Effective Scientific Posters & Presentations

Dr. Cassie Jones
Dept. Animal Sciences & Industry
Kansas State University

GSA Presentation: October 13, 2020

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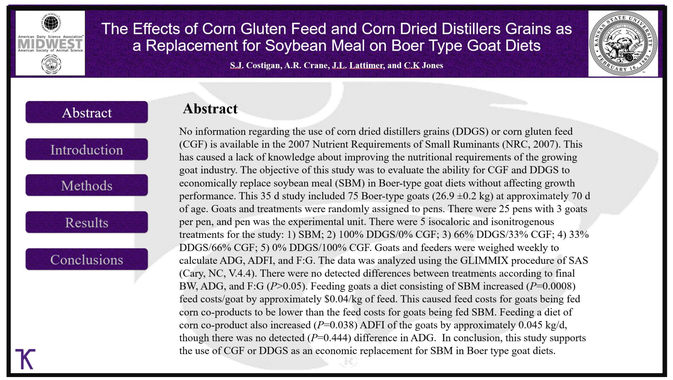
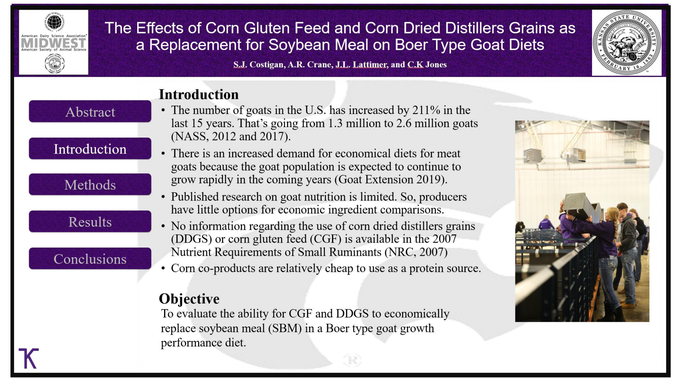
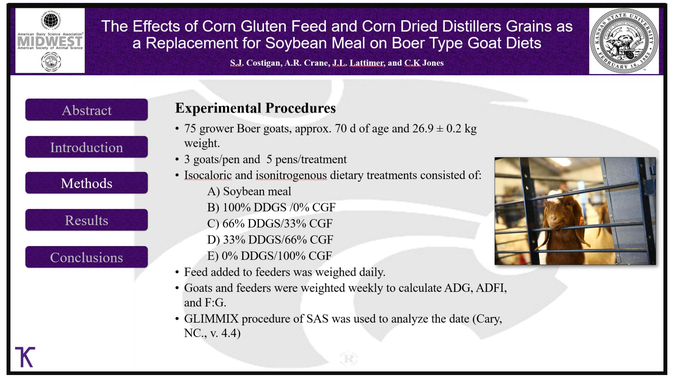
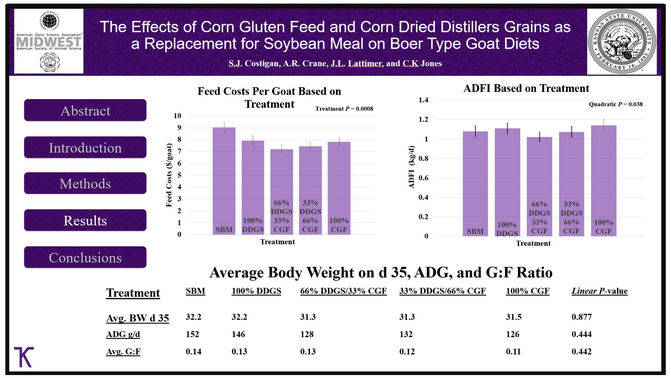
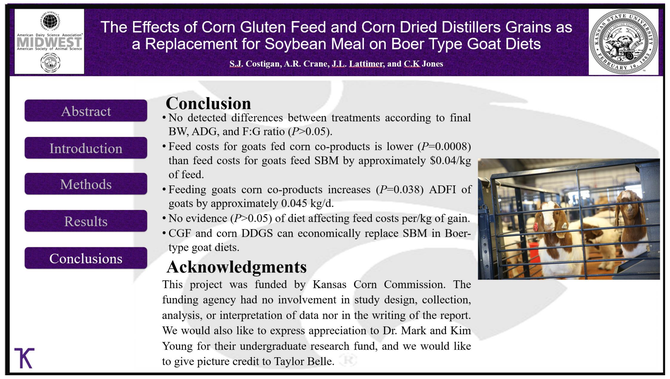
Physical or ePoster?











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Start with the Format

- ADSA physical poster (Annual Meeting)
  - No more than 48” high x 96” wide
  - Metric units
  - Top has abstract number, title, authors, affiliations
    - Lettering 1 inch+ (> 96 point font)
    - Picture of yourself near abstract number

Major Components

WHY (introduction)

- 3-5 bullet points explaining why the research is important and establishing the research gap

WHAT (objectives)

HOW
(materials and methods)

- Experimental design, treatments, experimental unit
- Basic collection details (age, what data was collected and when)
- Statistics

Evaluating the efficacy of Medium Chain Fatty Acids as an Antibiotic Replacement for Zinc Oxide and Carbadox in Nursery Pig Diets

C.J. Comstock, A.B. Lerner, C.K. Jones

Department of Animal Sciences and Industry, Kansas State University, Manhattan

Introduction

- Increased regulatory and consumer pressure on the agricultural industry to limit use of antibiotics in livestock species has forced industry professionals to look for alternative options for nursery pig diets.
- One of these alternatives is the use of Medium Chain Fatty Acids (MCFA).
- With limited research on the efficacy of MCFA diets, this study focused on assessing the ability of MCFAs to replace traditionally used Zinc Oxide (ZnO) and carbadox concentrations in weaned pig diets, while maintaining growth and feed intake.

Objective

- To evaluate the efficacy of MCFAs as an effective alternative for traditionally used antibiotics ZnO and carbadox.

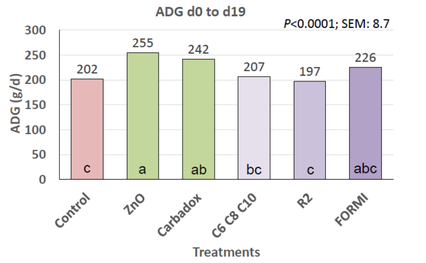
Experimental Design

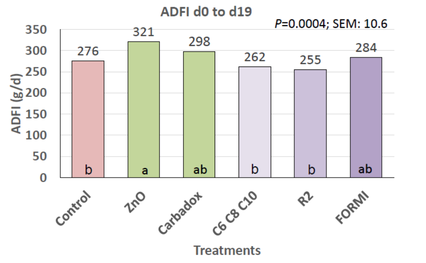
- 360 weaned pigs (DNA 200 x 400; 5.4±kg) were allotted to each experimental unit (pen) and placed on one of six treatment diets.
- Six pigs per pen were used to form total of 10 replicates per treatment in a completely randomized block design.
- Treatments were fed in 3 phases, with phase 1 being d0 to d7, phase 2 being d8 to d 19 and a common phase fed from d 20 to 35.
- Treatments were as follows:
  - **Treatment 1- Control**
  - **Treatment 2- Zinc Oxide**
  - **Treatment 3- 50g/ton carbadox**
  - **Treatment 4- 1% C6:C8:C10**
  - **Treatment 5- 1% Feed Energy R2 (Feed Energy Corp., Des Moines , IA)**
  - **Treatment 6- 1% FORMI GML (ADDCON, Bitterfeld-Wolfen, Germany)**

Materials and Methods

- Individual pig and feeder weights were collected on a weekly basis.
- All data was analyzed using the PROC GLIMMIX procedure of SAS (SAS Inst., Cary, NC).

Results





d0 to d35	Control	ZnO	Carbadox	C6:C8:C10	R2	FORMI	SEM	*P*=
ADG	344^{ab}	377^{a}	374^{ab}	355^{ab}	339^{b}	359^{ab}	8.5	0.0012
ADFI	492^{ab}	536^{a}	517^{a}	488^{ab}	463^{b}	494^{ab}	11.5	0.001
G:F	0.70	0.70	0.72	0.73	0.73	0.73	0.012	0.32

Conclusion

- Pigs that were fed ZnO and carbadox during phase 1 and 2 performed significantly better than those on control and R2 diets for treatment period (d0 to d19) ADG.
- For overall(d0 to D35) study, pigs fed ZnO performed significantly better than those fed R2, with all other diets being intermediate.
- Pigs fed the FORMI diet were not significantly different in their ADG or ADFI from Zno or Carbadox for the treatment (d0 to d19) or overall (d0 to d35) periods.
- G:F did not change significantly regardless of treatment.

Future Directions

- The results of this study warrant further research to be conducted on the effects of MCFA as a replacement for antibiotics in nursery pig diets.

Acknowledgements

- Thank you to the Dr. Mark and Kim Young Undergraduate Research Fund and ADDCON (Bitterfeld-Wolfen, Germany) for their financial support on this research project.

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Major Components

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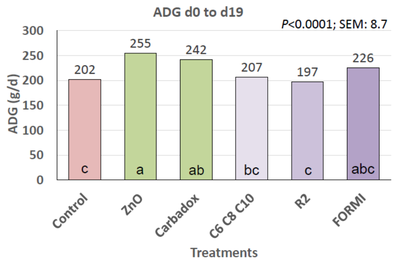

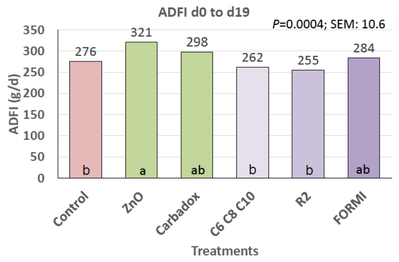

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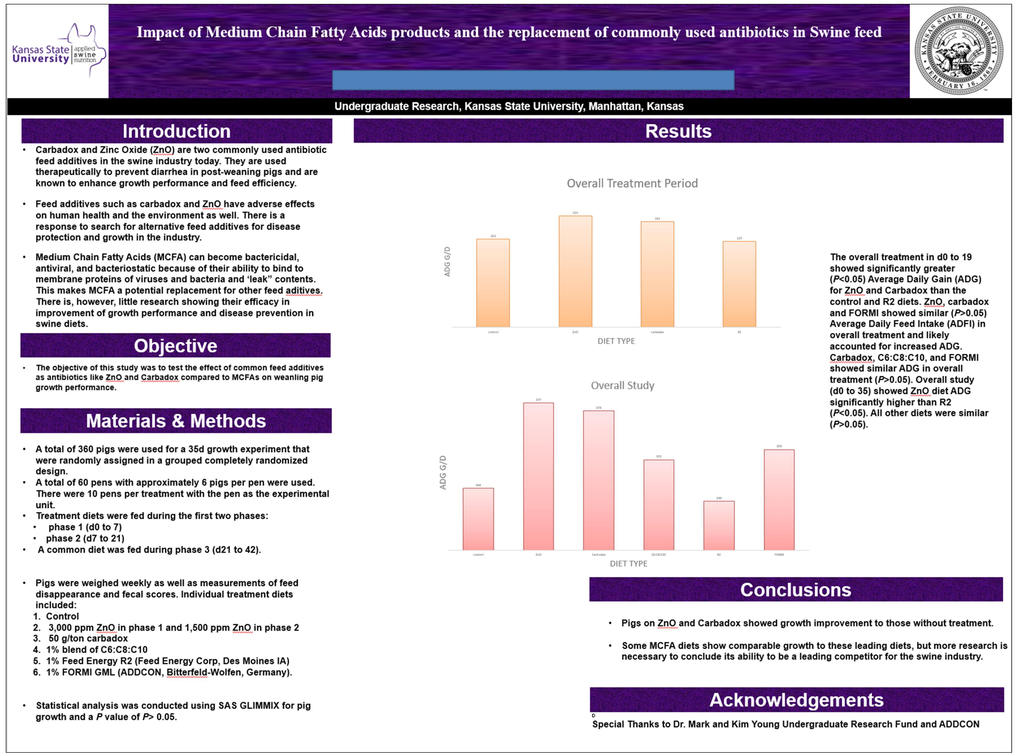
WHAT HAPPENED? (results)

SO WHAT? (conclusions)

Sponsors, acknowledgements, references

Recommendations

- White space
  - Align headings, text boxes, table values
  - Have logical places for the eye to ‘rest’
  - Choose 2 or 3 columns, move from top left to bottom right



Impact of Medium Chain Fatty Acids products and the replacement of commonly used antibiotics in Swine feed

Undergraduate Research, Kansas State University, Manhattan, Kansas

Introduction

- Carbadox and Zinc Oxide (ZnO) are two commonly used antibiotic feed additives in the swine industry today. They are used therapeutically to prevent diarrhea in post-weaning pigs and are known to enhance growth performance and feed efficiency.
- Feed additives such as carbadox and ZnO have adverse effects on human health and the environment as well. There is a response to search for alternative feed additives for disease protection and growth in the industry.
- Medium Chain Fatty Acids (MCFA) can become bactericidal, antiviral, and bacteriostatic because of their ability to bind to membrane proteins of viruses and bacteria and ‘leak” contents. This makes MCFA a potential replacement for other feed aditives. There is, however, little research showing their efficacy in improvement of growth performance and disease prevention in swine diets.

Objective

- The objective of this study was to test the effect of common feed additives as antibiotics like ZnO and Carbadox compared to MCFAs on weanling pig growth performance.

Materials & Methods

- A total of 360 pigs were used for a 35d growth experiment that were randomly assigned in a grouped completely randomized design.
- A total of 60 pens with approximately 6 pigs per pen were used. There were 10 pens per treatment with the pen as the experimental unit.
- Treatment diets were fed during the first two phases:
  - phase 1 (d0 to 7)
  - phase 2 (d7 to 21)
- A common diet was fed during phase 3 (d21 to 42).
- Pigs were weighed weekly as well as measurements of feed disappearance and fecal scores. Individual treatment diets included:
  1. Control
  2. 3,000 ppm ZnO in phase 1 and 1,500 ppm ZnO in phase 2
  3. 50 g/ton carbadox
  4. 1% blend of C6:C8:C10
  5. 1% Feed Energy R2 (Feed Energy Corp, Des Moines IA)
  6. 1% FORMI GML (ADDCON, Bitterfeld-Wolfen, Germany).
- Statistical analysis was conducted using SAS GLIMMIX for pig growth and a *P* value of *P*> 0.05.

