%)	Yield ² (%)	
		(g)	(%)			Overall	Breast meat (pectoralis major + minor)
4 Weeks							
0 (near)	1,421 ^x	—	—	1.53 ^x			
25	1,395 ^x	26	2	1.52 ^x			
50	1,178 ^y	243	17	1.62 ^x			
75	1,128 ^y	293	21	1.62 ^x			
7 Weeks							
0 (near)	3,211 ^x	—	—	1.93 ^x	5.8 ^{xy}	73.2 ^x	19.8 ^x
25	3,202 ^x	9	0.3	1.91 ^x	2.8 ^{xy}	73.0 ^x	19.7 ^x
50	3,004 ^y	207	6.4	1.98 ^x	10.6 ^{yz}	72.7 ^x	19.0 ^x
75	2,920 ^y	291	9.0	1.97 ^x	13.9 ^z	72.4 ^x	19.0 ^x
SEM	(61.6)			(0.11)		(0.31)	(0.34)

^{x-z} Means within a column lacking a common superscript differ ($P \leq 0.05$).

¹ There were 4 observations per mean for the near 0 treatment and 3 observations per mean for the 25, 50, and 75 ppm treatments. In the first trial, mechanical problems with ammonia control required 3 chambers (one each of the 25, 50, and 75 ppm treatments) to be discontinued.

² Yield observations per mean for the near 0, 25, 50, and 75 ppm treatments were 160, 107, 151, and 144, respectively.

Table 1. Performance Losses due to Ammonia Exposure the First Four Weeks of Grow-Out, (Miles et al. 2004)

Ammonia's Impact on Bird Performance

While high levels of ammonia can be detrimental to bird performance at any stage, poultry are most susceptible to ammonia insults during the first four weeks of life. Several studies over the last few years have shown the costly impact of ammonia exposure on bird performance. In one study (see Table 1), birds exposed to 50 PPM of ammonia for the

first four weeks and no ammonia thereafter were 6.4% lighter and birds exposed to 75 PPM were 9% lighter than birds exposed to only 25 PPM. Ammonia levels of 75 PPM or greater during the first four weeks of life are quite common (even in the summertime) in houses not using a litter amendment at the beginning of each flock.

Controlling Ammonia with Litter Management

Prevention of ammonia release is the key to maximizing bird performance. This is done through proper litter management during the down time and in the grow-out house and proper usage of a litter amendment to lower litter pH and convert volatile ammonia into a stable fertilizer: ammonium sulfate. Using an acidic litter amendment just prior to bird

placement or immediately after tilling brings ammonia levels down below 25 PPM houses to be minimally ventilated for relative humidity control. On farms where birds are released from the brood chamber before they are 14 days old, the litter amendment should be applied in the whole house to prevent production losses from ammonia.

Taking Action Against Ammonia: The Bottom Line and Smart Steps

20 years of research has shown the effects of ammonia on bird weight (Figure 2). At 50 PPM, birds lost ½ lb in weight causing a substantial production loss for any grower or integrator. According to this same study, birds challenged with ammonia lost 8 points of feed conversion. With feed at \$325+/ton, the loss of feed conversion on 20,000 birds will cost \$1,690. The loss can reach as high as \$84,500 per week for a million bird complex.

In addition to applying PLT® litter acidifier according to manufacturer's directions, simple steps have been defined to avoid ammonia-induced performance losses:

- Take ammonia readings no more than one inch above litter.
- Remove all cake between flocks, but do not till.
- Pre-heat properly before bird placement to complete the ammonia purge from the litter.
- Maintain relative humidity between 50-70% during minimum ventilation.
- Properly manage water lines to avoid wet litter.

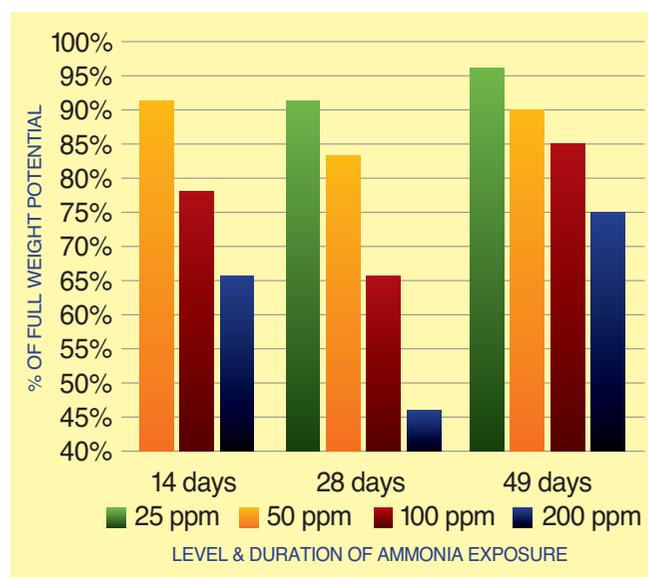


Figure 2. Body Weight Changes with Ammonia Exposure (Miles et al 2002)