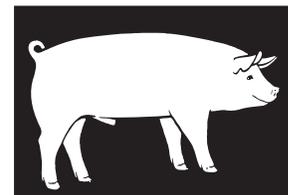




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"What Producers Need to Know about the EPA Air Consent Agreement" **Jerry May, MSU Extension Swine Educator**

On January 21st the National Pork Producers Council (NPPC) announced a landmark agreement between EPA and representatives of the swine, dairy, and poultry industries covering air emissions from livestock facilities. Producers entering into the Air Quality Compliance Agreement will be offered Safe Harbor from lawsuits or EPA fines, for any past infractions of air emissions regulations in exchange for participating in the Agreement. The Agreement was published in the Federal Registry on January 31, 2005. The current application deadline is July 1, 2005.

This Air Quality Compliance Agreement is intended to bring the industry into compliance with three federal statutes. The Clean Air Act (CAA) limits the quantities of all hazardous air emissions. Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) requires that all emissions of criteria pollutants be reported to EPA. The Emergency Planning and Community Right to Know Act (EPCRA) requires reporting the amount and location of certain chemical hazards.

It is common knowledge that ammonia (NH₃) and hydrogen sulfide (H₂S) are released from swine production facilities. CERCLA and EPCRA require any releases exceeding 100 pounds per day be reported to EPA. The CAA established thresholds for releases of particulate matter (PM), volatile organic compounds (VOC), and H₂S. All of these

emissions are released from swine production facilities but, to date there has been only limited studies to determine the quantities released.

Recent court cases established that animal feeding operations (AFO's) may be held responsible for past violations of these acts. Therefore representatives of the swine, poultry, and dairy commodity organizations felt it would be in the producer's best interest to join with EPA in a comprehensive monitoring study to accurately determine emissions from production facilities. In return, cooperating farms are granted Safe Harbor for any past CAA and CERCLA violations.

By participating in the Agreement producers agree to pay a penalty based on size of the operation, along with a standard fee to help fund the emissions monitoring study. Participating farms will also be expected to make their farms available for collecting emissions as part of the monitoring study. However, not all farms participating in the Agreement will be used in the monitoring study. Currently the Agreement states that five swine farms throughout the Midwest will be utilized in the study. Based on the expected small number of farms to be monitored, and with Michigan in the upper midwest, it is unlikely that a Michigan farm would be selected to participate in the study.

The penalty is based on the number of animal units (AU) per farm and the number of farms owned by the operation. An operation with a single farm, having less than 1,000 AU will pay a penalty of \$200.00.

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Operations having farms over 1,000 AU (Large CAFOs) will pay \$500.00 per farm. Farms with animal inventories greater than 10 times the Large CAFO threshold will pay \$1,000 per farm. Table one shows the maximum fee schedule for operations reporting ten or more farms.

Number of Large CAFO's	Maximum Total Penalty
1-10 farms	\$10,000
11-50 farms	\$30,000
51-100 farms	\$60,000
101-150 farms	\$80,000
151-200 farms	\$90,000

EPA emphasizes that by signing the Consent Agreement and paying the penalty producers **will not** be considered as admitting guilt to past violations of CAA regulations or CERCLA requirements. While paying a penalty causes producers some concern, it is common practice for EPA to require penalties in similar agreements. According to Eldon McAfee, legal council to the Iowa Pork Council, in the March 25th issue of National Hog Farmer, it is paying the penalty that provides producers legal protection from citizen suits. Current law will allow citizens to file suit to force EPA to levy fines against livestock operations for past violations. In these legal cases, farmers are liable for any fines EPA collects, their own attorney fees, along with the legal costs of the plaintiff. Paying the penalty indicates that EPA has already taken enforcement action against the site (farm), thus providing protection from citizens or private groups forcing EPA to take further action.

Operations are also required to pay a participation fee of \$2,500.00 per farm to help fund the air emissions monitoring study. Fortunately for pork producers, the act enabling the Pork Checkoff allows for funding production related research projects. The National Pork Board will be funding the monitoring study for the pork industry.

Many facilities used for pork production are based on contractual relationships between the owners of the pigs (contractor) and owners of the facilities (contract growers). To gain full EPA Safe Harbor protection the contractor will need to list each farm and pay the

penalty for each of the operation's contract growers. But, by the paying that penalty fee, only the contractor will gain Safe Harbor protection. To be fully protected the contract grower will also need to enter into an Agreement with EPA and pay the penalty fee on his or her own facilities.