Results

Overall Treatment Period

Overall Study

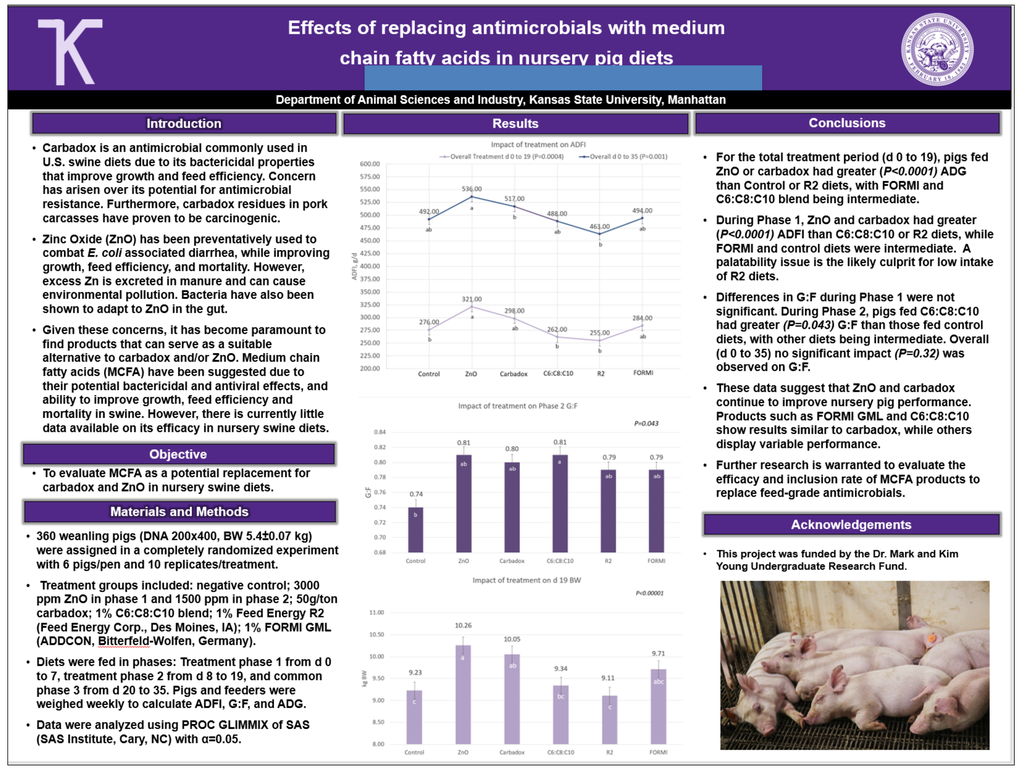
The overall treatment in d0 to 19 showed significantly greater (*P*<0.05) Average Daily Gain (ADG) for ZnO and Carbadox than the control and R2 diets. ZnO, carbadox and FORMI showed similar (*P*>0.05) Average Daily Feed Intake (ADFI) in overall treatment and likely accounted for increased ADG. Carbadox, C6:C8:C10, and FORMI showed similar ADG in overall treatment (*P*>0.05). Overall study (d0 to 35) showed ZnO diet ADG significantly higher than R2 (*P*<0.05). All other diets were similar (*P*>0.05).

Conclusions

- Pigs on ZnO and Carbadox showed growth improvement to those without treatment.
- Some MCFA diets show comparable growth to these leading diets, but more research is necessary to conclude its ability to be a leading competitor for the swine industry.

Acknowledgements

Special Thanks to Dr. Mark and Kim Young Undergraduate Research Fund and ADDCON



Effects of replacing antimicrobials with medium chain fatty acids in nursery pig diets

Department of Animal Sciences and Industry, Kansas State University, Manhattan

Introduction

- Carbadox is an antimicrobial commonly used in U.S. swine diets due to its bactericidal properties that improve growth and feed efficiency. Concern has arisen over its potential for antimicrobial resistance. Furthermore, carbadox residues in pork carcasses have proven to be carcinogenic.
- Zinc Oxide (ZnO) has been preventatively used to combat *E. coli* associated diarrhea, while improving growth, feed efficiency, and mortality. However, excess Zn is excreted in manure and can cause environmental pollution. Bacteria have also been shown to adapt to ZnO in the gut.
- Given these concerns, it has become paramount to find products that can serve as a suitable alternative to carbadox and/or ZnO. Medium chain fatty acids (MCFA) have been suggested due to their potential bactericidal and antiviral effects, and ability to improve growth, feed efficiency and mortality in swine. However, there is currently little data available on its efficacy in nursery swine diets.

Objective

- To evaluate MCFA as a potential replacement for carbadox and ZnO in nursery swine diets.

Materials and Methods

- 360 weanling pigs (DNA 200x400, BW 5.4±0.07 kg) were assigned in a completely randomized experiment with 6 pigs/pen and 10 replicates/treatment.
- Treatment groups included: negative control; 3000 ppm ZnO in phase 1 and 1500 ppm in phase 2; 50g/ton carbadox; 1% C6:C8:C10 blend; 1% Feed Energy R2 (Feed Energy Corp., Des Moines, IA); 1% FORMI GML (ADDCON, Bitterfeld-Wolfen, Germany).
- Diets were fed in phases: Treatment phase 1 from d 0 to 7, treatment phase 2 from d 8 to 19, and common phase 3 from d 20 to 35. Pigs and feeders were weighed weekly to calculate ADFI, G:F, and ADG.
- Data were analyzed using PROC GLIMMIX of SAS (SAS Institute, Cary, NC) with α=0.05.

Results

Impact of treatment on ADFI

Impact of treatment on Phase 2 G:F

Impact of treatment on d 19 BW

Conclusions

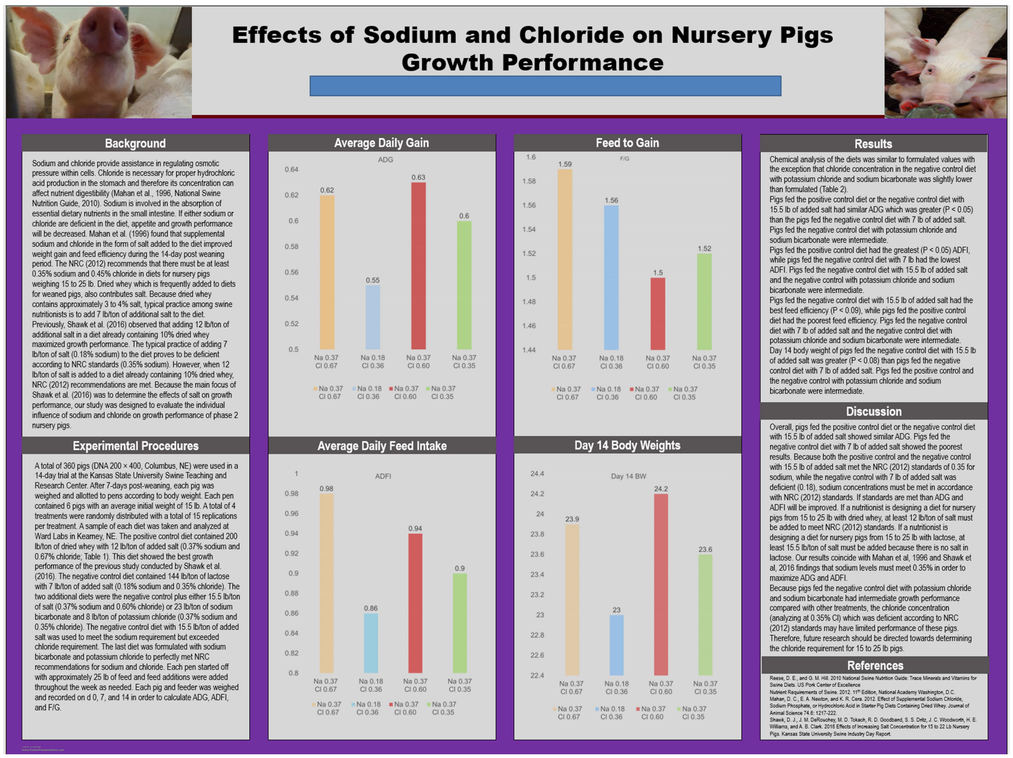
- For the total treatment period (d 0 to 19), pigs fed ZnO or carbadox had greater (*P<0.0001)* ADG than Control or R2 diets, with FORMI and C6:C8:C10 blend being intermediate.
- During Phase 1, ZnO and carbadox had greater (*P<0.0001)* ADFI than C6:C8:C10 or R2 diets, while FORMI and control diets were intermediate. A palatability issue is the likely culprit for low intake of R2 diets.
- Differences in G:F during Phase 1 were not significant. During Phase 2, pigs fed C6:C8:C10 had greater *(P=0.043)* G:F than those fed control diets, with other diets being intermediate. Overall (d 0 to 35) no significant impact *(P=0.32)* was observed on G:F.
- These data suggest that ZnO and carbadox continue to improve nursery pig performance. Products such as FORMI GML and C6:C8:C10 show results similar to carbadox, while others display variable performance.
- Further research is warranted to evaluate the efficacy and inclusion rate of MCFA products to replace feed-grade antimicrobials.

Acknowledgements

This project was funded by the Dr. Mark and Kim Young Undergraduate Research Fund.

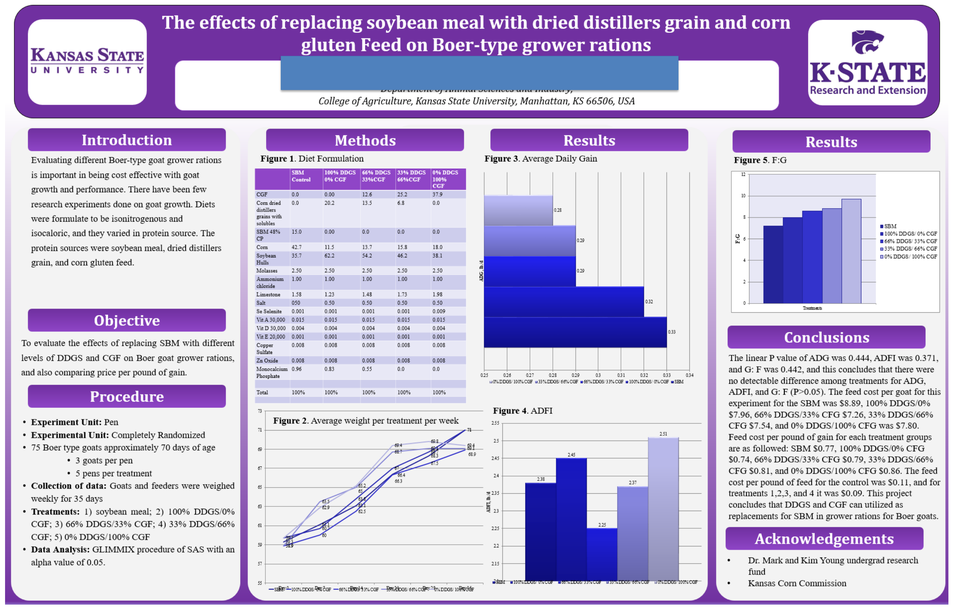
Recommendations

- Text
  - Bulleted phrases instead of full sentences
  - Concise, numbered lists
  - Pick one block text font and stick with it
  - Be careful about capitalization



Recommendations

- Colors
  - Font: Black or very dark
  - Background: solid white or light, watermarked simple photo/logo
  - Charts: All the same or meaningful differences
    - Gradients for titrations
    - Red for negative control, green for positive control
    - Related treatments grouped by color
    - Outline chart bars in black
    - NEVER use shadowing



The effects of replacing soybean meal with dried distillers grain and corn gluten Feed on Boer-type grower rations

Kansas State University

K-State Research and Extension

College of Agriculture, Kansas State University, Manhattan, KS 66506, USA

Introduction

Evaluating different Boer-type goat grower rations is important in being cost effective with goat growth and performance. There have been few research experiments done on goat growth. Diets were formulate to be isonitrogenous and isocaloric, and they varied in protein source. The protein sources were soybean meal, dried distillers grain, and corn gluten feed.

Objective

To evaluate the effects of replacing SBM with different levels of DDGS and CGF on Boer goat grower rations, and also comparing price per pound of gain.

Procedure

- **Experiment Unit:** Pen
- **Experimental Unit:** Completely Randomized
- 75 Boer type goats approximately 70 days of age
  - 3 goats per pen
  - 5 pens per treatment
- **Collection of data:** Goats and feeders were weighed weekly for 35 days
- **Treatments:** 1) soybean meal; 2) 100% DDGS/0% CGF; 3) 66% DDGS/33% CGF; 4) 33% DDGS/66% CGF; 5) 0% DDGS/100% CGF
- **Data Analysis:** GLIMMIX procedure of SAS with an alpha value of 0.05.

