



Evaluation of medium chain fatty acid supplementation in nursery pig diets

R.T. Maurer, A.B. Lerner, C.K. Jones



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

Introduction

- Antibiotic supplements, zinc oxide (ZnO) and carbadox, are commonly added to nursery pig diets at therapeutic levels to minimize disease and improve growth performance. However, these benefits come with some negative drawbacks.
- Although low leveled compared to other drugs, carbadox does have some antibiotic resistance. On top of that, its carcinogenic residue can amass in the liver. Use of carbadox is banned in Canada, the European Union, and Australia.
- Soil pollution can be caused ZnO can create soil pollution by accumulating the excreted zinc during ground application of manure. In addition, some bacteria can become adapted to its radical-like effects. Use of ZnO is banned in some European countries.
- Increased pressure has motivated the pork industry to seek antibiotic alternatives that provide a similar response in growth performance.
- One possible alternative is medium chain fatty acids (MCFA). Not only do they have antiviral, bactericidal, and bacteriostatic properties, but can typically improve growth performance, as well. Yet, there is limited research evaluating their response.

Objective

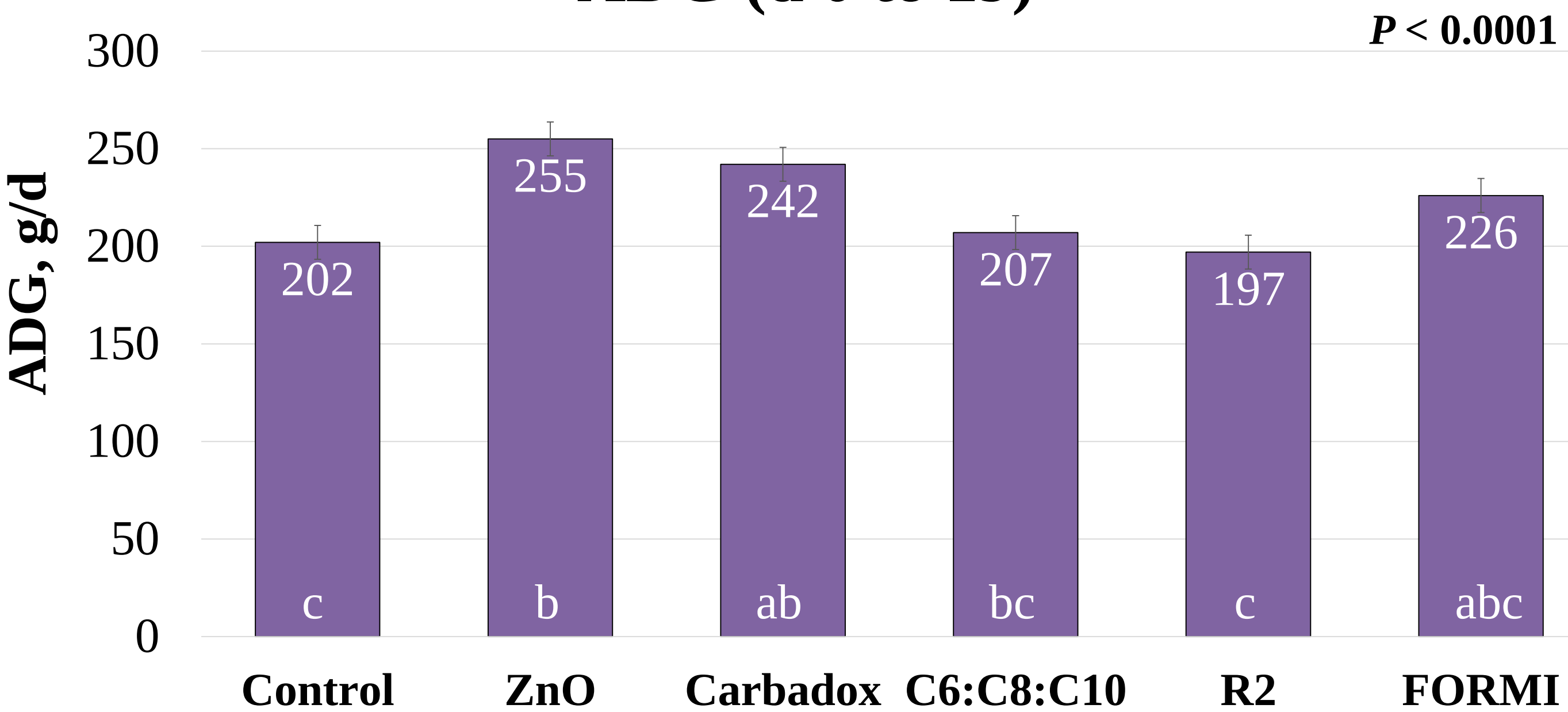
- To compare the effects of MCFA-based products, carbadox and ZnO on nursery growth performance.