Should results of the monitoring study determine that emissions from the contract grower's farm exceeds CERCLA reporting requirements, or CAA emissions standards, it will be the responsibility of the facility owner (contract grower) to ensure the facility meets all air regulations.

At the conclusion of the monitoring study EPA will publish the Emission Estimating Methodologies in the form of "look up" charts that will list the expected emissions from various types of facilities, under differing management schemes. Producers will reference these charts to calculate the expected emissions from their farm. Based on the results of those calculations producers will have three options:

- ✓ If the "look up" charts prove the farm is below all thresholds, the producer will give EPA a one time notification that the farm is not subject to any CAA, CERCLA or EPCRA requirements.
- ✓ Some farms will need to simply file CERCLA reporting forms.
- ✓ A few large farms may need to apply for air permits and eventually install controls on their farm.

This Consent Agreement is not just for large farms. Small farms may benefit from the Agreement's protection as well. Information provided by the National Pork Producers Council (NPPC) suggests that farms with 1,000 finishing pigs in barns with deep pits may need the Safe Harbor protections offered by participating in the Agreement.

In summary EPA agrees to:

- ✓ Grant Safe Harbor to participating farms from any past CAA, CERCLA, or EPCRA violations.
- ✓ Conduct a monitoring study through third party private contractors to determine the amount of emissions from livestock farms.
- ✓ Develop and publish Emission Estimating Methodologies in the form of "look up" charts that producers will reference when determining their reporting and air permit requirements.

(Continued on page 3)

Participating farms agree to:

- ✓ Pay a penalty based on the size of their operation
- ✓ Help fund the industry monitoring study.
- ✓ At the conclusion of the monitoring study participating farms will refer to EPA's "look up" charts to determine their CAA, CERCLA and EPCRA requirements.
- ✓ If the farm's emissions are below the CERCLA reporting requirements the farm is required to notify EPA within 60 days of the release of the study.
- ✓ If the study's results indicate the farm meets or exceeds CAA or CERCLA thresholds the farm will have 120 days to file for a permit or meet CERCLA reporting requirements.

Non-participating farms:

- ✓ Will not pay the penalty.
- ✓ Will not be required to help fund the monitoring study.
- ✓ Will not have Safe Harbor from past or current violations.
- ✓ At the conclusion of the monitoring study, non-participating farms will be expected to meet all air emission regulations.

Farms installing waste-to-energy systems will be granted an additional 180 days to comply with all emission regulations.

The original order published in the Federal Registry the EPA set May 1, 2005 as the sign up deadline. On Wednesday, March 16th EPA gave notice of the intent to re-open the comment period and extend the application deadline. Currently EPA intends to publish notice in the Federal Register announcing a reopening of the comment period from April 1 to May 2, 2005. The deadline for AFOs to sign the agreement was May 1, 2005, but will be extended until July 1, 2005.

The Air Consent Agreement is a legal and binding contract between participating farms and EPA. Producers should treat this contract as they would any other contract by seeking their own legal counsel prior to entering into the Agreement.

For additional information see:

The National Pork Producers Council's Air Emission Consent Agreement at <http://www.nppc.org/>

EPA Releases the Animal Feeding Operations Air Quality Compliance Agreement by Wendy Powers, at <http://www.extension.iastate.edu/Pages/communications/EPC/Spring05/epa.html>

Animal Feeding Operations Air Quality Compliance Agreement Fact Sheet by EPA, at: <http://www.epa.gov/compliance/resources/agreements/caa/cafo-fesht-0501.html>

The Air Compliance Agreement it self is available at: <http://www.epa.gov/compliance/resources/agreements/caa/cafo-agr-0501.html>

Are small butcher shops, for custom and retail meat processing, important to the people of Michigan? Why and why not?

Jennie Webb, Green and White Youth Education Fair, Senior Division Essay Contest Winner, Newport, MI

Butcher shops, for custom and retail meat processing are very important to the people of Michigan. These small businesses thrive because of the consumer's desire for friendly personal transactions. Large grocery chain meat sales focus a lot on the price of their meat and less on service. Both custom butcher shops and large chain retail grocery stores try to provide their consumers with a product they trust and can be satisfied with. While aiming for quality, custom butcher shops and chain grocery stores have their differences. Some may strongly believe the custom butcher shops provide better products and service. On the other hand others may strongly believe the chain grocery stores provide better products and service. Whatever the case may be both try to make the business as best as possible and to meet the needs of Michigan's consumers.