Methods

Figure 1. Diet Formulation

	SBM Control	100% DDGS 0% CGF	66% DDGS 33%CGF	33% DDGS 66%CGF	0% DDGS 100% CGF
CGF	0.0	0.00	12.8	25.2	37.9
Corn dried distillers grains with solubles	0.0	20.2	13.3	6.8	0.0
SBM 48% CP	15.0	0.00	0.0	0.0	0.0
Corn	42.7	11.5	13.7	15.8	18.0
Soybean Hulls	35.7	62.2	54.2	46.2	38.1
Molasses	2.50	2.50	2.50	2.50	2.50
Ammonium chloride	1.00	1.00	1.00	1.00	1.00
Limestone	1.58	1.23	1.48	1.73	1.98
Salt	050	0.50	0.50	0.50	0.50
Se Salenite	0.001	0.001	0.001	0.001	0.009
Vit A 30,000	0.015	0.015	0.015	0.015	0.015
Vit D 30,000	0.004	0.004	0.004	0.004	0.004
Vit E 20,000	0.001	0.001	0.001	0.001	0.001
Copper Sulfate	0.008	0.008	0.008	0.008	0.008
Zn Oxide	0.008	0.008	0.008	0.008	0.008
Monocalcium Phosphate	0.96	0.83	0.55	0.0	0.0
Total	100%	100%	100%	100%	100%

Figure 2. Average weight per treatment per week

Results

Figure 3. Average Daily Gain

Figure 4. ADFI

Results

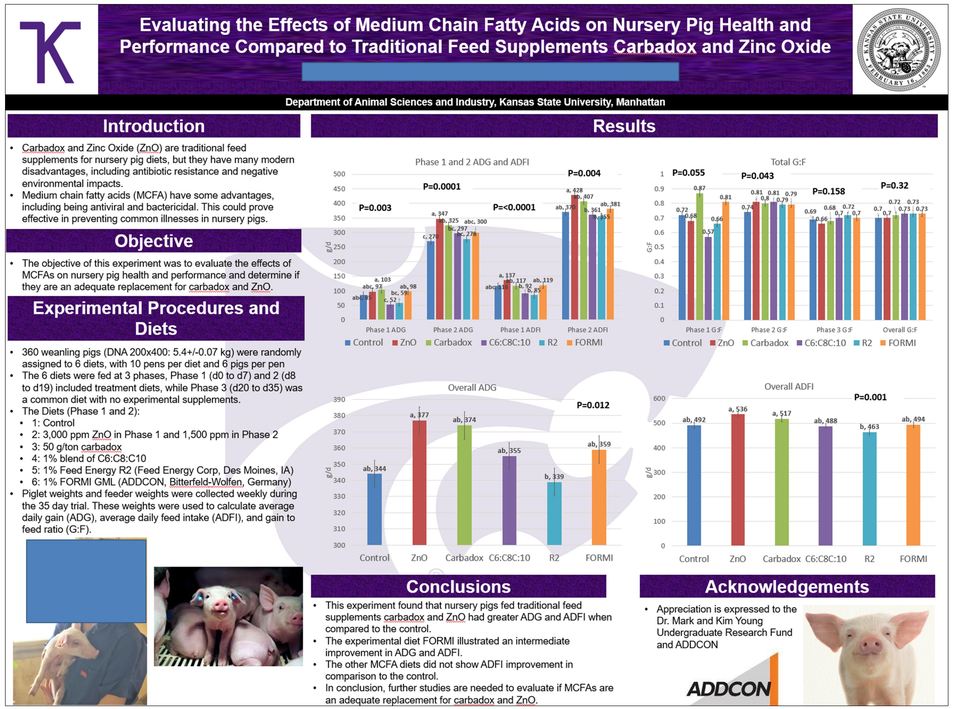
Figure 5. F:G

Conclusions

The linear P value of ADG was 0.444, ADFI was 0.371, and G: F was 0.442, and this concludes that there were no detectable difference among treatments for ADG, ADFI, and G: F (P>0.05). The feed cost per goat for this experiment for the SBM was $8.89, 100% DDGS/0% $7.06, 66% DDGS/33% CFG $7.26, 33% DDGS/66% CFG $7.54, and 0% DDGS/100% CFG was $7.80. Feed cost per pound of gain for each treatment groups are as followed: SBM $0.77, 100% DDGS/0% CFG $0.74, 66% DDGS/33% CFG $0.79, 33% DDGS/66% CFG $0.81, and 0% DDGS/100% CFG $0.86. The feed cost per pound of feed for the control was $0.11, and for treatments 1,2,3, and 4 it was $0.09. This project concludes that DDGS and CGF can utilized as replacements for SBM in grower rations for Boer goats.

Acknowledgements

- Dr. Mark and Kim Young undergrad research fund
- Kansas Corn Commission



Evaluating the Effects of Medium Chain Fatty Acids on Nursery Pig Health and Performance Compared to Traditional Feed Supplements Carbadox and Zinc Oxide

Department of Animal Sciences and Industry, Kansas State University, Manhattan

Introduction

- Carbadox and Zinc Oxide (ZnO) are traditional feed supplements for nursery pig diets, but they have many modern disadvantages, including antibiotic resistance and negative environmental impacts.
- Medium chain fatty acids (MCFA) have some advantages, including being antiviral and bactericidal. This could prove effective in preventing common illnesses in nursery pigs.

Objective

- The objective of this experiment was to evaluate the effects of MCFAs on nursery pig health and performance and determine if they are an adequate replacement for carbadox and ZnO.

Experimental Procedures and Diets

- 360 weanling pigs (DNA 200x400; 5.4+/-0.07 kg) were randomly assigned to 6 diets, with 10 pens per diet and 6 pigs per pen
- The 6 diets were fed at 3 phases, Phase 1 (d0 to d7) and 2 (d8 to d19) included treatment diets, while Phase 3 (d20 to d35) was a common diet with no experimental supplements.
- The Diets (Phase 1 and 2):
  - 1: Control
  - 2: 3,000 ppm ZnO in Phase 1 and 1,500 ppm in Phase 2
  - 3: 50 g/ton carbadox
  - 4: 1% blend of C6:C8:C10
  - 5: 1% Feed Energy R2 (Feed Energy Corp, Des Moines, IA)
  - 6: 1% FORMI GML (ADDCON, Bitterfeld-Wolfen, Germany)
- Piglet weights and feeder weights were collected weekly during the 35 day trial. These weights were used to calculate average daily gain (ADG), average daily feed intake (ADFI), and gain to feed ratio (G:F).

Results

Conclusions

- This experiment found that nursery pigs fed traditional feed supplements carbadox and ZnO had greater ADG and ADFI when compared to the control.
- The experimental diet FORMI illustrated an intermediate improvement in ADG and ADFI.
- The other MCFA diets did not show ADFI improvement in comparison to the control.
- In conclusion, further studies are needed to evaluate if MCFAs are an adequate replacement for carbadox and ZnO.

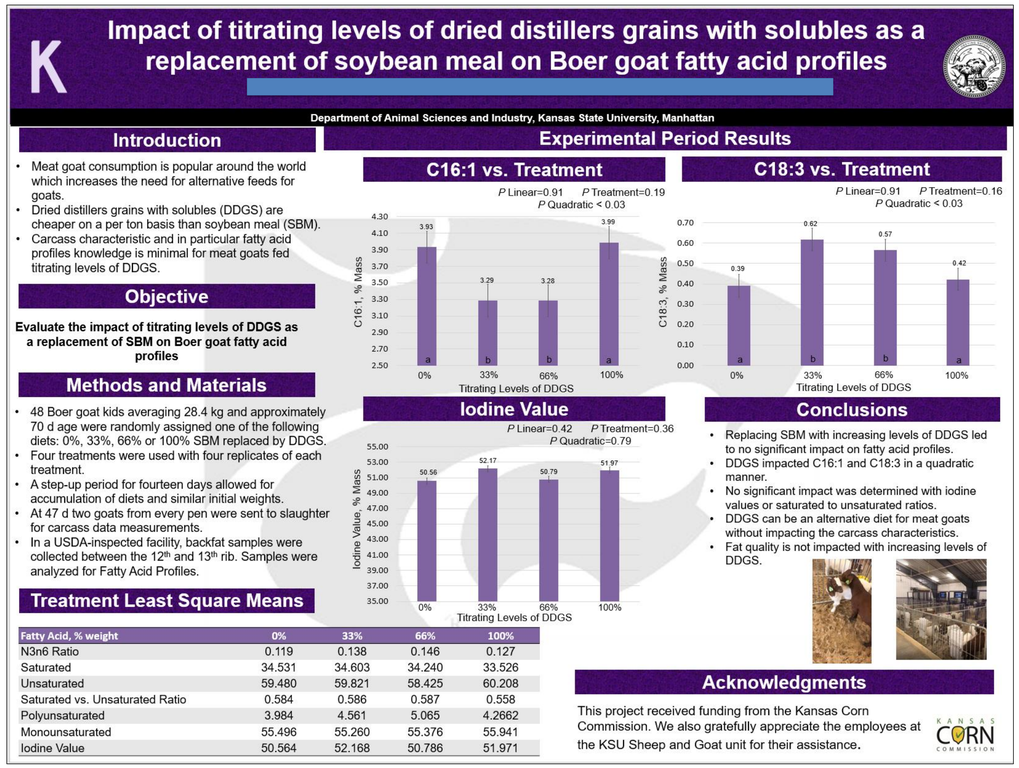
Acknowledgements

- Appreciation is expressed to the Dr. Mark and Kim Young Undergraduate Research Fund and ADDCON

ADDCON

Recommendations

- Data
  - The tradeoff:
    - Charts = easier to understand/interpret
    - Tables = more efficient use of space to convey information
  - Include *P*-values, SEM bars, axis labels, units
  - Less is more. Focus on what is most important.



Impact of titrating levels of dried distillers grains with solubles as a replacement of soybean meal on Boer goat fatty acid profiles

Department of Animal Sciences and Industry, Kansas State University, Manhattan

Introduction

- Meat goat consumption is popular around the world which increases the need for alternative feeds for goats.
- Dried distillers grains with solubles (DDGS) are cheaper on a per ton basis than soybean meal (SBM).
- Carcass characteristic and in particular fatty acid profiles knowledge is minimal for meat goats fed titrating levels of DDGS.

Objective

Evaluate the impact of titrating levels of DDGS as a replacement of SBM on Boer goat fatty acid profiles

Methods and Materials

- 48 Boer goat kids averaging 28.4 kg and approximately 70 d age were randomly assigned one of the following diets: 0%, 33%, 66% or 100% SBM replaced by DDGS.
- Four treatments were used with four replicates of each treatment.
- A step-up period for fourteen days allowed for accumulation of diets and similar initial weights.
- At 47 d two goats from every pen were sent to slaughter for carcass data measurements.
- In a USDA-inspected facility, backfat samples were collected between the 12th and 13th rib. Samples were analyzed for Fatty Acid Profiles.

Treatment Least Square Means

Fatty Acid, % weight	0%	33%	66%	100%
N3n6 Ratio	0.119	0.138	0.146	0.127
Saturated	34.531	34.603	34.240	33.526
Unsaturated	59.480	59.821	58.425	60.208
Saturated vs. Unsaturated Ratio	0.584	0.586	0.587	0.558
Polyunsaturated	3.984	4.561	5.065	4.2662
Monounsaturated	55.496	55.260	55.376	55.941
Iodine Value	50.564	52.168	50.786	51.971

Experimental Period Results

C16:1 vs. Treatment

P Linear=0.91 *P* Treatment=0.19 *P* Quadratic < 0.03

C18:3 vs. Treatment

P Linear=0.91 *P* Treatment=0.16 *P* Quadratic < 0.03

Iodine Value

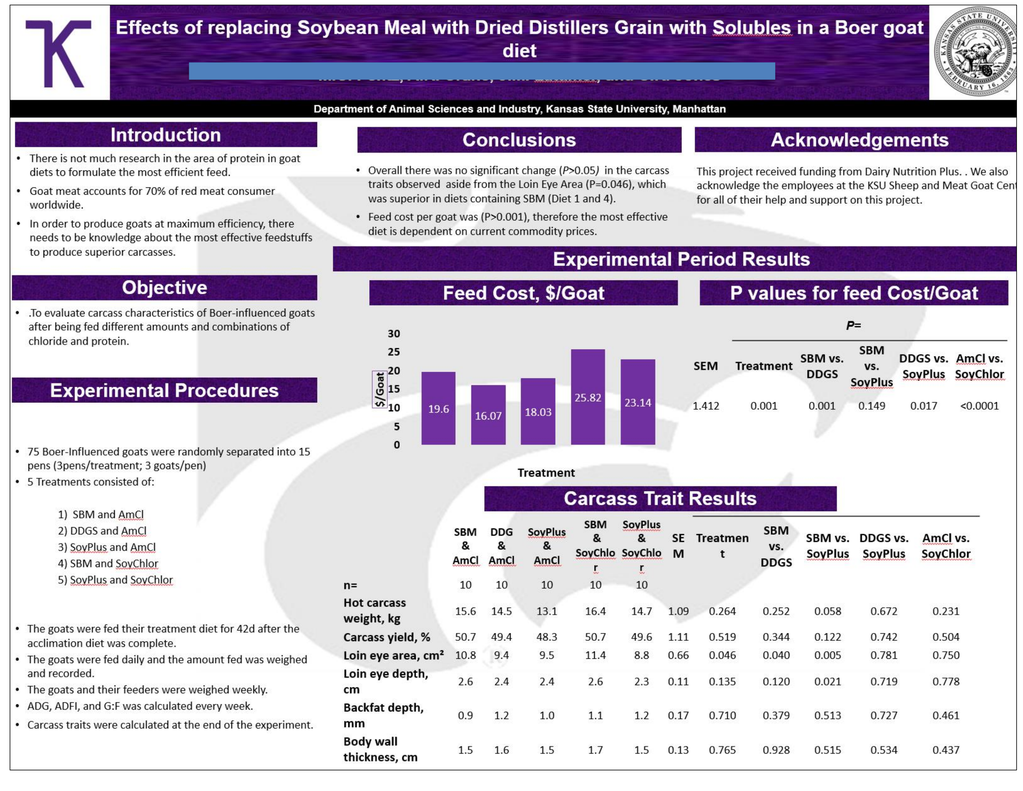
P Linear=0.42 *P* Treatment=0.36 *P* Quadratic=0.79

Conclusions

- Replacing SBM with increasing levels of DDGS led to no significant impact on fatty acid profiles.
- DDGS impacted C16:1 and C18:3 in a quadratic manner.
- No significant impact was determined with iodine values or saturated to unsaturated ratios.
- DDGS can be an alternative diet for meat goats without impacting the carcass characteristics.
- Fat quality is not impacted with increasing levels of DDGS.

Acknowledgments

This project received funding from the Kansas Corn Commission. We also gratefully appreciate the employees at the KSU Sheep and Goat unit for their assistance.