Experimental Procedures

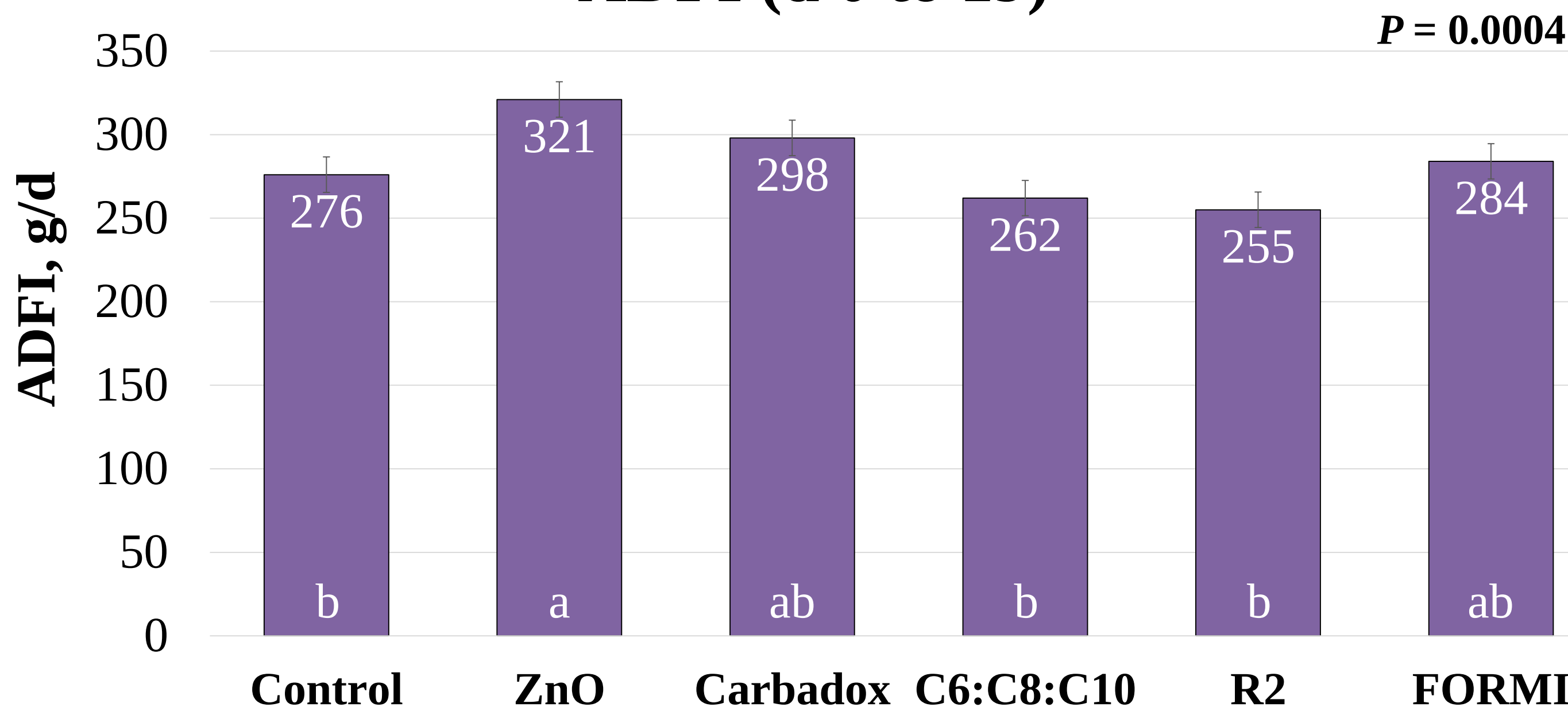
- **Experiment:** 35-d feeding trial, divided into 3 phases
- **Subject:** 360 nursery pigs (DNA 200×400; initially 5.4 ± 0.07 kg; 21-d)
- **Treatments:**
 - 1) negative control
 - 2) 3,000ppm ZnO in Phase 1, 1,500ppm ZnO in Phase 2
 - 3) 50g/ton carbadox
 - 4) 1% blend of C6:C8:C10
 - 5) 1% Feed Energy R2 (Feed Energy Corp, Des Moines, IA)
 - 6) 1% FORMI GML (ADDCON, Bitterfeld-Wolfen, Germany)
- **Phases:** 2 treatment phases: d 0 to 7; d 7 to 19
1 common diet phase: d 19 to 35
- **Design:** completely randomized with 10 replicates per treatment
- **Data Retrieval:** pen feeders and individual pigs weighed weekly
- **Data Analysis:** PROC GLMMIX (SAS version 9.4; Cary, NC)