(Continued on page 4)

As I thought about this topic I thought it best to find out from those who work in the field. I decided to call around and interview employees of small butcher shops and large retail systems. In doing this I found varied opinions on which are suited to meet the needs of Michigan's consumers.

The first person I contacted was Jan¹, State of Michigan Department of Agriculture Food Specialist, I asked for her opinion on custom slaughter houses. She commented on how important they are to farmers as well as people who want their choice of a whole pig, cow, or half a cow. According to Jan¹, small butcher shops are important to people who do not live near a big retail grocery store along with people who want specialty cuts. I also called Ted¹, of a local butcher shop, in southeastern Michigan. I asked the question, "Why would people buy from a small butcher shop?" He replied saying, "Custom cuts are available, and it offers friendly personal service." Ted¹ also made a remark referring to wild game, stating special wild game meats like muskrat can be ordered. Another spokesperson for neighborhood butcher shops was Diana¹, representing yet another custom butcher shop, also located in southeastern Michigan. She said specialty meats can be ordered through custom butcher shops and people like fresh cut meat with no preservatives like processed meats, such as pork with sodium and water added. She also mentioned friendly personal service. The last person I questioned about custom butcher shops was Chris¹ from a larger custom butcher shop known well around Monroe, MI. He also commented on more personal service as well as the topic of wild game and no preservatives. Chris¹ said that it is easier to get specialty cuts on demand through a custom butcher shop. Both Ted and Chris commented on the fact that custom butcher shops can specialize in wild game where as retail stores do not.

I also asked Jan¹ from the state of Michigan about the disadvantages of custom butcher shops. She said custom butcher shops are not important to people who want quick access to meat or do not eat a lot of meat. It would not appeal to consumers looking for the lowest price or not interested in buying specialty product cuts.

I asked Jan¹ what the importance of a large chain retail grocery store would be. She replied with the fact that large retail chains are more convenient to the people of a big city, and those who would want a lower price. I contacted my local Kroger store and talked to Nick¹, the meat department manager. I asked him, why you would buy meat from a larger chain grocery store. He replied with the answer, large retail stores are more convenient at a lower cost as well as providing a wider range of meat cuts. I wanted another opinion on the importance of large retail butcher shops. I talked to a representative from the Meijer store chain. I asked the same question, why would you buy meat from a large chain grocery store? He answered straight forward, it is the same quality as a small butcher shop. He also added large retail chains are more convenient and lower priced. Lastly, he said that company policy strongly states that no wild game is to be sold within the store.

After all of the calling and interviewing the different spokespersons of both custom butcher shops and large chain grocery stores, I took a trip to the library. The information I had gathered was very interesting and substantiated earlier comments about large retail grocery stores being more convenient. I found that the Library of Michigan reports that 74.65% of people in the state of Michigan live in an urban area. The proportion of Michigan citizens living in the rural area is only 25.35%. This suggests that large chain grocery stores are more convenient for the greater number of people.

I believe that the small custom butcher shops are important to the people of Michigan. The custom grocery stores have a more personal atmosphere and provide the consumer with options the large chain grocery stores cannot offer. My research shows that custom butcher shops are not important to the consumers looking for convenience or economic value. Custom butcher shops serve the people of Michigan by providing specialty meats, custom meat cutting, and most important personal friendly service.

¹Actual interviews were conducted. Names of people interviewed have been created to protect real identities.

Green and White Show Meat Quality Evaluation

**Ronald O. Bates, Jerry May, Thomas Guthrie and Dale Rozeboom,
Swine MSU Extension Team^a**

Introduction

There has been interest in determining the meat quality of pigs that are exhibited in shows. Pigs in shows are transported from the farm to a show facility, shown and then transported to market. This sequence of events does disrupt a pig's normal routine and can become stressful for the animal. Animals under stress often modify their behavior and may not eat or drink as much as when housed in their normal surroundings. These behavior modifications can elicit biochemical processes within the animal, which may cause poorer meat quality once the animal is harvested. In addition the trend within pigs shows has been selection for very lean and heavily muscled animals, which normally tend to have poorer meat quality. This trend for leaner, heavier muscled pigs along with how pigs at shows are handled before harvest may cause poorer meat quality in show pigs.