Effects of replacing Soybean Meal with Dried Distillers Grain with Solubles in a Boer goat diet

[redacted]

Department of Animal Sciences and Industry, Kansas State University, Manhattan

Introduction

- There is not much research in the area of protein in goat diets to formulate the most efficient feed.
- Goat meat accounts for 70% of red meat consumer worldwide.
- In order to produce goats at maximum efficiency, there needs to be knowledge about the most effective feedstuffs to produce superior carcasses.

Objective

- .To evaluate carcass characteristics of Boer-influenced goats after being fed different amounts and combinations of chloride and protein.

Experimental Procedures

- 75 Boer-Influenced goats were randomly separated into 15 pens (3pens/treatment; 3 goats/pen)
- 5 Treatments consisted of:

  1) SBM and AmCl
  2) DDGS and AmCl
  3) SoyPlus and AmCl
  4) SBM and SoyChlor
  5) SoyPlus and SoyChlor

- The goats were fed their treatment diet for 42d after the acclimation diet was complete.
- The goats were fed daily and the amount fed was weighed and recorded.
- The goats and their feeders were weighed weekly.
- ADG, ADFI, and G:F was calculated every week.
- Carcass traits were calculated at the end of the experiment.

Conclusions

- Overall there was no significant change (*P*>0.05) in the carcass traits observed aside from the Loin Eye Area (P=0.046), which was superior in diets containing SBM (Diet 1 and 4).
- Feed cost per goat was (P>0.001), therefore the most effective diet is dependent on current commodity prices.

Acknowledgements

This project received funding from Dairy Nutrition Plus. . We also acknowledge the employees at the KSU Sheep and Meat Goat Cen for all of their help and support on this project.

Experimental Period Results

Feed Cost, $/Goat

P values for feed Cost/Goat

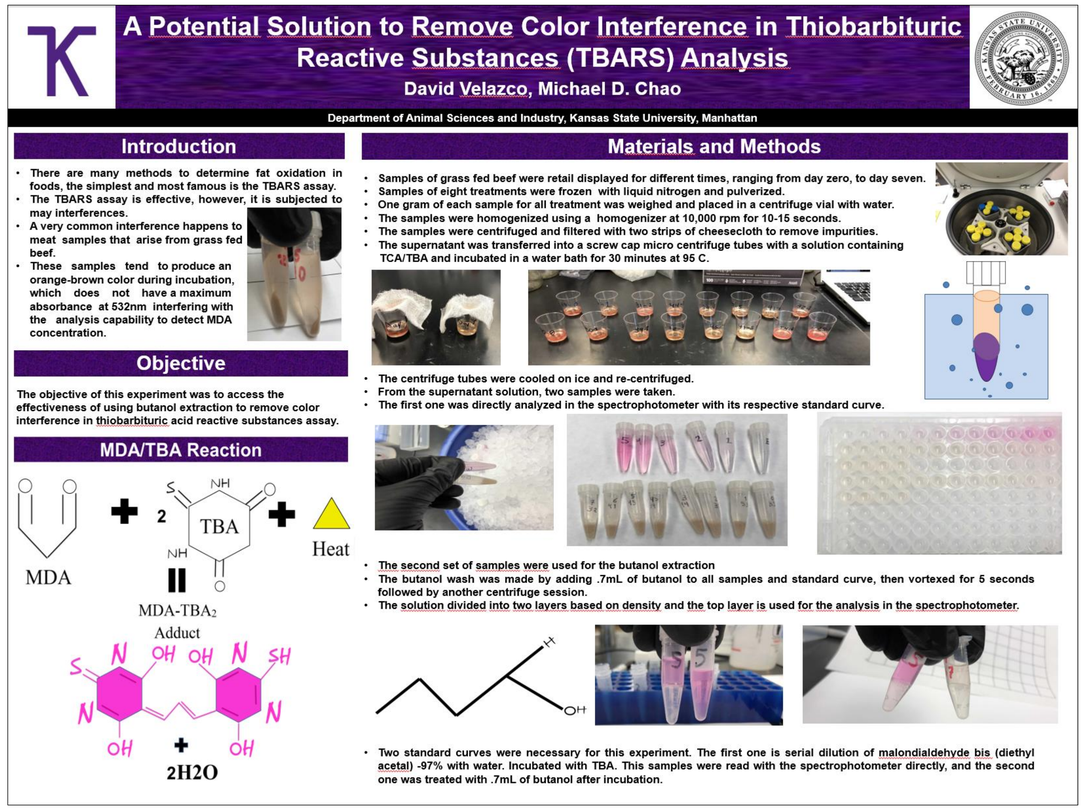
		P=			
SEM	Treatment	SBM vs. DDGS	SBM vs. SoyPlus	DDGS vs. SoyPlus	AmCl vs. SoyChlor
1.412	0.001	0.001	0.149	0.017	<0.0001

Carcass Trait Results

	SBM & AmCl	DDG & AmCl	SoyPlus & AmCl	SBM & SoyChlor	SoyPlus & SoyChlor	SEM	Treatment	SBM vs. DDGS	SBM vs. SoyPlus	DDGS vs. SoyPlus	AmCl vs. SoyChlor
n=	10	10	10	10	10						
Hot carcass weight, kg	15.6	14.5	13.1	16.4	14.7	1.09	0.264	0.252	0.058	0.672	0.231
Carcass yield, %	50.7	49.4	48.3	50.7	49.6	1.11	0.519	0.344	0.122	0.742	0.504
Loin eye area, cm²	10.8	9.4	9.5	11.4	8.8	0.66	0.046	0.040	0.005	0.781	0.750
Loin eye depth, cm	2.6	2.4	2.4	2.6	2.3	0.11	0.135	0.120	0.021	0.719	0.778
Backfat depth, mm	0.9	1.2	1.0	1.1	1.2	0.17	0.710	0.379	0.513	0.727	0.461
Body wall thickness, cm	1.5	1.6	1.5	1.7	1.5	0.13	0.765	0.928	0.515	0.534	0.437

Recommendations

- Pictures
  - High resolution
    - Increase to 100% on screen to ensure they are not pixelated
  - Relevant, clear, useful



A Potential Solution to Remove Color Interference in Thiobarbituric Reactive Substances (TBARS) Analysis

David Velazco, Michael D. Chao

Department of Animal Sciences and Industry, Kansas State University, Manhattan

Introduction

- There are many methods to determine fat oxidation in foods, the simplest and most famous is the TBARS assay.
- The TBARS assay is effective, however, it is subjected to may interferences.
- A very common interference happens to meat samples that arise from grass fed beef.
- These samples tend to produce an orange-brown color during incubation, which does not have a maximum absorbance at 532nm interfering with the analysis capability to detect MDA concentration.

Objective

The objective of this experiment was to access the effectiveness of using butanol extraction to remove color interference in thiobarbituric acid reactive substances assay.

MDA/TBA Reaction

MDA + 2 TBA + Heat → $MDA\text{-}TBA_2$ Adduct + $2H_2O$

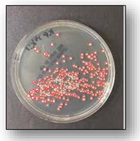
Materials and Methods

- Samples of grass fed beef were retail displayed for different times, ranging from day zero, to day seven.
- Samples of eight treatments were frozen with liquid nitrogen and pulverized.
- One gram of each sample for all treatment was weighed and placed in a centrifuge vial with water.
- The samples were homogenized using a homogenizer at 10,000 rpm for 10-15 seconds.
- The samples were centrifuged and filtered with two strips of cheesecloth to remove impurities.
- The supernatant was transferred into a screw cap micro centrifuge tubes with a solution containing TCA/TBA and incubated in a water bath for 30 minutes at 95 C.

- The centrifuge tubes were cooled on ice and re-centrifuged.
- From the supernatant solution, two samples were taken.
- The first one was directly analyzed in the spectrophotometer with its respective standard curve.

- The second set of samples were used for the butanol extraction
- The butanol wash was made by adding .7mL of butanol to all samples and standard curve, then vortexed for 5 seconds followed by another centrifuge session.
- The solution divided into two layers based on density and the top layer is used for the analysis in the spectrophotometer.

- Two standard curves were necessary for this experiment. The first one is serial dilution of malondialdehyde bis (diethyl acetal) -97% with water. Incubated with TBA. This samples were read with the spectrophotometer directly, and the second one was treated with .7mL of butanol after incubation.



The Good, the Bad, and the Ugly

Evaluating the efficacy of Medium Chain Fatty Acids as an Antibiotic Replacement for Zinc Oxide and Carbadox in Nursery Pig Diets

C.J. Comstock, A.B. Lerner, C.K. Jones

Department of Animal Sciences and Industry, Kansas State University, Manhattan

Introduction

- Increased regulatory and consumer pressure on the agricultural industry to limit use of antibiotics in livestock species has forced industry professionals to look for alternative options for nursery pig diets.
- One of these alternatives is the use of Medium Chain Fatty Acids (MCFA).
- With limited research on the efficacy of MCFA diets, this study focused on assessing the ability of MCFAs to replace traditionally used Zinc Oxide (ZnO) and carbadox concentrations in weaned pig diets, while maintaining growth and feed intake.

Objective

- To evaluate the efficacy of MCFAs as an effective alternative for traditionally used antibiotics ZnO and carbadox.

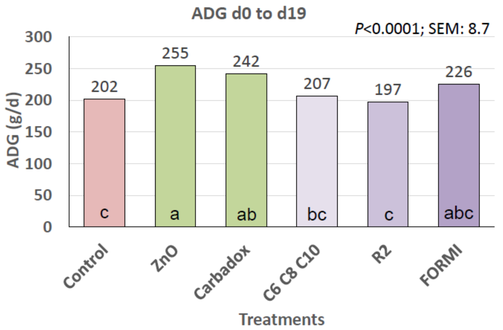
Experimental Design

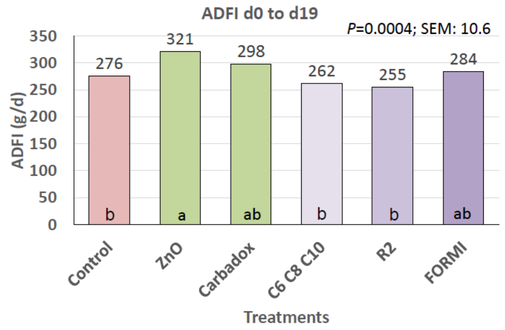
- 360 weaned pigs (DNA 200 x 400; 5.4±kg) were allotted to each experimental unit (pen) and placed on one of six treatment diets.
- Six pigs per pen were used to form total of 10 replicates per treatment in a completely randomized block design.
- Treatments were fed in 3 phases, with phase 1 being d0 to d7, phase 2 being d8 to d 19 and a common phase fed from d 20 to 35.
- Treatments were as follows:
  - **Treatment 1- Control**
  - **Treatment 2- Zinc Oxide**
  - **Treatment 3- 50g/ton carbadox**
  - **Treatment 4- 1% C6:C8:C10**
  - **Treatment 5- 1% Feed Energy R2 (Feed Energy Corp., Des Moines , IA)**
  - **Treatment 6- 1% FORMI GML (ADDCON, Bitterfeld-Wolfen, Germany)**

Materials and Methods

- Individual pig and feeder weights were collected on a weekly basis.
- All data was analyzed using the PROC GLIMMIX procedure of SAS (SAS Inst., Cary, NC).

Results





d0 to d35	Control	ZnO	Carbadox	C6:C8:C10	R2	FORMI	SEM	*P*=
ADG	344^{ab}	377^{a}	374^{ab}	355^{ab}	339^{b}	359^{ab}	8.5	0.0012
ADFI	492^{ab}	536^{a}	517^{a}	488^{ab}	463^{b}	494^{ab}	11.5	0.001
G:F	0.70	0.70	0.72	0.73	0.73	0.73	0.012	0.32

Conclusion

- Pigs that were fed ZnO and carbadox during phase 1 and 2 performed significantly better than those on control and R2 diets for treatment period (d0 to d19) ADG.
- For overall(d0 to D35) study, pigs fed ZnO performed significantly better than those fed R2, with all other diets being intermediate.
- Pigs fed the FORMI diet were not significantly different in their ADG or ADFI from Zno or Carbadox for the treatment (d0 to d19) or overall (d0 to d35) periods.
- G:F did not change significantly regardless of treatment.

Future Directions

- The results of this study warrant further research to be conducted on the effects of MCFA as a replacement for antibiotics in nursery pig diets.

Acknowledgements

- Thank you to the Dr. Mark and Kim Young Undergraduate Research Fund and ADDCON (Bitterfeld-Wolfen, Germany) for their financial support on this research project.

KANSAS STATE UNIVERSITY

The Good, the Bad, and the Ugly

Effects of feeding medium chain fatty acids (MCFA) as a replacement to ZnO or carbadox

J.M. Lawrence, A.B. Lerner, and C.K. Jones

Department of Animal Sciences and Industry, Kansas State University, Manhattan

Introduction

Due to high demands from consumers to limit antimicrobial usage in nursery pig diets, pork producers are seeking replacements that improve growth performance. Some currently used antimicrobials include ZnO and carbadox. However, each have their own disadvantages. ZnO can lead to subsequent ground contamination of Zn in soil while carbadox residue has been found to carcinogenic. Literature suggests a possible replacement could be medium chain fatty acids (MCFA). However very few studies exist that compare MCFA to Zno or carbadox.

Objective

- The objective of this experiment was to evaluate the ability of MCFA to replace ZnO and carbadox in nursery pig diets.

