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James B. Kliebenstein
Iowa State University

Jeffery C. Lorimor
Iowa State University

Benjamin Larson
Iowa State University

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Air/Odor Control Technology Used By Iowa Pork Producers

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James Kliebenstein, Department of Economics
Jeffery Lorimor, Department of Agricultural and
Biosystems Engineering
Benjamin Larson, Research Assistant, Department of
Economics

Summary and Implications

An issue that has received attention in the livestock industry is that of air quality/odor. An Iowa pork producer survey showed that about two-thirds of the respondents felt air quality/odor was an issue that needed evaluation. This report is aimed at developing a baseline of air quality/odor control measures currently in use by Iowa pork producers. Information is obtained on use of selected odor control technologies and user level of satisfaction. Two survey methods were utilized; a mail survey and a telephone survey. The telephone survey followed the mail survey and was used to test the representativeness of the mail survey respondents and obtain information on why selected odor control technologies were not used.

Level of use and level of satisfaction with selected odor control methods varied. A deep pit was used by 77 percent of the respondents. About seven-in-ten injected manure. About half of the respondents immediately incorporated manure. One-half composted pig mortalities. About four-in-ten had a windbreak, used manure additives, and/or had a bedded system somewhere in the production system. Level of satisfaction was high for windbreaks, bedded systems, bio-covers, deep pits, composting pigs/manure, and incorporating manure. Satisfaction was low for bio-filters, ozone, manure storage plastic covers, and manure additives. Reasons why odor control technologies were not used varied. A dominant reason was that the technology was not applicable to the production facility. For example, a bio-cover, plastic cover, etc. would not be applicable for a deep pit manure storage system. Another response for non-adoption of some technologies was that odors are managed sufficiently already. This was related to the response for building odors. About one-third of the respondents indicated they did not use selected building odor control technologies because they were too expensive and/or they were not familiar with the technology. Responses for not using modified diets and/or manure additives included too expensive, not effective for odor control, and not familiar with the technology.

This survey shows that swine producers are using a wide variety of techniques to minimize off-site odor and air quality effects. The most common type of manure storage used is deep pits (68 percent of producers) followed by solid manure systems (20 percent). While a large

number of technologies are available, none provides a perfect solution to air quality.

Introduction

Air/odor issues related to livestock production have received much attention recently. This attention has come from many fronts - policy makers, media, state residents, and agribusiness including livestock producers. While the discussions have been lengthy and regulations have been instituted, little is known about the current status of the livestock producers' use of air/odor control measures. There is not a baseline of air/odor control measures currently in use.

An Iowa Pork Producers Association survey showed that about two-thirds (63 percent) of the respondents felt air quality/odor was an issue to be evaluated. They encouraged development of odor and air quality solutions that minimize odor effects. Moreover, in the 2001 survey, environmental concerns were ranked as the biggest obstacle for producers to prosper.

This report focuses on establishing a baseline of air/odor control measures currently in use by Iowa pork producers. Baseline information on air/odor control measures currently in use can serve multiple purposes. First, it can be used for societal and industry education on the current technologies in use. This can be used to help reaffirm the industry's commitment to the issue. Secondly, it will assist in documenting changes in technology adoption over time. Third, it can be used to establish a producer educational focus on the air/odor issue and help identify air/odor control technologies that are effective and low cost control technologies. Fourth, it can be established as the base for use in evaluating industry impacts of selected air/odor control technologies. This would aid in analyzing industry impacts of alternative regulatory actions. Regulatory action has been taken with limited evaluation of industry and/or producers impacts.

This report provides a summary of the odor control methods used by Iowa pork producers. The producer's level of satisfaction with those methods is provided.

Materials and Methods

Surveys were structured to obtain information on level of use of odor control methods. Level of satisfaction of respective odor control methods which were in use or had been used was also obtained from the respondents. Two surveys were conducted. One was a mail survey. The mail survey was followed by a telephone survey.

To obtain information on odor control methods used in the Iowa swine industry and level of satisfaction by the users a mail survey was sent to Iowa pork producers. The mailing list was coordinated with the Iowa Pork Producers Association. There were 3,249 surveys sent in early August

2002. Of these, 575 were returned; thirteen were no longer raising pigs leaving 562 usable surveys.

The telephone survey was conducted to help verify the results of the mail survey. It was conducted by ISU Statistics Department personnel during spring 2003. One issue was the representativeness of the mail survey. There were 354 telephone surveys completed. The telephone survey population was selected independently from the mail survey population. Questions were similar to the mail survey, but not identical due primarily to time constraints in conducting the phone survey. An additional focus of the mail survey was to determine why selected odor control technologies were not used.