Green and White Show Evaluation

In an attempt to determine pork quality of pigs exhibited at a show, a random sample of 92 pigs from the 248 head shown during the Green and White Show held on February 5, 2005 at the Pavilion for Livestock Education at Michigan State University were evaluated for meat quality. After the show, pigs were moved to the Manchester, MI and held at the United Producers Inc. sales facility and provided free access to water and feed. Pigs were transported to Routh Packing, Sandusky OH on February 7 and harvested on February 9. The Swine AoE team evaluated one loin from each of these pigs for meat quality characteristics on February 10. These carcasses had been chilled and evaluations took place as carcasses were processed into wholesale cuts.

Meat Quality Evaluation

The characteristics evaluated were CIE L*, pH, color score and marbling score. CIE L* is measured with

equipment that determines the reflectance of light on a pork loin. Higher L* values indicate that there is more light reflectance and indicates the meat is pale in color. Lower L* values indicate there is less light reflectance and suggests that the meat is dark in color. Related to this is color score. Color score is a 1-6 score with a "1" represented by a very pale meat and a "6" indicating very dark meat. In Figure 1 is a representation of the color scoring system and the possible associated L* values with particular color scores. For the U.S. market it is believed that most consumers prefer pork to have a color score of 3.

The marbling score is also subjective in nature. It follows a similar guide as that of color score. The marbling scoring system used for this evaluation is found in Table 2. Each scores indicates what the possible intramuscular fat may be in percentage units. For instance a marbling score of "2" indicates that a pork loin may have 2% intramuscular fat. A marbling score of "3" would indicate that intramuscular fat may be 3%. It is believed that within the U.S. market, the desired level for marbling score is 2 to 3.

To measure pH, a pH meter was used in which a probe was inserted into the loin muscle and pH determined. A pH value of 7.0 is neutral. A pH measurement is a measure of meat acidity with ranges typically observed from 5.0 to 6.8. Lower values suggest meat has a higher acid content from the breakdown of glycogen to lactic acid after harvest occurs. This causes meat to lose water and be less juicy with poor eating characteristics. Higher pH values indicate that meat is less acidic and more able to hold water. Meat with higher pH is more apt to be juicy after cooking, and probably more tender as well.

PSE The term PSE stands for *Pale, Soft and Exudative*. Pork that loses water readily (exudative), is gray in color and is very soft, is often considered PSE. The PSE condition is one that is both undesirable

^aThe Swine AoE Team would like to thank United Producers Inc. and Routh Packing for their cooperation and assistance with this project.

(Continued on page 6)

from both a fresh and processed pork standpoint . Fresh pork that is PSE has an undesirable color in the meat case. In addition it will exude or leak water into the package. Consumers typically avoid fresh pork with these characteristics. Pork that is PSE is also discounted by pork processors who market smoked and cured pork products. Pork that is PSE does not take up curing solutions easily, is difficult to cure and may not maintain shape very well. Cured PSE pork products will not have a desirable color and flavor can often be variable due to its inability to “hold” or maintain curing solutions.

DFD This term DFD stands for *Dark, Firm and Dry*. Pork that is very dark in color (dark red) with high pH (greater than 6.0) is often considered to be DFD. Pork that is DFD has very high water holding capacity and is very firm to the touch and often appears to have a dry surface, even though the surface is no drier than normal pork. Pork that is DFD has both good and bad fresh product characteristics. Fresh pork that is DFD can be discriminated by consumers due to its dark color. However, after cooking it is typically very juicy and tender. Unfortunately due to its high pH, it may have less shelf life as a fresh product, since microbial growth will tend to be higher on products with high pH versus those with lower pH. Yet, dark fresh pork is very desirable in many Asian countries and is often exported as fresh pork. Pork that is DFD is good for pork processing. It does absorb and hold curing solutions very well and the color is acceptable after smoking and curing. However, shelf life may be shorter due to better conditions for microbial growth.

Green and White Meat Quality Results

In Table 1 are the averages for the meat quality characteristics measured. The average color score was 2.84 while the average CIE L* value was 51.72. For the most part, the color of the loins from these pigs was in the “acceptable” range. In Figure 3 is a graph showing the percentage breakdown of loins that were classified into one of the six color scores. As can be seen, there was quite a range in color scores. An acceptable range for color score is 2 to 4, with 81.5%

classified within this range. Of the loins evaluated, 10.9% were classified as a “1” while 3.3% and 4.35% were classified into the 5 and 6 categories respectively. In other words nearly 11% were unacceptably pail, scoring a “1”.