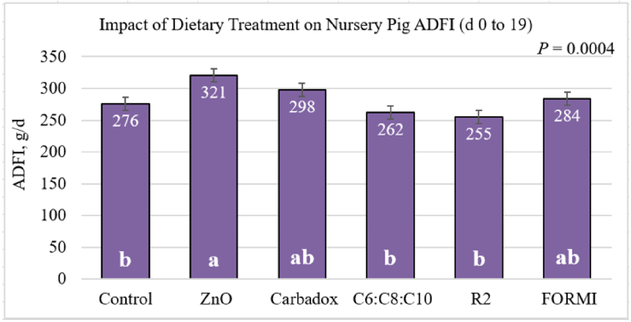
Experimental Procedures

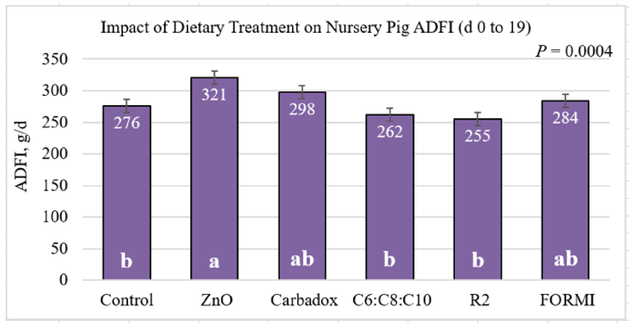
- 360 nursery pigs (DNA 200x400;5.4+/-0.06kg;) were used in a 35-d growth experiment.
- There were 6 pigs/pen and 10 pens/treatment
- Pigs allotted to pens based on randomized design to 1 of 6 dietary treatments.
- Fed in two phases from weaning to d 19 of the experiment and a common phase 3 diet fed from d 20 to 35.
- Feeder, pig, and fecal data were collected weekly
- Blood Samples taken d 0, 7, 21 and 35.
- Data analyzed using PROC GLIMMEX (SAS version 9.4; Cary NC).

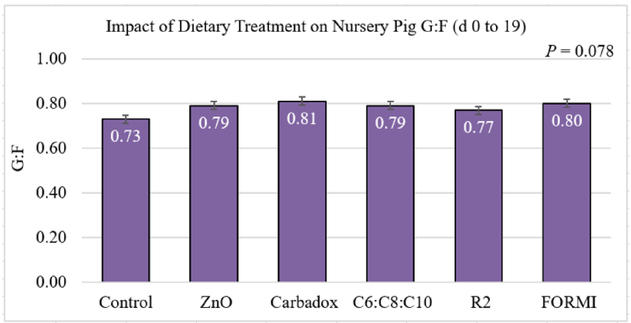
Experimental Diets

1. Negative Control
2. ZnO (3,000 ppm in phase1 and 1,500 ppm in phase 2)
3. Carbadox (50 g/ton)
4. MCFA (1% C6:C8:C10 (MCFA blend)
5. MCFA (1% R2 (Feed Energy, City, IA)
6. MCFA (1% FORMI GML (ADDCON; Bitterfeld-Wolfen, Germany)

Results







Conclusions

- During the treatment period, pigs fed ZnO or carbadox had grater ADG than those fed the control or R2 diets.
- For pigs fed ZnO compared to pigs fed the negative control ADFI was improved with little impact on G:F.
- It can be concluded that ZnO and carbadox improved weanling growth and feed intake while MCFA were variable in performance.
- Therefore, more research is needed on MCFA as a possible replacement to ZnO or other antimicrobials.

KANSAS STATE UNIVERSITY

The Good, the Bad, and the Ugly

Effects of medium-chain fatty acid diets on nursery pig performance

Department of Animal Sciences and Industry, Kansas State University, Manhattan

Introduction

- Carbadox and Zinc oxide are common feed additives in nursery pig diets that improve growth performance.
- Pressure is increasing to replace carbadox and ZnO due to disadvantages including building antibiotic resistance and environment pollution respectively
- MCFA have shown promise as a feed additive that improved performance without the drawbacks of carbadox and ZnO.

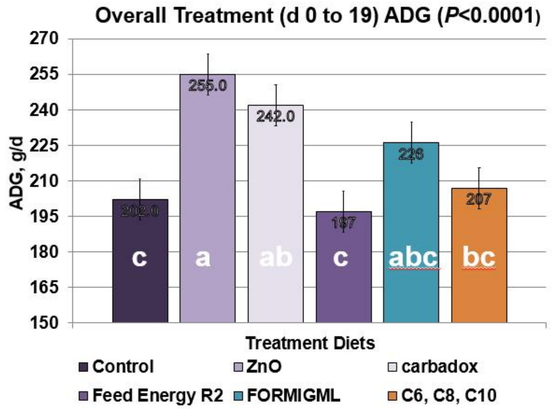
Objective

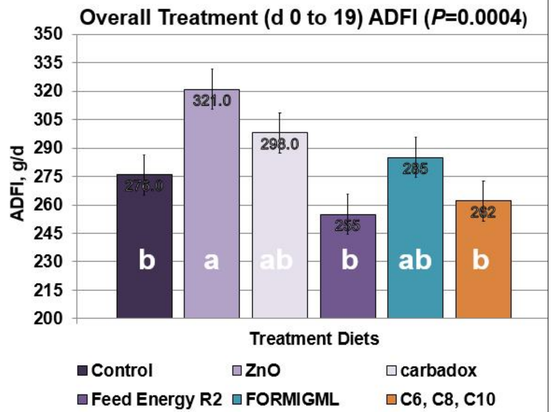
- To evaluate the effects of MCFA on nursery pig performance.

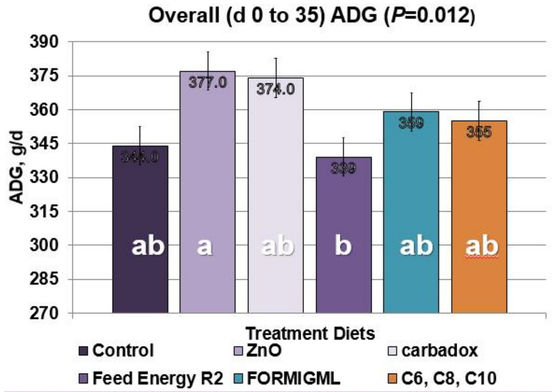
Experimental Procedures

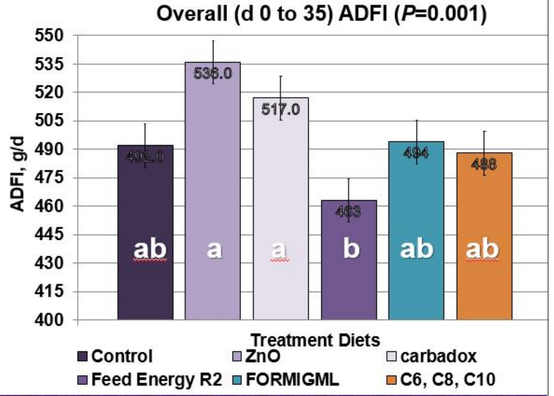
- A study at the KSU Swine Unit used 360 weanling pigs (DNA 200 x 400; 5.4 ± 0.2 kg).
- Treatments
  - 1) Control
  - 2) ZnO 3,000 ppm in Phase 1 and 1,500 ppm in Phase 2
  - 3) carbadox 50 g/ton
  - 4) 1% Feed Energy R2 (Feed Energy Corp., Des Moines, IA)
  - 5) 1% FORMI GML (ADDCON, Bitterfeld-Wolfen, Germany) 6) 1% C6, C8, C10
- The treatments were tested for 35 days with treatment diets being fed from d 0 to 19 and d 20 to 35 being a common phase.
- 10 replicates/treatment and 6 pigs/pen in a completely randomized design.
- Pens were the experimental unit.
- Alpha-value was set at α<.05.
- Weekly recordings were collected of pig weights and feed disappearance.
- Statistics were ran using SAS GLIMIX procedure with data considered significant if $P < 0.05$.
- Regarding the abc on the results, those that do not share a common letter differ $P < 0.05$.
- Appreciation is expressed to Dr. Mark and Kim Young Undergraduate Research Fund and ADDCON.

Results









Conclusions

- Carbadox and ZnO resulted in the greatest nursery pig performance.
- Diets containing MCFA improved pig performance.
- MCFA show promise as a feed additive that can replace carbadox and ZnO

KANSAS STATE UNIVERSITY

The Good, the Bad, and the Ugly

Effect of products containing medium chain fatty acids (MCFA) compared to zinc oxide (ZnO) or carbadox in improving nursery pig performance

[redacted]

Department of Animal Sciences and Industry
College of Agriculture, Kansas State University, Manhattan, KS 66506, USA

Introduction

- Pig producers have been looking for alternatives to antibiotics or feed-based additives, including ZnO and carbadox, to enhance nursery pig performance.
- ZnO, while it consistently increases performance, has the tendency to give excess Zn in the manure, which causes environmental pollution.
- Carbadox, while it also has been proven to increase performance, there is antibiotic resistance associated with it, which decreases efficiency.
- Feed products containing medium chain fatty acids (MCFA) have been said to be possible substitutes for these additives.

Objective

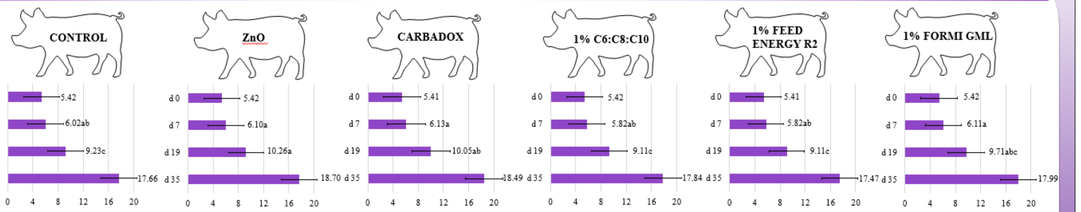
To evaluate whether 3 products containing medium chain fatty acids (MCFA) are able to replace ZnO or carbadox in improving nursery pig performance.

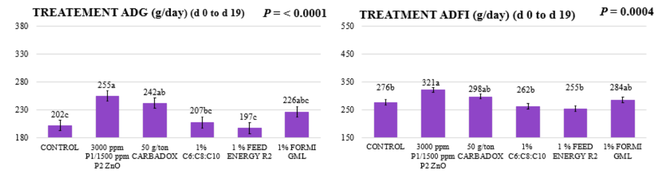
Materials and Methods

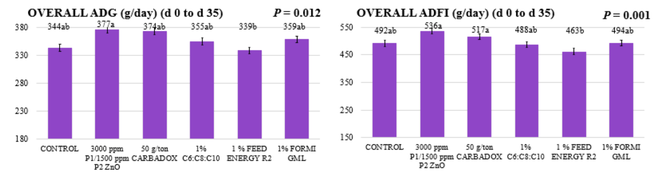
- **Subject:** 360 weanling pigs (DNA 200x400; 5.4 ± 0.07 kg)
- **Experimental Design:** Completely randomized design
- **Replicates:** 10 pens with 6 pigs/pen
- **Experiment Unit:** Growth - pen, Fecal - pig
- **Treatments:** Control, 50 g/ton carbadox, 3000 ppm/1500 ppm P2 ZnO, 1% blend of C6:C8:C10, 1% Feed Energy R2 (Feed Energy Corp., Des Moines, IA), 1% FORMI GML (ADDCON, Bittrfield-Wolfen, Germany)
- **Phases:** Treatment Phase 1 (d 0 to d 7), Treatment Phase 2 (d 14 to d 19), Control Phase (d 20 to d 35)
- **Data Collected (weekly):** Body weight, feeder weight, fecal
- **Data Analysis:** GLIMMIX PROC of Statistical Analysis System (SAS).

Results

BODY WEIGHT (kg)
d 0 *P* = 0.696
d 7 *P* = 0.003
d 19 *P* = < 0.0001
d 35 *P* = 0.06







Conclusions

- Pigs fed the ZnO treatment overall had the most efficient growth performance when looking at ADG, ADFI.
- Pigs fed the R2 treatment overall had the least efficient growth performance due to reduced palatability.
- There was no significant difference found looking at G:F.
- ZnO and carbadox both have possible negative consequences, but in overall growth performance in nursery pigs MCFA are not a sufficient substitute.
- Researching more about MCFA would help increase efficiency and make them a greater possible substitute for ZnO or carbadox.

Acknowledgments

Thanks to the Dr. Mark and Kim Young Undergraduate Research Fund and ADDCON for their contribution to this project.

KANSAS STATE UNIVERSITY

The Good, the Bad, and the Ugly

Evaluating alternatives to zinc oxide and antibiotics in nursery pig diets

Department of Animal Sciences and Industry, Kansas State University, Manhattan KS

Introduction

- Carbadox and ZnO are used therapeutically to control swine dysentery and post-weaning diarrhea associated with ***E. coli***. These two products are used to improve growth and feed efficiency.
- Disadvantages of these two products include antimicrobial resistance with carbadox and Zn accumulation in the soil with high concentrated use of ZnO.
- Medium chain fatty acids (MCFA) could be a solution to these concerns.

Objective

The objective of this study was to test the results of medium chain fatty acids on growth and feed efficiency in weanling pigs when compared to carbadox and ZnO.

