Air Quality Options for Poultry Producers—New EPI Trial Results

The SPFG is working on several ways to reduce the impact of poultry farms on the air quality of adjoining properties. In the last SPFG newsletter (Fall 2007) , research into the use of an in-barn electrostatic device called the Electrostatic Particle Ionization System, (or EPI) to charge barn air was introduced. From the SPFG perspective, the overall purpose of this project is to find an affordable way for producers to reduce dust emissions from poultry farms. Since then, the SPFG and project partners have had a great deal of success with this technology.

Particulate Removal Effectiveness

Table 1 provides an overview of the percentage of particulate material that is removed from the in-barn environment of a typical broiler farm which housed 20,000 birds per cycle. From this table, it can be seen that greater removal is achieved in the first 14 days versus the end of the cycle (Days 26—end) for both larger PM10 and smaller PM2.5 particles. Of note is the observation that even the lowest mean removal rate at 38 % for PM 2.5 near the end of the cycle when the dust loading is the greatest is significant. As well, PM10 at 45 % removal is even greater. It is quite likely that particles greater than PM10 (10 microns) could be removed to even a greater extent, as the trend from the data may suggest. However, at the present time the SPFG does not have the capability to test accurately for much larger particles.

Flock Performance Improvement Benefits

In carrying out this study, the SPFG recognized the importance of tying a better environment inside the barn with flock productivity gains.

Table 1 Effectiveness of EPI—Dust Emission Reduction Statistics (% Particulate Removal over 8 broiler cycles)

	Days 1 - 14		Days 15 - 25		Days 26 - end	
	PM 2.5	PM 10	PM 2.5	PM 10	PM 2.5	PM 10
High	78%	82%	67%	70%	44%	53%
Low	47%	41%	44%	40%	30%	28%
Mean	69%	69%	54%	58%	38%	45%
Median	72%	71%	53%	60%	41%	50%

With this in mind, Table 2 summarizes some of the flock productivity data collected for 5 broiler cycles. From this table, it can be seen that feed conversion gains have been achieved in the order of 0.04—0.07 or 3—4% improvement. In addition, body weights for the birds were greater for the EPI treatment.

For this 20,000 bird per cycle barn, the value per bird per cycle was calculated to be $0.06—$0.09. This suggests the technology is economically feasible and has the potential for payback in less than 2 years.

Table 2 Preliminary Results—5 Cycle Broiler Flock Performance Evaluation of EPI on Feed Conversion and Body Mass for Treatment Barns

Cycle #	Average Bird Density (ft2/bird)		Feed Conversion		Body Mass (kg)[1]	
	Control	EPI	Control	EPI	Control	EPI
1	0.88	0.78	2.00	1.94	37,979	39,076
2	0.82	0.80	1.73	1.69	36,771	37,792
3	0.93	0.91	1.59	1.55	42,777	44,246
4	0.99	0.92	1.76	1.69	39,875	40,209
5	0.92	0.92	1.75	1.69	39,145	41,140

[1] *Calculations based on shipment weights to processing plant*

How does this study strategically address dust and odor complaints when lodged against Fraser Valley poultry producers?

This study demonstrated and evaluated the EPI technology which can be utilized on broiler farms to effectively reduce dust within barns and impacts outside of the broiler farming environments. This has positive implications for both flock and poultry farm worker health, though these aspects were not seriously examined within the study's parameters. A study is now underway to examine the microbiological effects of the technology on poultry pathogens and flock health.

In terms of large-scale adoption of this technology, financial calculations indicate that there would be flock performance improvements of such nature that investment and use of the EPI technology would be a prudent business decision.

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