The average marbling score for the loins evaluated was 1.87 or nearly a “2” with a marbling score of 2-3 considered desirable within the U.S. fresh pork market. In Figure 4 is a percentage breakdown of loins that were classified by marbling score. There were 70.6% that were classified as marbling score “2” or “3”. However, 28.3% were classified as marbling score “1” which is considered undesirable in fresh pork.

Using the pH values and the color information, loins were then classified into the categories of “PSE”, “NORMAL”, or “DFD” (Figure 5). From this classification, 83.7% were classified as normal, 10.9% were PSE and 5.4% were DFD. Reports from surveys conducted in U.S. packing plants would indicate that a 10.9% incidence of PSE pork is considered poor but not beyond the range of typical industry expectations.

Summary A majority of the loins evaluated from the pigs shown at the Green and White Show were in the acceptable range for U.S. standards for color, marbling and overall acceptability. However, the high incidence of PSE and low marbling is a concern when marketing pork for either fresh markets or for further processing. An

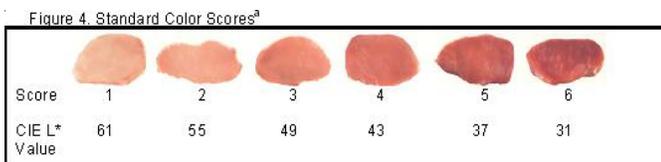
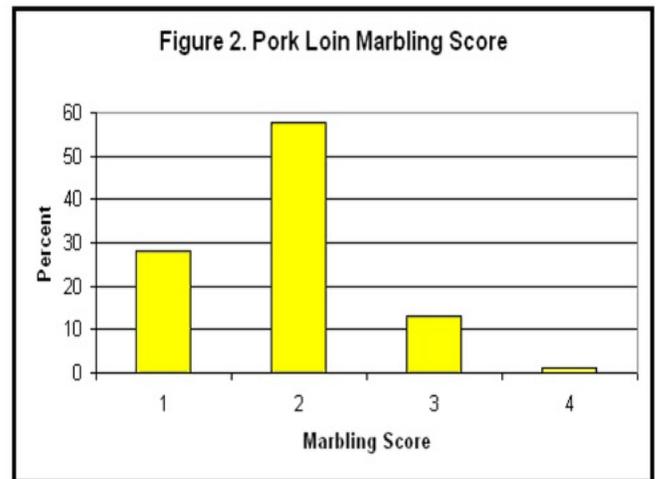
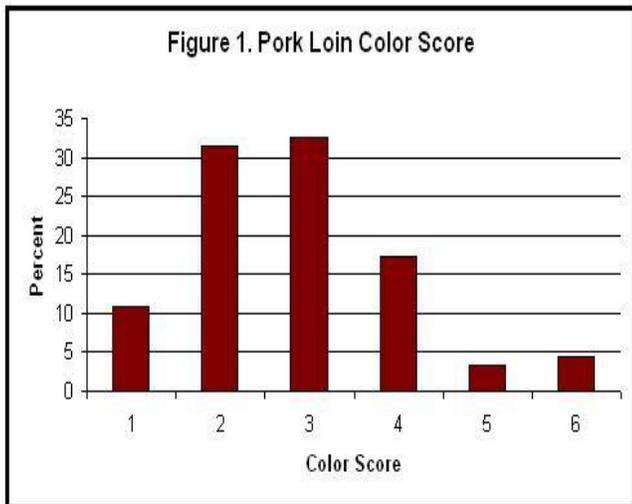
important point of consideration for this meat quality evaluation was that the pigs were rested for two days, with access to water and feed before harvest. This could allow pigs to recover from the stress of exhibition and replenish water and nutrients thus potentially improving meat quality characteristics after harvest, which may have improved the overall meat quality of these pigs.

(Continued on page 7)

This demonstration does illustrate that pigs from shows can have meat quality within typical ranges for color and overall acceptability. However, large extremes in meat quality characteristics can increase the difficulty in marketing wholesale cuts for either fresh pork or further processing. Harvest groups comprised of show pigs with a high incidence of PSE and poor marbling, as what was observed this case, can cause pigs from shows to be discounted by pork processors.

Table 1. Meat Quality Performance of Pigs Exhibited at the Green & White Show.