Results and Discussion

Odor Control Methods Used and Producer Satisfaction

The mail survey asked respondents if they were using, or had previously used 24 different technologies to help reduce odors. The technologies were divided into 4 groups, 1) those associated with buildings, 2) those associated with manure storage, 3) manure additive or feed modifications, and 4) land application. Producers who were using, or had used, each technology were asked to indicate whether they were satisfied, indifferent, or unsatisfied with that technology. Table 1 shows the results.

The four technologies that were the most popular with producers were deep pit buildings (77 percent using and 77 percent of the users satisfied), soil injection (69 percent using and 88 percent of the users satisfied), composting mortalities (50 percent using and 75 percent of the users satisfied), and windbreaks (38 percent using and 64 percent of the users satisfied). Each of these technologies had a low number of producers discontinuing use...1, 1, 6, and 7 percent for windbreaks, deep pits, composting mortalities, and soil injection, respectively.

Some technologies were well liked by the users, but were not used by many producers, or had a higher dropout rate. Bedded manure systems were used by 36 percent of the respondents and 59 percent were satisfied. However, 16 percent had quit using bedded systems. Biocover users represented only ten percent of respondents, but 69 percent were satisfied. Sixteen percent had quit using the biocovers. Aeration was used by only six percent, of which 55 percent were satisfied. Twenty-two percent who had tried aeration had quit.

Producers were also dissatisfied with some of the technologies. Plastic covers, both permeable and impermeable were tried by only two percent of producers

and, of these, only 33 percent were satisfied with the impermeable covers, and 20 percent with the permeable. Thirty-three percent of the users were dissatisfied with the impermeable covers and 60 percent (greatest dissatisfaction of all the technologies) were dissatisfied with the impermeable covers. Of those who had tried them, 67 percent and 40 percent, respectively, had quit using them. Manure additives were used by 43 percent of producers, but only 23 percent were satisfied and 54 percent had quit using them. Ozone was tested by nearly 2 percent of producers, but none were satisfied. Most were indifferent (63 percent) and 37 percent were dissatisfied. Seventy percent of ozone users had quit using the technology.

Reasons Odor Control Technologies Are Not Used

Information was obtained, during the telephone survey on why technologies in selected areas were not used. To obtain this information, technologies were grouped into four areas. They were building odor control, manure storage odor control, land application methods, and manure and feed additives. While the comparison does not provide specific information on specific technologies, it provides insight into the respective technology groups. The groupings were as follows:

- Building odor control: biofilters, windbreaks, oil sprinkling, bedded system, and ozone
- Manure storage odor control: biocovers, plastic covers, aeration, deep pit, lagoon, and composting
- Land application: broadcast, immediate incorporation, and injection
- Additives: diet/feed and manure

Table 2 provides a summary of the results. Slightly more than one-half of the telephone survey respondents had windbreaks and/or a bedded system incorporated within their production system. About half (45.8 percent) of the respondents indicated that they did not use more technologies for building odor because odor was sufficiently managed already (Table 13). This is consistent with the low level of complaints which were linked to buildings and facilities.

About 40 percent indicated it was not applicable to their facilities. For example, most confinement barns would not use bedding. Slightly more than 100 respondents (about 30 percent) indicated they were not familiar with the technology, or that it was too expensive. Thus, there are technologies in the building

Table 1. Odor control technologies used and producer satisfaction level.

