

LITTER *forum*

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Accurately Measuring Ammonia Levels in Poultry Houses

Ammonia gas in poultry houses seriously affects bird health. The gas results from the chemical decomposition of uric acid in droppings by certain bacteria in the litter, and is further influenced by moisture content, pH and litter temperature. The main factors affecting atmospheric ammonia concentration in poultry houses are litter conditions and air movement (ventilation). Poor ventilation, loose droppings, and faulty, over filled or low positioned drinkers are common causes of wet litter in poultry houses. High levels of ammonia have a negative impact on overall livability, weight gain, feed conversion, condemnation rate at processing and the immune system of the birds.

Proper litter management and ventilation will minimize ammonia levels, improve productivity,

reduce the likelihood of respiratory diseases, improve the birds' welfare and provide a pleasant, safe environment for workers. The problem is that many broiler producers have difficulty in measuring ammonia concentration in an affordable, reliable, and consistent way. Without measurement, they are unaware of harmful levels of ammonia in their houses and how to control it.

There are a number of tools available to producers that can help them determine ammonia levels in their houses. While some cost hundreds of dollars and require frequent calibration, there are a number of low cost, easy to use and relatively accurate options that can be used to determine whether ammonia has reached harmful levels (Table 1).

Tool	Response Time	Degree of Maintenance	Portability	Approximate Cost	Suitability	Growout Stage	
	Electro-chemical sensor	<3 minutes	Moderate, calibrate sensor every 3-4 month and replace sensor every year	Portable, easy to use	Base unit:\$500 to \$800; Sensor: \$170 to \$300	Time-weighted average; Spot check	All
	Passive colorimetric Tube	1 to 10 hours	N/A	Portable, easy to use	Tube holder: \$50; Tube: \$7-\$8	Time-weighted average	All
	Active colorimetric Tube	<2 Minutes	N/A	Portable, easy to use	Pump: \$300-\$400 Tube: \$7-\$8	Spot check	Brooding and minimum ventilation
	Colorimetric paper	15 seconds	N/A	Portable, easy to use	Roll of tape: \$6-\$7	Spot check	Brooding and minimum ventilation
	Ammonia Gun	1-3 minutes	Recommend monthly cleaning. Apply grease to rubber gasket	Portable hand held unit; Approx 1 pound	\$160-\$200	Spot check	All

Table 1. Tools for measuring ammonia concentration





While these tools will help gauge ammonia levels, it is important to factor in the timing of your ammonia checks. Ammonia levels in poultry house may vary quite a bit during a day with air movement (ventilation). A few spot checks of ammonia levels during an afternoon may not represent the real high levels of ammonia during the night while fewer fans are on and ventilation drops significantly. Research has shown that ammonia levels are more stable during brooding period and when ventilation system runs with minimum ventilation. Therefore, ammonia levels need to be measured with a right tool at a right time or the readings may not properly represent the problem.

Any one of the tools listed in the table can be used to measure ammonia levels with spot check. However, when birds are older than three weeks and the ventilation system runs with transition ventilation (between the minimum vent and tunnel) during a day, a spot check will not be enough to determine the ammonia levels. For example, 30 PPM is read at 4 PM while 50 PPM is read at 6 AM. Passive tube and electronic sensors are recommended to measure ammonia level over a 6- to 10-hr period to determine the time-weighted average levels, which are more representative to the real concentrations.

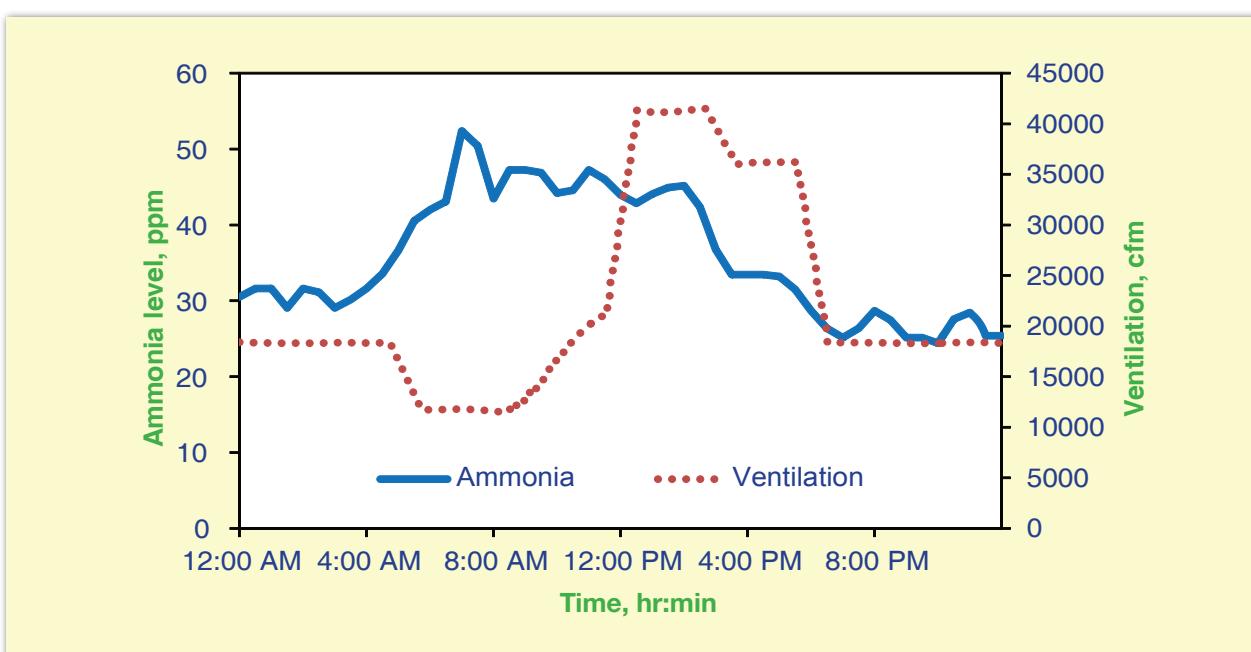


Figure 1.

Ammonia level and ventilation changes in a broiler house during a 24-hr period at 40 days of age.