Experimental Procedures

- **Preparatory:** This 35 day study was conducted using 360 weanling pigs (DNA 200×400; 5.4±0.07 kg BW; 21 days old) to evaluate the effects of substituting (MCFA) for carbadox and ZnO.
- **Design structure:** Pig were allotted to pens in a completely randomized design with 6 pigs to a pen and 10 pens per treatment. The experimental unit was the individual pens.
  - This experiment was conducted in three individual phases: Phase 1 was conducted from day 0 to day 7, Phase 2 from day 7 to 19 and Phase 3 from day 19 to 35.
- **Date collection:** At each phase change pigs and feeders were individually weighed to record ADG, ADGI, and the F:G ratio.
  - Treatment diets were fed for 19 days, then pigs were changed to a common diet from day 19 to 35.
- **Data was analyzed using:** Statistical Analysis System (SAS version 9.4 Cary, NC)

Figure 1: Highlighted Phase operations

Phase 1
- Allot pigs to pens, add medicated feed, record data
- Pigs become adjusted to the new location and are fed a pelleted mix to increase consumption

Phase 2
- Weigh pigs and medicated feeders, record data
- Pigs feed changes from pellets to meal

Phase 3
- Weigh pigs and feeders, record data
- Treatment diets were removed and pigs were fed a common corn based diet

Experimental Diets

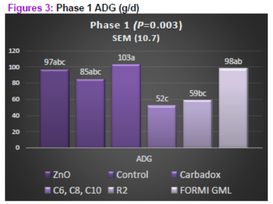
ZnO	• 3,000 ppm Phase 1 • 1,500 ppm Phase 2
Negative Control	• No additives
Carbadox	• 50 g/ton • Mecadox
C6, C8, C10	• 1% Sigma blend • PMI Nutritional Products
Start R2	• 1% • Feed Energy Corp., Des Moines, IA
FORMI GML	• 1% • ADDCON, Bitterfeld-Wolfen, Germany

Figure 2: Treatment Feed Diets

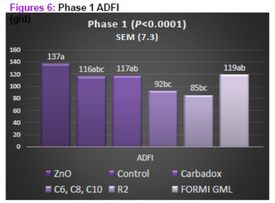
Results

(P<0.05)

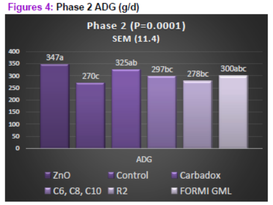
Figures 3: Phase 1 ADG (g/d)



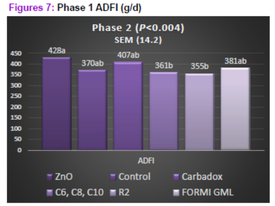
Figures 6: Phase 1 ADFI (g/d)



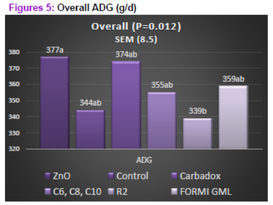
Figures 4: Phase 2 ADG (g/d)



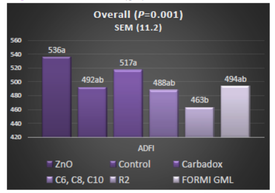
Figures 7: Phase 1 ADFI (g/d)



Figures 5: Overall ADG (g/d)



Figures 8: Overall ADFI (g/d)



Discussion

Table 1 Interpretation:

- In Phase 1 (d 0 to 7) ADG and ADFI had a greater significant difference (*P*<0.05) between carbadox, C6:C8:C10, and R2.
- Phase 2 (d 7 to 19) observed a significant difference (*P*<0.0001) in ADG with ZnO and FORMI GML having greater ADG than other treatments.
- Overall (d 0 to 35) pigs fed ZnO or carbadox had greater (*P*<0.012) ADG than those fed the control or R2 diets, pigs fed the C6:C8:C10 blend or FORMI had similar (*P*>0.012) ADG as those fed carbadox.
- There proved to be no significant difference (*P*<0.05) in ADG and ADFI in Phase 1, Phase 2, and Overall between ZnO, Carbadox and FORMI GML.

Conclusions

- ZnO and carbadox continue to be good options for producers wanting to maximize growth performance in early weaning.
- During the common period, pigs fed ZnO continued to have greater (P<0.05) ADG than those fed R2, with other treatments being intermediate.
- The MCFA-based products had variable performances throughout the experiment.
- 1% FORMI GML did not have significantly different (*P*<0.05) results in ADG and ADFI in Phase 1, Phase 2 and in the overall treatment period.

Future Directions

- The results of this study suggest that although the MCFA did not improve weanling pig growth over ZnO and Carbadox, 1% FORMI GML may be a promising alternative.
- Additional research regarding concentrations of MCFA is warranted to effectively replace ZnO or antibiotics in pork production.

Appreciation is expressed to: Dr. Mark and Kim Young Undergraduate Research Fund and ADDCON.

Figure 10: Me with Theodor

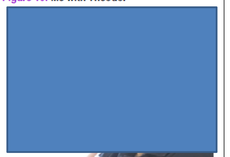


Figure 9: Weanling experimental pigs

KANSAS STATE UNIVERSITY

The Good, the Bad, and the Ugly

Evaluating alternatives to Zinc Oxide or antibiotics in nursery pig diets

[redacted]

Department of Animal Sciences and Industry,
College of Agriculture, Kansas State University, Manhattan, KS 66506, USA

Introduction

There has been an increase in consumer pressure to reduce the use of ZnO and antimicrobials in swine diets. There is limited research evaluating alternatives in nursery pig growth performance to replace antibiotics or ZnO.

Procedures and Methods

- Experiment Unit: Pens (6 pigs/pen/treatment)
- A total of 360 PIC 337 (DNA 200 X 400, initially 5.4 ± 0.06 kg BW) weanling pigs
- Treatments:
  - Negative control[1]
  - 3,000ppm ZnO phase 1; 1,500ppm ZnO phase 2
  - 50g/ton carbadox
  - 1% blend of C6:C8:C10
  - 1% feed energy R2 (Feed Energy Corp, Des Moines, IA)
  - 1% Formi GML (ADDCON, Bitterfeld-Wolfen, Germany).
- A common diet was implemented at d 20 through d 35.
- Routine: Pig weights, feeder weights, and feed added were taken weekly.
- Data Analysis: Data was collected and analyzed with Statistical Analysis System (SAS Version 9.4, Cary, NC) GLIMMIX program with significance at (*P*<0.05).

Results

Figure 1. Treatment period (d 0 to 35)

Overall (d 0 to 35)	ZnO	Control	50 g/ton Carbadox	1% C6:C8:C10	1% Feed Energy R2	1% FORMI GML	SEM	*P*=
ADG, g/d	377[a]	344[ab]	374[ab]	355[ab]	339[b]	359[ab]	8.5	0.012
ADFI, g/d	536[a]	492[ab]	517[a]	488[ab]	463[b]	494[ab]	11.5	0.001
G:F	0.70	0.70	0.72	0.73	0.73	0.73	0.012	0.32

Figure 2. ADG, treatment period d 0 to 19

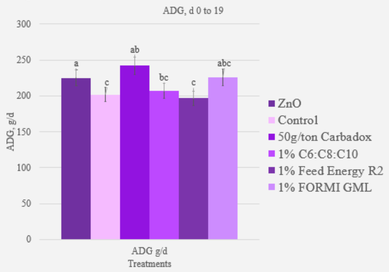
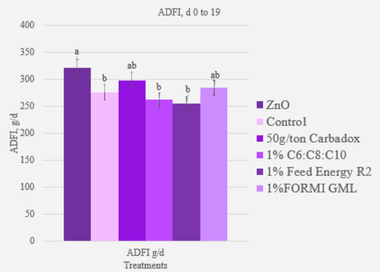
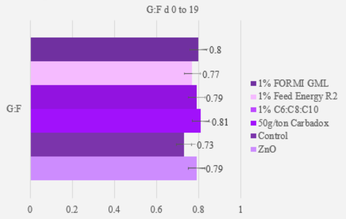


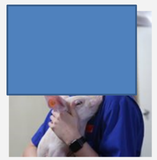
Figure 3. ADFI, treatment period d 0 to 19



[abc]Means within a row that do not share a common superscript differ *P* < 0.05.
[1]Control diet was formulated using 1% choice white grease.

Figure 4. G:F, treatment period 0 to 19





Objective

To evaluate the dietary effects of ZnO, Carbadox, and Medium Chain Fatty Acids (MCFA) on nursery pig performance.

Conclusions

- Pigs fed ZnO, carbadox, or 1% FORMI GML had greater ADG (*P*<0.0001).
- During the common diet phase there was no detected difference between the treatments for ADG (*P*=0.873), ADFI (*P*=0.089), and G:F (*P*=0.158).
- More research is required to determine whether MCFA-based products can replace ZnO or carbadox with little overall effect

Appreciation

Appreciation is expressed to Dr. Mark and Kim Young and ADDCON for financial support of this project.

The Good, the Bad, and the Ugly

An indirect Enzyme-Linked Immunosorbent Assay for Detecting Antibody Response in Pigs Infected by Emerging Porcine Seneca Valley Virus

Department of Diagnostic Medicine and Pathobiology, College of Veterinary Medicine, Kansas State University, Manhattan, KS 66506

INTRODUCTION

Seneca Valley virus (SVV), is a single-stranded non-enveloped RNA virus. SVV belongs to the genus Senecavirus, family Picornaviridae. Important members in the family also include poliovirus, rhinovirus, hepatitis A virus, foot-and-mouth disease virus (FMDV) and swine vesicular disease virus (SVDV). Historically, the association of SVV with swine vesicular disease was speculative, since the virus had also been isolated from pigs without clinical symptoms, and experimentally inoculating pigs with SVV isolates were unable to reproduce the disease. Recently, multiple studies from Brazil, Canada, China and the US provided evidence that SVV is a potential causative agent of idiopathic vesicular disease (IVD) in pigs (Leme et al., 2015; Singh et al., 2012; Vannucci et al., 2015; Wu et al., 2016; Zhang et al., 2015). In some of those pigs tested as SVV positive, clinical signs of anorexia, lethargy, lameness, and vesicular lesions were observed. Gross lesions could be found on the oral mucosa, snout, nares, distal limbs, especially around the coronary bands (Singh et al., 2012). In addition, our previous study confirmed that SVV is the causative agent of IVD by experimentally infecting pigs with SVV recovered from a full-length cDNA clone. The clinical presentations of SVV resemble those caused by other economically more devastating transboundary pathogens that caused vesicular disease, including vesicular exanthema of swine virus (VESV), FMDV (**Figure 1**), and SVDV, which may lead to foreign animal disease investigations. Due to the clinical resemblance of SVV to the more pathogenic FMDV and SVDV, a serological test is required for diagnosis and differentiation. In addition, early identification of the cause of the lesions will help decrease the spread of the pathogenic SVV.

SVV infection

FMDV infection

Figure 1. Surface lesions observed on SVV infected piglets (left panel) and FMDV infected piglets (right panel). The left panel was adapted from Chen Z., et al., 2016, and the right panel was adapted from the Texas A&M College of Veterinary Medicine. (http://www.cvm.tamu.edu/fadr/Disease.aspx?DID=2700)

OBJECTIVES

1. To produce recombinant SVV VP2 protein as an antigen for use in diagnostic assay development
2. To develop an SVV VP2-based indirect ELISA

ACKNOWLEDGEMENTS

This study is supported by a research start up fund from College of Veterinary Medicine and OURCI Research Grant from Office of Undergraduate Research & Creative Inquiry.

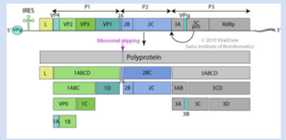


Figure 2. Schematic diagram of the full-length SVV genome and viral protein expression strategies (http://viralzone.expasy.org/697).

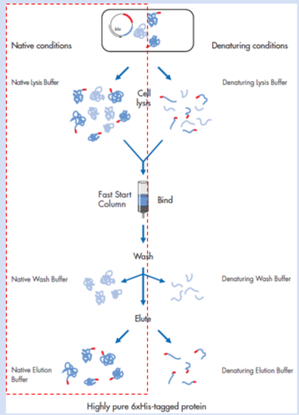


Figure 4. The schematic of purification strategy for 6His-tagged VP2 fusion protein using Ni-NTA beads from QIAGEN. Briefly, after induction with 0.1 mM IPTG overnight, bacterial cells were harvested and lysed with native lysis buffer supplemented with lysozyme followed by sonication. The soluble expressed VP2 fusion protein in native buffer was bind to Ni-NTA beads through 6His-tag. The nonspecific binding proteins were washed away with native wash buffers containing low concentrations (20, 50, 80 mM) of imidazole. Finally, the VP2 fusion protein was eluted with native elution buffer containing 250 mM imidazole.

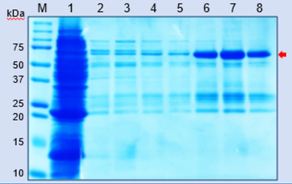
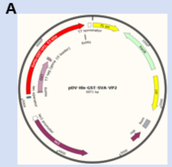


Figure 5. Detection of purified VP2 fusion protein by SDS-PAGE electrophoresis followed with coomassie blue staining. M: Protein maker; 1: flow through; 2~5: wash buffer; 6~8: elution buffer (250 mM imidazole).



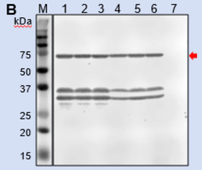
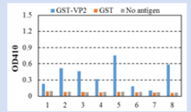
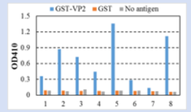


Figure 3. Expression of SVV VP2 protein as a fusion protein (6His-GST-VP2-6His) in *E coli*. A) The map of expression plasmid which expresses 6His-tag and GST fused VP2 protein (Generated with Snapgene software). B) Detection of VP2 fusion protein by western blot analysis using mAb against 6His-tag. Lane 1~3: protein expression was induced at RT with 0.1, 0.5, or 1.0 mM IPTG overnight, lane 4~6: protein expression was induced at 37 °C with 0.1, 0.5, or 1.0 mM IPTG for 4 hours, lane 7: no induction.

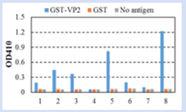


Coating antigen: 100 ng/well
Serum dilution: 1/20

Coating antigen: 100 ng/well
Serum dilution: 1/50



Coating antigen: 200 ng/well
Serum dilution: 1/20



Coating antigen: 200 ng/well
Serum dilution: 1/50

Figure 6. Indirect ELISA detecting swine IgG response to SVV in fusion samples collected from experimentally infected piglets. 1~5: serum samples collected from SVV infected piglets at 14 dpi or 21 dpi; 6 and 7: serum samples collected from SVV negative piglets; 8: mouse mAb against His-tag.

RESULTS AND DISCUSSION

- The recombinant SVV VP2 protein was expressed in *E coli*. and purified as a soluble protein. The specificity of the protein was confirmed by Western blot (Figure 3B) and the purity of the protein was determined by SDS-PAGE (Figure 5);
- The purified SVV VP2 protein was used as an antigen for indirect ELISA assay development. Specific IgG response was detected from piglets infected by SVV at 14 and 21 days post infection (Figure 6).
- Further validation of this ELISA is needed, including the determination of test cutoff value, diagnostic sensitivity and diagnostic specificity, as well as the comparison to that of FMDV specific ELISAs.
- Outcomes of this study provide additional tools to aid in SVV and FMDV epidemiological surveillance and outbreak investigation.