| | Number Using or Previously Used | Percent Using or Previously Used | Level of Satisfaction (%) | | | Percent Quit |
|--------------------------------|---------------------------------|----------------------------------|---------------------------|-------------|-------------|--------------|
| | | | Satisfied | Indifferent | Unsatisfied | |
| Biofilter * | 9 | 1.6 | 25.0 | 37.5 | 37.5 | 11.1 |
| Windbreak ** | 214 | 38.1 | 63.6 | 35.5 | 0.9 | 1.0 |
| Oil Sprinkling | 9 | 1.6 | 33.3 | 44.4 | 22.2 | 55.6 |
| Bedded System | 203 | 36.1 | 59.0 | 34.1 | 7.0 | 15.8 |
| Ozone | 10 | 1.8 | 0.0 | 62.5 | 37.5 | 70.0 |
| Bio Cover | 55 | 9.8 | 68.9 | 24.4 | 6.7 | 16.4 |
| Impermeable Plastic | 6 | 1.1 | 33.3 | 33.3 | 33.3 | 66.7 |
| Permeable Plastic | 5 | 0.9 | 20.0 | 20.0 | 60.0 | 40.0 |
| Deep Pit | 433 | 77.1 | 76.6 | 20.5 | 2.9 | 1.4 |
| Other Type Cover | 21 | 3.7 | 84.2 | 15.8 | 0.0 | 4.8 |
| Aeration | 33 | 5.9 | 55.6 | 22.2 | 22.2 | 21.2 |
| Lagoon *** | 48 | 8.5 | 45.2 | 41.9 | 12.9 | 4.2 |
| Solids Separation | 23 | 4.1 | 60.0 | 35.0 | 5.0 | 8.7 |
| Composting-Pigs | 280 | 49.8 | 75.5 | 20.2 | 4.3 | 5.7 |
| Composting-Manure | 114 | 20.3 | 65.7 | 26.5 | 7.8 | 13.2 |
| Other | 16 | 2.9 | 100.0 | 0.0 | 0.0 | 0 |
| Manure Additive | 240 | 42.7 | 23.4 | 44.4 | 32.2 | 54.2 |
| Feed Additive | 152 | 27.1 | 38.0 | 43.8 | 18.3 | 30.9 |
| Low Protein Diet | 43 | 7.7 | 37.1 | 48.6 | 14.3 | 18.6 |
| Other | 8 | 1.4 | 71.4 | 28.6 | 0.0 | 0 |
| Don't Agitate | 111 | 19.8 | 54.4 | 28.3 | 17.4 | 20.7 |
| Immediate incorporation | 294 | 52.3 | 71.2 | 22.8 | 6.0 | 14.6 |
| Soil Injection | 390 | 69.4 | 88.3 | 10.8 | 0.9 | 7.2 |
| Other | 56 | 9.9 | 70.8 | 20.8 | 8.3 | 5.4 |

* Includes Biofilters that included mech. Ventilation.
 ** Combines Windbreak and Shelterbelt.
 *** Includes Lagoons and Anaerobic.

odor area that producers do not feel are cost effective. Additionally, they were not familiar with some technologies.

The principle manure storage system was a deep pit. Composting was used by over half the producers but much of this was for composting dead animals. The primary reason systems (technologies) were not adopted for manure storage odor control was that it was not applicable for the facilities (Table 2). About seven-in-ten of the respondents provided this response. This is consistent with the fact that many respondents had a deep pit system. Storage covers such as straw, etc. do not fit with a deep pit system. Only about one-in-five felt odors from manure storage was sufficiently managed at the current time. Producers are sensitive to the potential for odors from manure storage. Between 8 and 12 percent of the respondents indicated that the technology was too expensive, was too much work or

was not effective for odor control. The issue of not being cost effective was not as important for these types of technologies. Producers were quite familiar with these technologies.

The primary reason for not using manure additives or modified diets was that odor was managed sufficiently already. However, this was only one-third of the respondents. Between 11-18 percent indicated that the technology was too expensive, not effective for odor control, they were not familiar with the technology, or it was not applicable to the facility. One-in-six respondents felt they were not an effective odor control technique.

About 40 percent of the respondents indicated that they did not inject or incorporate manure because it was not applicable for their facilities. About one-in-eight respondents indicated that they did not feel it was an effective odor control method. Between 6-9 percent

indicated that it was too expensive, too much work, or that odor was already sufficiently managed.

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Acknowledgements

Table 2. Reasons Technologies Are Not Used.

| Response | Percent of Producer Respondents | | | |
|-----------------------------------|---------------------------------|---------------------|------------------------|------------------------------|
| | Building Odor | Manure Storage Odor | Diet & Manure Additive | Not Injecting or Incorporate |
| Not applicable to my facilities | 40.1 | 71.2 | 11.9 | 39.5 |
| Too expensive | 31.6 | 12.1 | 18.1 | 6.8 |
| Too much work | 4.0 | 8.8 | 1.1 | 9.0 |
| Not effective for odor control | 9.9 | 7.9 | 16.1 | 11.9 |
| Odor managed sufficiently already | 45.8 | 22.3 | 33.6 | 6.5 |
| Not familiar with technology | 29.1 | 4.2 | 14.7 | --- |