PRESENTATION PROPOSAL for National Center Meeting, San Antonio

3.) TITLE of PRESENTATION:
Control of particulate emissions from high rise layer barns using a Biocurtain™

4.) PRESENTER (Speaker) or SESSION ORGANIZER / SPEAKER FOR INVITED SESSION:

ASAE Member Number (if applicable): 0696
Family/Last Name: Heber First Name: Albert Middle Initial: J.
Organization: Agricultural and Biological Engineering, Purdue University
Address 1: 225 S University St.
City: West Lafayette
State: IN
Postal Code: 47907
Phone: (765)494-1214 **Fax:** (765)496-1115. **E-mail Address:** heber@purdue.edu

6.) AUTHOR(s):
A.J. Heber, T.T. Lim, J.-Q. Ni, P.C. Tao, R. Chervil, A. Longman

7.) PRESENTATION PREFERENCE:
Lecture.
8a.) PAPER AVAILABILITY: Yes.

12.) ABSTRACT: (300 Words Maximum, please)
This paper will report on the performance of the Biocurtain™ (BEI, Inc.) for removing particulate matter from the air exhausted from a swine finishing barn and a high-rise layer barn. The 12.2 m x 3 m x 4 m (40 ft x 9.5 ft x 14 ft) (width x height x depth) curtain was tested at the end wall of a tunnel-ventilated finishing barn. Except for a 1.22 m x 12.2 m opening at the wall above the fans, it treated the air from all the exhaust fans of the swine barn, which consisted of one 0.91-m diameter variable speed fan and four, 1.22-m diameter single-speed fans. At the layer barn, the Biocurtain was installed to treat the exhaust air from three, 1.22-m diameter single-speed fans. Six propeller anemometers measured outlet air velocity and a differential pressure meter monitored the pressure difference across the biocurtain material. The test was conducted in May and June. Over 130 hours of swine barn data were collected in light winds (<4 m/s) and when each anemometers indicated strong upward air velocity. Over 150 hours of layer barn data were collected in light winds (<4 m/s) and when all three fans were operating. At the swine barn, the mean PM10 (n=65) concentration in the curtain outlet (240 $\mu g/m^3$) were 22% greater than the curtain inlet (barn exhaust) mean concentration of (mean 196 $\mu g/m^3$). The mean TSP (n=62) concentration in the curtain outlet (585 $\mu g/m^3$) were 10% greater than the curtain inlet (barn exhaust) mean concentration of (mean 531 $\mu g/m^3$). The curtain failed to reduce PM emissions and appeared to resuspend deposited PM on the curtain material during times of highest turbulence causing even higher concentrations at the exhaust. Similar disappointing results were obtained at the layer barn where the mean PM10 concentration in the curtain outlet (738 $\mu g/m^3$) were only 4.6% less than the curtain inlet (barn exhaust) mean concentration of (mean 774 $\mu g/m^3$).