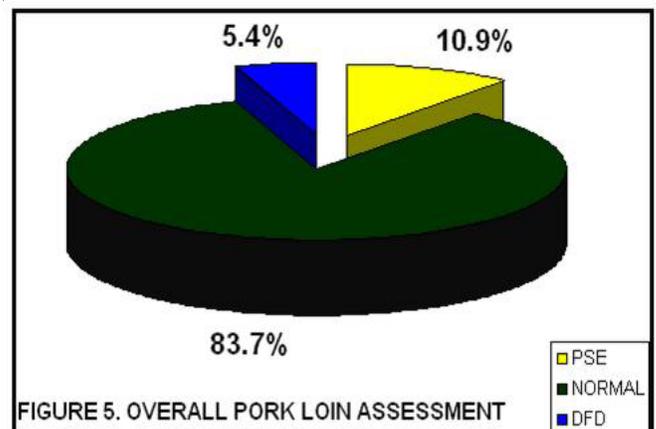
Item	Average
CIE L*	51.72
PpH	5.68
Color Score	2.84
Marbling Score	1.87



^aAdapted from the NPB Pork Quality Standards.



^aAdapted from the NPB Pork Quality Standards.



Withholding Feed from Pigs during the Marketing Period

Thomas Guthrie, Swine AoE Extension Educator, Jackson, MI

When emptying a barn under commercial conditions, the heaviest pigs are typically removed from pens over several weeks of a marketing period in an effort to meet the desired weight range at the packing facility. In most cases, pork processors typically harvest a large percentage of hogs they receive on the day of their arrival at the plant. In general, most pigs have free access to feed until marketing and the typical time off feed may be less than 24 hours before harvest.

There are several reports that document a decrease in warm carcass yield when feed withdrawal times exceed 24 hours before harvest. However, this decrease seems to diminish when feed withholding is less than 24 hours. In addition, there appears to be several benefits of withholding feed for 12 to 24 hours before harvest. These benefits include: decreased weight of the gastrointestinal tract, decreased feed wastage and a decrease cost of manure treatment in the packing facility.

In a recent report by Kephart and Mills (2005)^a, two experiments were conducted in commercial swine facilities to determine the effect of withholding feed from market hogs for 6 to 24 hours prior to harvest during a two week marketing period. Effects on carcass weight, carcass value, feed intake and growth performance were evaluated.

Experiment 1 subjected pigs to either 6 or 24 hours feed withholding before harvest. In Experiment 2, pigs were subjected to feed withholding for 6, 16 or 24 hours before harvest. Five hundred twenty three pigs were marketed in Experiment 1 and 317 pigs were marketed in Experiment 2 over a two-week marketing period for each respective experiment (day 0 = 1st marketing period, day 7 = 2nd marketing period, and day 14 = 3rd marketing period).

Results from Experiment 1 indicated that withholding feed from pigs for 24 hours during the marketing period reduced carcass weight,

carcass yield and viscera weight compared to pigs subjected to 6 hours of feed withholding before harvest. Growth rates of pigs between the first two marketing periods (day 0 and day 7) and between the 2nd and 3rd marketing periods (day 7 and day 14) were similar for both the 6 and 24 hour withholding feed periods. Gilts had heavier carcasses, less fat depth, higher carcass yield and actual economic value compared to barrows.

Table 1. Pig performance and carcass traits for Experiment 1.

Feed withholding time, hrs	6	24
Item		
No. of pigs	263	260
Body Weight in lbs.		
Day 0 (1 st marketing date)	238.9	238.9
Day 7 (2 nd marketing date)	237.8	237.2
Day 14 (3 rd marketing date)	236.1	233.4
ADG, lbs. (d 0 to 7)	1.58	1.50
ADG, lbs. (d 7 to 14)	1.61	1.45
HCW, lbs.	186.1	183.7
Yield, %	74.5	73.7
Carcass Value	120.17	118.47
Viscera Weight, lbs.	17.8	15.0
Feed Intake, lbs./pig		
Day 0 to 7	4.05	0
Day 1 to 7	40.15	34.78
Day 7 to 14	53.55	47.87

(Continued on page 9)

Results from Experiment 2 revealed that viscera weight was decreased in the 16 and 24 hour groups when compared to the 6 hour feed withholding period. Carcass weight in the 24 hour group was not different from that of the 6 hour group. Carcass

yield, fat depth, and carcass value were unaffected by treatment. However, gilts had lower viscera weight, less fat depth, higher carcass yield and value than barrows.