Results

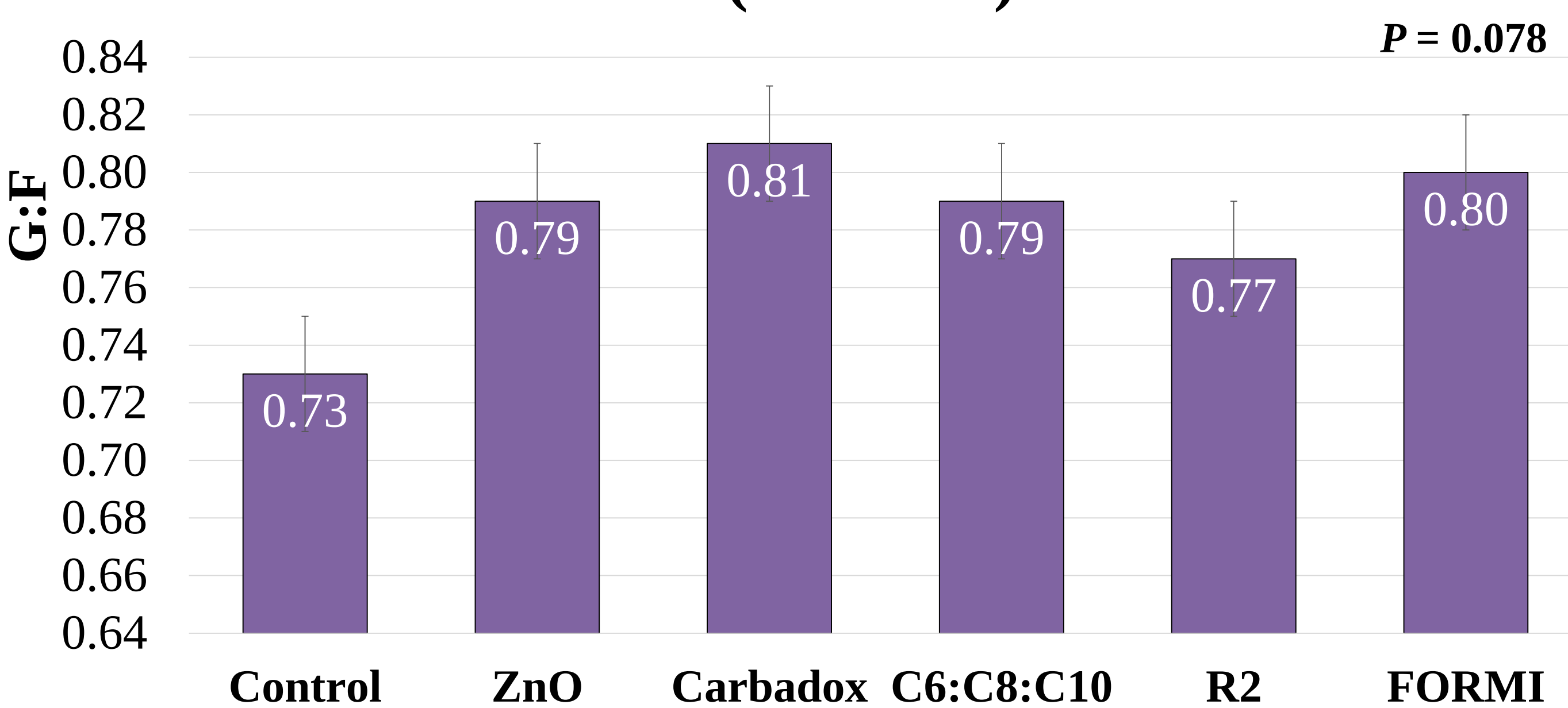
Impact of Dietary Treatment on Nursery Pig ADG (d 0 to 19)



Impact of Dietary Treatment on Nursery Pig ADFI (d 0 to 19)



Impact of Dietary Treatment on Nursery Pig G:F (d 0 to 19)



Impact of Dietary Treatment on Nursery Pig Growth Performance (d 0 to 35)

	Control	ZnO	Carbadox	C6:C8C:10	R2	FORMI	P =
ADG, g/d	344 ^{ab}	377 ^a	374 ^{ab}	355 ^{ab}	339 ^b	359 ^{ab}	0.012
ADFI, g/d	492 ^{ab}	536 ^a	517 ^a	488 ^{ab}	463 ^b	494 ^{ab}	0.001
G:F	0.70	0.70	0.72	0.73	0.73	0.73	0.320

- During the treatment period (d 0 to 19), pigs fed ZnO and carbadox had greater ($P < 0.05$) ADG and ADFI. Despite that, pigs fed FORMI and C6:C8:C10 had similar ($P < 0.05$) ADG and ADFI as ZnO and carbadox, which can also be seen in the marginally significant ($P = 0.078$) G:F of the pigs. In comparison, pigs fed R2 had lower ($P < 0.05$) ADG and ADFI than the negative control, even though the G:F during the treatment period was greater ($P = 0.078$).
- Throughout the experiment (d 0 to 35), pigs fed ZnO and carbadox held greater ($P < 0.05$) ADG and ADFI. Pigs fed FORMI and C6:C8:C10 had similar ($P < 0.05$) ADG and ADFI, while R2 had lower ($P < 0.05$) ADG and ADFI compared to pigs fed the negative control. The G:F of the pigs decreased in significance due strong similarity ($P < 0.320$) among the treatments.

Conclusions

- Based on these results, it can be concluded that ZnO and carbadox still allow for greater nursery growth performance, while some MCFA-based products have the potential to be comparable.
- Due to the variable results of the three MCFA-products used in this experiment, it can be concluded that further research is needed to warrant specific MCFA-products as viable substitutions for carbadox or ZnO in nursery pig diets.

Acknowledgements

- Dr. Mark and Kim Young Undergraduate Research Fund
- ADDCON