KANSAS STATE UNIVERSITY

The Good, the Bad, and the Ugly

Evaluating USDA quality grade influences on beef top sirloin cap (*bicep femoris*) with proximate analysis and consumer assessment

Department of Animal Sciences and Industry,
College of Agriculture, Kansas State University, Manhattan, KS 66506, USA

Introduction

Beef top sirloin cap, popularized in Brazilian cuisine known as "picanha", is lean and of a rich flavor but is not as renown in American dining culture. In the United States, despite its growing use, no published research exists for eating quality or palatability traits, nor has the impact of USDA quality grade on this cut been explored. Understanding palatability characteristics and impact of quality grade allows meat processors to better market this cut to optimize purchasing as well as eating quality among customers.

Objective

To evaluate the influences of four USDA quality grades of beef top sirloin cap (184D beef loin) on palatability traits with proximate analysis and consumer assessment.

Procedure

- **Experiment Unit:** Top sirloin Cap, IMPS #184D [1]
- **Treatments:** Prime, Top Choice, Low Choice, Select. Please refer to **Figure 1.** USDA Beef Grading Chart.
- **Fabrication:** Please refer to **Figure 2.** Fabrication.
- **Proximate Analysis:**
  Fat and moisture analysis, Warner-Bratzler Shear Force, and percentage of cook loss were conducted and calculated to quantify juiciness and tenderness.
- **Consumer Assessment:**
  Taste panels were held for consumer assessment (n=118). Juiciness, tenderness, flavor, and overall liking were rated on a scale from 0 to 100.
- **Data Analysis:** Data was collected and analyzed with Statistical Analysis System (SAS).

Methods

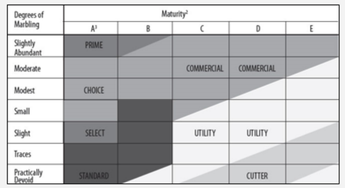


Figure 1. USDA Beef Grading Chart.

Figure 2. Fabrication.

Warner-Bratzler Shear Force

- Steaks were cooked and cooled overnight.
- Six round cores were obtained parallel to the longitudinal orientation of muscle fibers from each steak. Shearing action is therefore perpendicular to the longitudinal orientation of the muscle fibers.

Consumer Panels

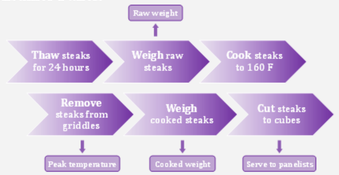


Figure 3. Consumer Panel Procedure and Data Collecting.

Results

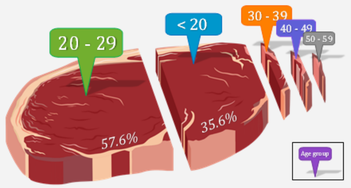


Figure 4. Age demographic characteristics of consumers.

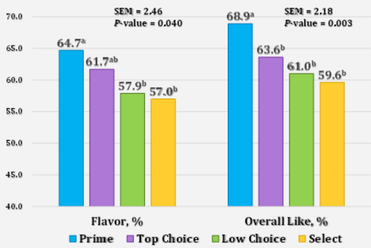


Figure 5. Consumer Ratings: Flavor and Overall Like.

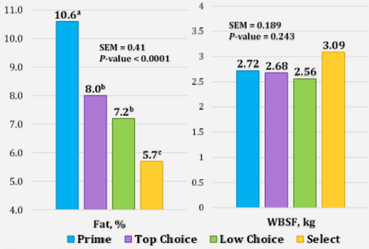


Figure 6. Proximate Analysis. Fat content (%) and Warner-Bratzler Shear Force (WBSF) (kg).

Conclusions

- Consumers in this study were able to detect the flavor differences but not the differences in juiciness or tenderness.
- USDA quality grades had the largest impact on the Overall Like and Fat profile of 184D Beef Loin.
- USDA Prime top sirloin cap can be sold with added value whereas Top Choice, Low Choice, and Select are of similar eating quality and should be sold on a weight basis.
- Consumers can acquire better knowledge of the indication of quality grades on beef top sirloin cap prior to making purchase decisions.

Future Directions

- Further studies are needed to examine consumer rating results of different local demographics.

References

[1] Bligh, E. G., & Dyer,W. J. (1959). A rapid method of total lipid extraction and purification. Canadian Journal of Biochemistry and Physiology, 37(8), 911–917.
[2] O'Quinn, T. G., Brooks, J. C., Polkinghorne, R. J., Garmyn, A. J., Johnson, B. J., Starkey, J. D., Miller, M. F. (2012). Consumer assessment of beef strip loin steaks of varying fat levels. Journal of Animal Science, 90(2), 626–634.
[3] Silva, D. R., Torres Filho, R. A., Cazedey, H. P., Fontes, P. R., Ramos, A. L., & Ramos, E. M. (2015). Comparison of Warner–Bratzler shear force values between round and square cross-section cores from cooked beef and pork Longissimus muscle. Meat Science, (103), 1-6.
[4] USDA. 1997. United States standards for grades of carcass beef. A. M. Service, ed. USDA, Washington, DC.
[5] USDA. 2014. Institutional Meat Purchase Specifications, 16.

Acknowledgements

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The Good, the Bad, and the Ugly

Identifying Beetle Species Using Machine Learning

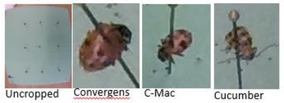
INTRO:

Machin learning Artificial Intelligence (AI) hold the potential to benefit farmers and the environment. Computer models can identify lady beetles in images, and, with more training, possibly determine their presence in crop fields. As predators, **lady beetles** could be a strong **indicator** of **aphid infestations**. Using this information and AI technology, farmers could simultaneously **reduce costs** and **environmental damage** by having the ability to identify an infested area and focus pesticide applications on a specified section rather than on an entire field,. Before we reach this point, we must determine whether AI or human identification is more reliable and efficient.

METHODS

1. **Developed images using GoPro HS5**
   a) Took pictures of pinned insects against colored backgrounds at various heights
   b) Cropped images down to individuals
2. **Human Test**
   a) Presented species Word doc for 45s
   b) Removed, then presented photos
   c) Subjects ID while being timed
3. **Computer Test using Neural Network**
   a) Adjusted parameters (image & kernel sizes and # of epochs)
   b) Linked to image folders & ran model

Compare accuracy and time results



Uncropped | Convergens | C-Mac | Cucumber Beetle

RESULTS

- Human Test Subjects proved to be **more accurate** by **4%**
- Computer Model was **18.5 fold faster**

Conclusion: With more research and training, the computer model has the potential to become more accurate and efficient at beetle species identification in images than humans.

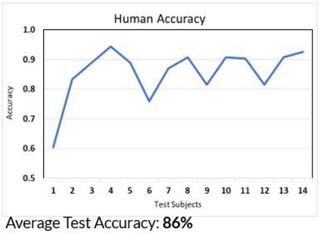
Artificial Intelligence can ID Beetles in images using Machine Learning

Hippodamia convergens (Convergens)
Photo by: Luis F. Aristizábal, University of Florida.

Coleomegilla maculate (C-Mac)
Photo by: Tom Murray, BugGuide

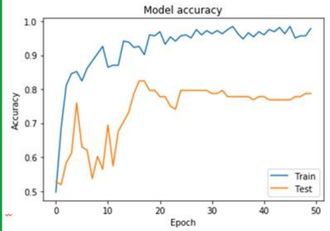
Diabrotica undecimpunctata (Cucumber Beetle)
Photo by: Dan Simon, Dan Simon Macophotography

Scan for video explanation of project!



Average Test Accuracy: **86%**
Average Time: **4 m 19 s**

***Note:** Test subject results ordered by experience to mimic model's "experience progression"(?) during training & testing.



Accuracy of Best Model: **82%**
Time of Best Model: **14 s**

	C-Mac	Convergens	Cucumber Beetle
C-Mac	**25**	13	4
Convergens	3	**30**	1
Cucumber Beetle	2	0	**30**

Confusion Matrix: describes which species the model confused & with what.
- Columns indicate what pictured specimen was, and rows are what the model identified it as.

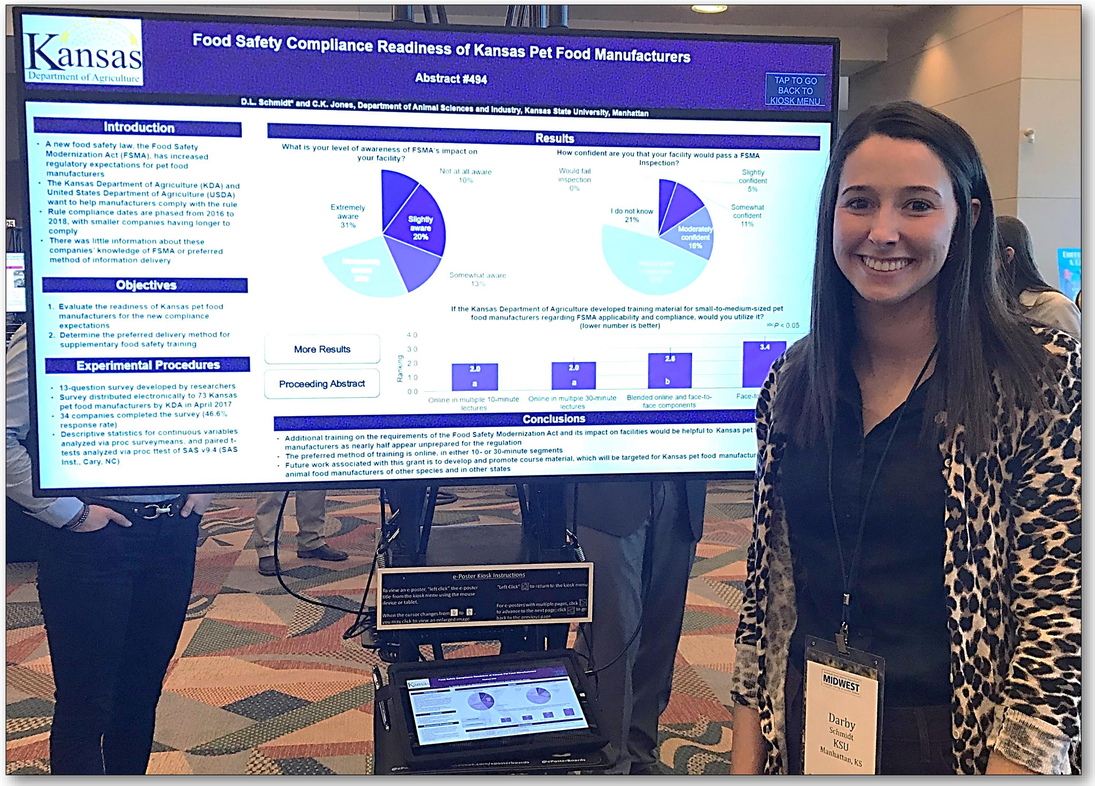
Samantha Whitten, Dr. Brian Spiesman, Dr. Brian McCornack

KANSAS STATE UNIVERSITY
Department of Plant Pathology

KANSAS STATE UNIVERSITY

ePosters - Start with the Format

- ePoster
  - 40.97” wide, 23.04” high (16:9 ratio) in landscape orientation
  - Font size 28 +
  - Metric units
  - Select “Loop Continuously until Esc”



Effects of ingredient composition of oral drenches in small piglets post-farrowing on average daily gain and pre-wean mortality

O. L. Harrison, S.K. Tauer, B. R. Frederick

Abstract

Introduction

Methods

Results

Conclusions

Abstract

Number of pigs born alive has been a key factor of the increasing efficiency of the U.S. swine industry. However, with increased pigs in the uterus, birth weight has been negatively impacted, with more small or at-risk pigs being born per litter. In order to overcome these changes, a study testing three commercial oral drenches against a control to determine which would increase average daily gain and decrease preweaning mortality. In a completely randomized design, 877 one-day-old suckling pigs from a high-health farm were selected for the experiment if they appeared to be in the bottom 20% of bodyweight compared to their contemporaries. Selected pigs were given one of four drenching treatments: 1) none (**control**), 2) bioactive proteins (**BP**), 3) high energy sugars (**HES**), and 4) immunoglobulins (**IgY**). Pigs were weighed on d 1 and d 19 of age (weaning), with mortality tracked during the suckling period. Data were analyzed using SAS v 9.4 (Cary, NC), with pig as the experimental unit and an accepted alpha of 0.05. Treatment had no detected effect on birth weight, weaning weight, ADG, or mortality (P = 0.79, 0.96, 0.86, 0.38 respectively). Likewise, statistical contrasts were used to determine there was no detected impact (P > 0.10) of drench, regardless of type, compared to the control in any measured response criteria. Interesting, pigs drenched with BP or IgY had numerically lower preweaning mortality (11.2 and 11.5% respectively), than those administered the control or HES (15.4 and 15.2%, respectively). In conclusion, this experiment showed no significant difference in the performance between piglets given no product vs. those drenched with bioactive proteins, high energy sugars, or immunoglobulins. However, additional research is warranted with greater replication or disease stressors to better understand if oral drenches may improve preweaning performance or mortality in different situations.

Effects of ingredient composition of oral drenches in small piglets post-farrowing on average daily gain and pre-wean mortality

O. L. Harrison, S.K. Tauer, B. R. Frederick

Abstract

Introduction

Methods

Results

Conclusions

Introduction

- The commercial swine industry has been successfully increasing number of pigs born alive per sow in recent years. However, due to limited uterine space, birth weight has been decreasing.
- Smaller birth weights have increased the number of at risk piglets (small or runt piglets) in the farrowing rooms.
- Oral drenches have been suggested for use on at risk piglets in order to increase energy and appetite and to boost their immune system.
- A variety of ingredient compositions can be found on the market today. Three were chosen for this study based off of their differing compositions while maintaining the same health and energy benefits.

Objective

- Determine which ingredient composition will increase average daily gain and decrease pre-weaning mortality.