Table. 2 Pig performance and carcass traits for Experiment 2.			
Item	Feed withholding time, hours		
	6	16	24
No. of pigs	107	103	107
Body Weight in lbs.			
Day 0 (1 st marketing date)	245.1	245.1	245.1
Day 7 (2 nd marketing date)	251.9	252.8	251.0
Day 14 (3 rd marketing date)	257.2	257.2	257.0
ADG, lbs. (d 0 to 7)	2.00	2.11	1.87
ADG, lbs. (d 7 to 14)	1.83	1.87	2.00
HCW, lbs.	190.7	192.3	188.8
Yield, %	73.7	74.1	73.0
Carcass Value	145.29	146.50	145.11
Viscera Weight, lbs.	19.4	17.4	16.5
Feed Intake, lbs./pig			
Day 0 to 7	6.31	5.04	0
Day 1 to 7	50.20	47.28	42.37
Day 7 to 14	45.63	46.86	43.80

In conclusion, Kephart and Mills (2005) stated that withholding feed for either 16 or 24 hours decreased viscera weight and feed intake during the marketing phase of finishing hogs. It is also apparent that withholding feed during the marketing period resulted in significant feed savings during both experiments with only minimal effects on carcass weight.

However, there are several factors that should be taken into consideration before attempting to withhold feed during the marketing period. These factors include; 1) Projected duration from the beginning of load out until the time the

first hog is harvested, 2) Repeated feed withholding may be associated with increased incidences of ulcers, which could potentially decrease feed intake and carcass weight of those pigs in the last marketing group(s) and 3) A careful evaluation of your respective operation's marketing period to determine what works best within each respective situation or operation. In turn, an evaluation of these factors may warrant a different management approach to close out feed management.

^aKephart, K.B. and E. W. Mills. 2005. Effect of withholding feed from swine before slaughter on carcass and viscera weights and meat quality. J. Anim. Sci. 83:715-721.

Proper Care of Syringes

Barbara Straw, DVM, Ph.D. Extension Swine Veterinarian
Michigan State University

Clean and sterilized syringes are essential for administration of vaccines and antibiotics. Improperly cleaned syringes can lead to abscesses at injection sites. Abscesses can reduce pig growth rate, inactivate vaccines so that the pig doesn't develop immunity, and can require extensive trimming and carcass loss at slaughter.

With non-disposable syringes, it's always a good idea to use different syringes for vaccines and antibiotics. A spot of paint on the top of the plunger will help identify which syringes are which. This provides a back-up system so that if an unsterilized syringe is accidentally used, antagonistic compounds such as antibiotics and live vaccines won't mix.



To clean a 50 ml multiple dose syringe start by heating 1 ½ cups of distilled water. Place the water in a pan on the stove or a microwave-safe container in the microwave and bring the water to the boiling point. Just as the water starts to boil, remove it from the heat and set it aside.

While the distilled water is being heated to boiling, thoroughly clean the outside of the syringe with soap and water.



After the outside of the syringe is clean, clean the inside by drawing the just-boiled hot water into the syringe and emptying it. Repeat this process of rinsing the syringe with very hot water 5 times.

Remove as much water from the syringe as possible by forcefully depressing the plunger and then place the syringe in a new zip lock bag and store it in the freezer. Frost-free freezers provide an environment that is deadly to bacteria and viruses. They eliminate frost by continuously cycling between freeze and thaw. This freezing and thawing kills most microbes.

Don't use soap or disinfectant on the inside of a multiple dose syringe because their residues can inactivate modified live vaccines. If a freshly sterilized syringe is to be used right away make sure it cools because heat can inactivate modified live vaccines.

(Continued on page 11)

The manufacturers of multiple dose syringes provide directions for dismantling the syringe, boiling all the parts and reassembling it. This is a superior method for cleaning and sterilizing syringes compared to the one just described. However, it has the disadvantage that often it is difficult to get the syringe back together perfectly snug. If parts don't fit tight the syringe can draw in air and not deliver the correct amount per injection. Also oil is used to lubricate parts and the oil can become contaminated.

Plastic syringes can be reused several times if they are properly cleaned and sterilized. First clean the outside of the syringe with soap and water. Then rinse the inside with very hot tap water by drawing the hot water into the syringe and expelling it 5 times.

Then fill the syringe with distilled water. Wrap the syringe in 8 layers of wet paper towels and place it inside a zip-lock bag. Do not seal the bag.



Place it in the microwave and heat on high for 2 ½ minutes. After 2 ½ minutes check the paper towels to be sure that they are still very wet. If they are starting to dry out, they should be re-wetted, because if the paper towels dry out they may start a fire in the microwave.