Effects of ingredient composition of oral drenches in small piglets post-farrowing on average daily gain and pre-wean mortality

O. L. Harrison, S.K. Tauer, B. R. Frederick

Abstract

Introduction

Methods

Results

Conclusions

Experimental Procedures

- 877 piglets were put on trial approximately 12 hours post-farrowing
- In a completely randomized design, the bottom 20% were chosen by the researcher (bottom 20% included all pigs in the small and runt litters and the smallest from all other litters)
- Piglets were weighed, ear tagged, then given one of four drenching treatments on day 1
    1) none (**control**), $0.00/dose
    2) bioactive proteins (**BP**), $0.35/dose
    3) high energy sugars (**HES**), $ 0.13/dose
    4) immunoglobulins (**IgY**), $0.24/dose
- Piglets were weighed again on day 19 (weaning)
- Mortality was tracked throughout the suckling period
- Weaned pig value calculated based on piglet weight at weaning (USDA as of 7/19/19) minus the cost of oral drench per pig.

Effects of ingredient composition of oral drenches in small piglets post-farrowing on average daily gain and pre-wean mortality

O. L. Harrison, S.K. Tauer, B. R. Frederick

Abstract

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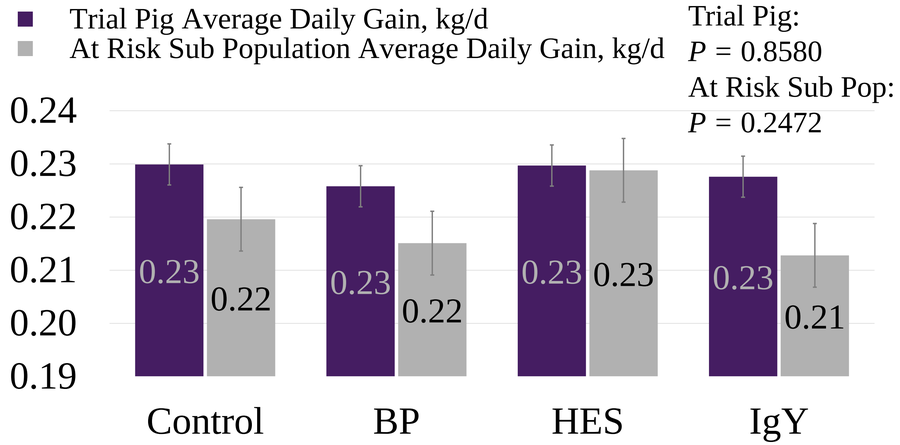
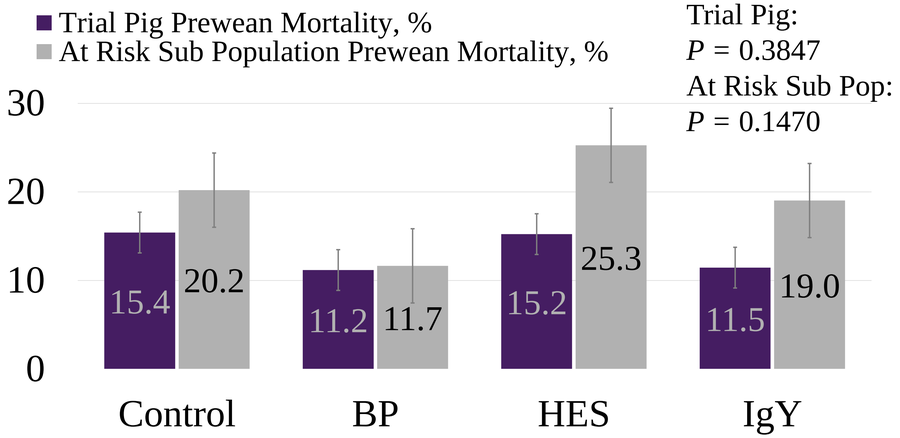
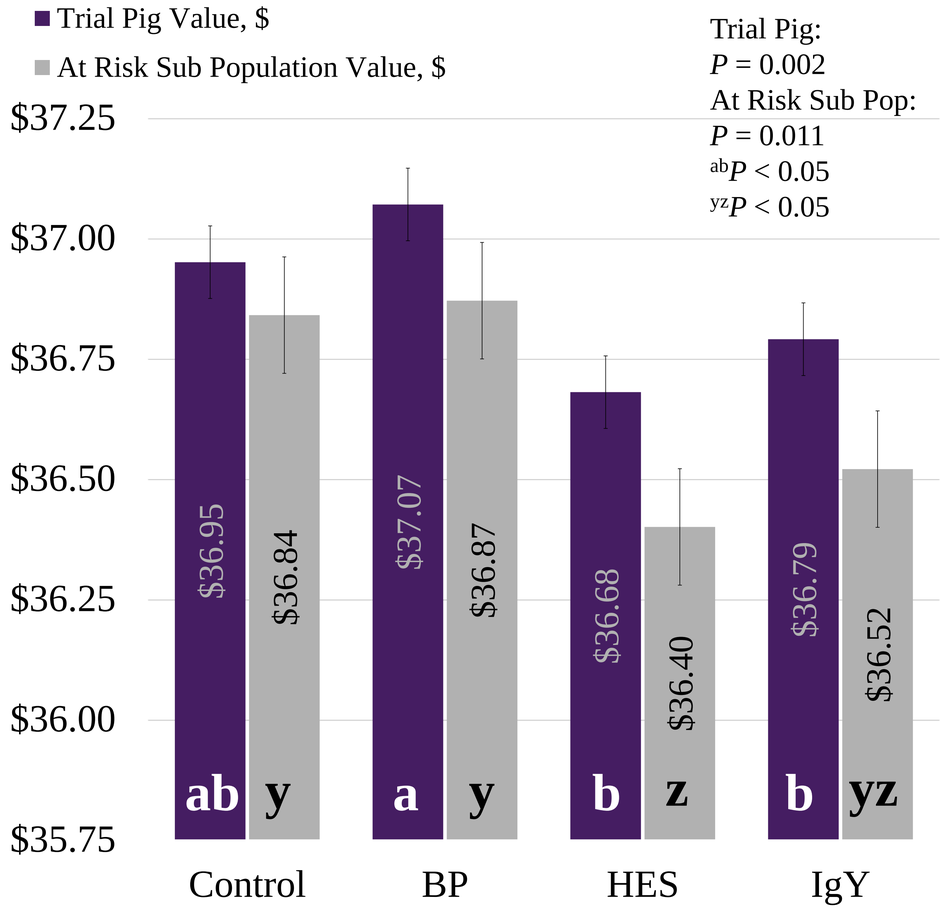
ADG



Prewean Mortality



Weaned Pig Value



Effects of ingredient composition of oral drenches in small piglets post-farrowing on average daily gain and pre-wean mortality

O. L. Harrison, S.K. Tauer, B. R. Frederick

Abstract

Introduction

Methods

Results

Conclusions

Conclusion

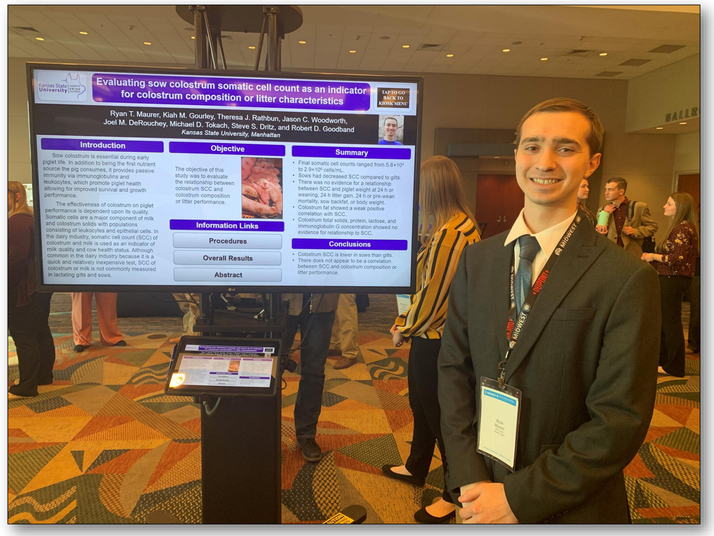
- Different ingredient compositions had no significant effect on average daily gain or pre-weaning mortality.
- Bioactive Proteins and Immunoglobulins had a numerically lower pre-wean mortality rate than High Energy Sugars and the Control.
- Weaned pig value for Bioactive Proteins was greatest, while lowest value was in pigs given High Energy Sugars.
- Additional research in differing situations, such as summer v. winter, greater replications, and disease stressors, are warranted.

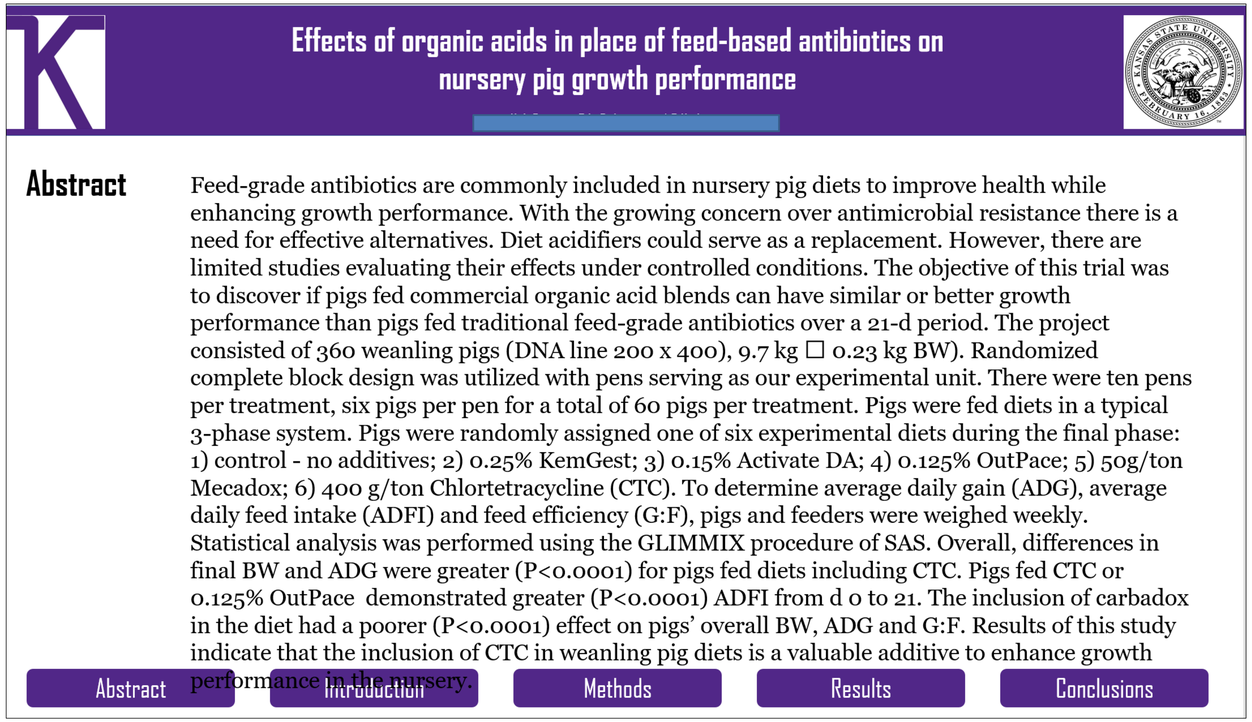
Acknowledgments

This project was funded by the Christensen Farms (Sleepy Eye, MN).

Additional ePoster Recommendations

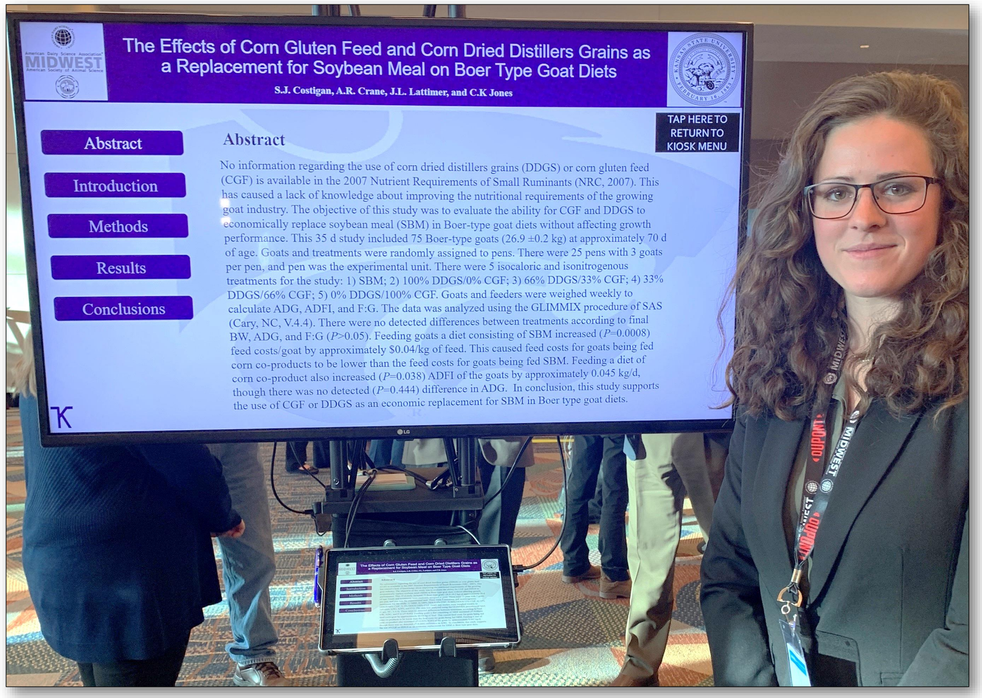
- Navigation bars are logical, not distracting
- Do not use animations
- Embedded hyperlinks are intuitive and provide value
- Each slide contains abstract number, title, authors





In-Person Presentation Considerations

- Practice to be fluent and stay within time limit
- Bring an extra copy on a flash drive
- Arrive 10-15 minutes early to check your poster works accurately
- Talk loud enough
- Refer to the poster, but not too much
- Be flexible!
- Prepare for questions



Recorded Presentation Considerations

- Practice to be fluent and stay within time limit
  - Do NOT read directly off a script
  - Accept (embrace?) minor verbal flaws – keep it conversational
- Use a headset with microphone to record
- Record in Zoom, WebEx, Camtasia, etc., not in PowerPoint
- Use your pointer in a logical, strategic manner
- Include contact information and monitor it
- Listen to your recording, re-record until you are satisfied
- Upload and confirm the uploaded file is correct
- Be responsive to questions

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