After making sure that the towels are wet, microwave for another 2 ½ minutes. After microwaving for a total of 5 minutes, remove the syringe from the zip-lock bag, throw away the paper towels and empty any remaining water from the syringe. Most of the water will have boiled away in the microwave, but any remaining should be discarded.

Only microwave one syringe at a time. To store the sterilized syringes, place them in a zip-lock bag and place in the freezer.

If you want to check to see that the syringes are being adequately sterilized, you can take some to your veterinarian for culture. He will rinse the inside of the syringe with sterile water and then place this sample on a blood agar plate, incubate it overnight, and check for growth of bacteria. If the syringe was properly sterilized there will be no bacterial growth. If bacteria are identified on the blood agar, it means that the syringe wasn't completely cleaned and sterilized.

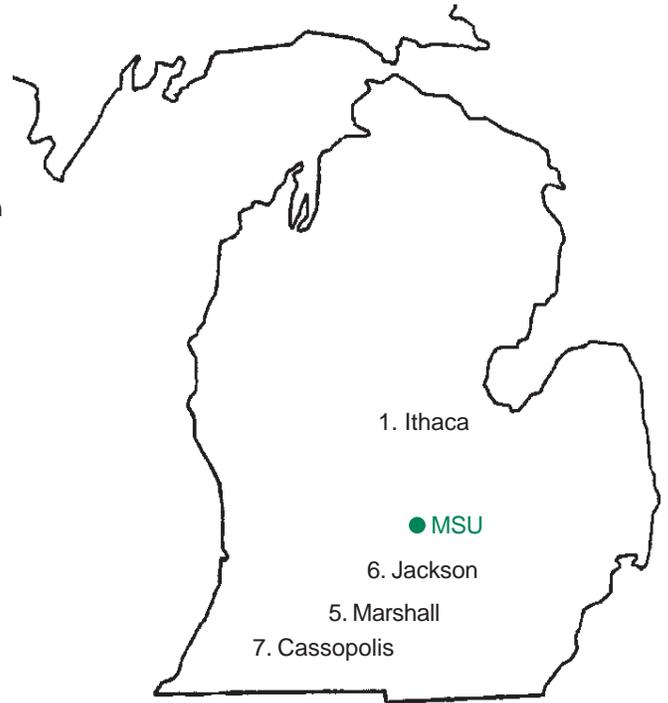
No Bacterial Growth



Bacterial Growth

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2. **Ron Bates, State Swine Specialist**
Michigan State University
(517) 432-1387
3. **Dale Rozeboom, Swine Extension Specialist**
Michigan State University
(517) 355-8398
4. **Barbara Straw, Extension Swine Veterinarian**
Michigan State University
(517) 353-9831
5. **Roger Betz, Southwest District Farm Mgt.**
Finance, Cash Flow, Business Analysis
(616) 781-0784
6. **Tom Guthrie, Southwest Swine Educator**
Nutrition and Management
(517) 788-4292
7. **Beth Franz, Southwest Swine Educator**
Value Added Production; Youth Programs
Michigan State University
(269) 445-4438

All comments and suggestions should be directed to:



Beth Franz has recently joined the Michigan State University Extension team as the Swine Extension Educator for southwest and west central Michigan. Beth recently received her Bachelor of Science degree in animal science at M.S.U. in 2003, focusing on swine production and management. While a student at M.S.U., she completed internships with major swine production companies including Murphy Family Farms in North Carolina and Christensen Family Farms in Minnesota. Following her graduation, Beth was employed by Christensen Family Farms in a management position at one of their sow operations.

As a swine educator, Beth's main focus will be working with the Extension AoE (Area of Expertise) team and transferring the research based information at M.S.U. to help local swine producers. Her primary responsibilities will be working with producers to develop niche markets, create value-added products, and assisting in environmental issues programming. In addition Beth will be a part of the programming effort for youth swine projects.

Beth will be located in the M.S.U. Extension office in Cassopolis, Michigan and will frequently travel through southwest (Berrien, Cass, Van Buren, Kalamazoo and St. Joseph counties) and west central (Allegan and Ottawa counties) Michigan. She can be contacted through the M.S.U. Extension office located at 120 N. Broadway, Suite 209 Cassopolis, Michigan 49031, by phoning 269.445.4438 or by email at franzeli@msu.edu.

