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Evaluation of the Impact of Flavoring Compounds on the Performance of Sows and their Progenies

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The objective of this study was to evaluate the effects of flavoring compounds (Spiced, PA, and Raspberry Peach, FL; Norel Animal Nutrition) on the performance of lactating sows and their progenies. In Experiment 1, thirty-eight sows (PIC, average parity = 3.2) and their litters were used. At 109 days of gestation, sows were blocked by parity and farrowing date, and assigned to one of two dietary treatments: Control (n = 19) and Control + PA at 0.0375% (n = 19). Sows received their respective diets from day 109 of gestation to weaning. Results indicated that sows fed PA returned to estrus sooner (-0.5 day; $P < 0.05$) than the control group. This improvement could be attributed to better feed intake of sows fed PA (+0.23 kg/day; $P > 0.10$). In Experiment 2, 504 weaned pigs (19 d of age; initial BW = 6.7 kg) born to sows from Experiment 1 were used to evaluate the effects of feeding PA and FL on nursery pig performance. At weaning, pigs were blocked by initial BW, gender, and sow treatment and allotted to pens, which were assigned to dietary treatments (12 pens/TRT; 10 to 11 pigs/pen) in a 2 × 2 factorial design, based on sow feeding (Control or PA) and nursery feeding (Control or PA in Phase 1, followed by FL in Phases 2 and 3).
Pigs and feeders were weighed on days 0, 8, 15, 22, and 42 for ADG, ADFI, and F:G calculations. During days 0–8, feeding PA had no significant effect on ADG, ADFI, or F:G in the nursery. During days 22–42 and 0–42, nursery pigs fed PA and FL tended (P, interaction < 0.10) to have better feed efficiency compared to pigs that did not receive PA and FL, regardless of sow feeding. In addition, feeding PA and FL to nursery pigs improved pen fecal firmness during days 0–22 (P, nursery effect < 0.01).
Data from this study suggest that feeding PA and FL in nursery diets may improve feed efficiency and fecal firmness compared to the control pigs.

Key Words: flavoring compounds, sows, nursery pigs

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ABSTRACT

Two experiments were conducted to assess the impact of two flavoring compounds, Spiced (PA) and Raspberry Peach (FL), on the performance of lactating sows and their progenies. In the first experiment, 38 sows were divided into two groups: a control group and a group fed PA. Results showed that sows receiving PA returned to estrus sooner and had a numerically better feed intake compared to the control sows. The second experiment involved 504 weaned pigs born to the sows from the first experiment, evaluating the effects of imprinting PA during lactation and feeding PA and FL in the nursery period on the performance & fecal firmness of pigs. While PA did not significantly affect growth performance in the first 8 days post-weaning, pigs fed PA and FL in nursery period showed a tendency of better feed efficiency during day 22-42 and 0-42 and an improved fecal firmness during day 0-22, indicating benefits over the control group.

INTRODUCTION

- Our research data indicates that each one additional pound of body weight at the end of nursery correlates with an approximate 2.1 pounds increase in final market weight, emphasizing the importance of optimizing early nutrition.
- Flavoring compounds have been used in nursery diets to enhance feed palatability, encouraging early feed consumption and reducing the risk of intestinal dystrophy associated with weaning. Additionally, maternal imprinting through exposure to flavors during gestation and lactation has been shown to impact the feed preference of pigs post-weaning.
- Spiced (PA) and Raspberry Peach (FL; Norel Animal Nutrition) are flavoring compounds. We hypothesize that these products can enhance feed intake, reduce scouring issues, and ultimately improve nursery pig performance.

OBJECTIVE

To evaluate the effects of two flavoring compounds (Spiced, (PA) and Raspberry Peach (FL), Norel Animal Nutrition) on the performance of lactating sows and their progenies

MATERIALS AND METHODS

EXPERIMENT 1 - SOW

- Animals: 38 sows & their litters (PIC; avg. parity = 3.2)
- Dietary Treatments:
  1. Control (n = 19 sows)
  2. Control + PA at 0.0375% (n= 19 sows)
- Feeding program: from day 109 of gestation to weaning.
- Data collection: sow and litter performance data

- Statistical analysis:
  1. Experiment 1: MIXED procedure of SAS (SAS 9.4; SAS Institute, Cary, NC); sows are experimental units
     - Covariates: number of pigs after transfer, litter weight after transfer, pig weight after transfer, sow weight at farrowing, and lactation days.
  2. Experiment 2: Nursery
     - Performance data were analyzed using a factorial randomized complete block design using the MIXED procedures of SAS (SAS 9.4; SAS Institute, Cary, NC) with pen as experimental units.
     - Individual fecal firmness, a contingency table using Fisher's Exact test (SAS 9.4; SAS Institute, Cary, NC) was used to test the association between treatments and fecal firmness scores.

EXPERIMENT 2 - NURSERY

- Animals:
  - A total of 504 weaned pigs (PIC Camborough female × PIC 337 boar; avg. 19 d of age; initial BW = 14.7 ± 0.8 lb) born to sows from Experiment 1.
  - Pigs were blocked by initial BW, gender, and sow-treatments and allotted to 48 pens (12 pens/TRT; 10 to 11 pigs/pen)
- Three-phase-feeding trial: Ph1 (8 days), PH2 (14 days); and PH3 (20 days)
- Dietary treatments: 2×2 factorial (**Table 1**)
  1. Sow feeding (Control or PA)
  2. Nursery feeding (Control or PA in Phase 1, followed by FL in Phase 2 & 3)
- Data collection: nursery performance & fecal firmness
- Fecal firmness were assessed 2X/week:

Table 1. Nursery Treatment description

Treatment	T1	T2	T3	T4
Sows	Control	Control	Spiced PA	Spiced PA
Nursery, Ph1	Control	0.0375% PA	Control	0.0375% PA
Nursery, Ph2	Control	0.05% FL	Control	0.05% FL
Nursery, Ph3	Control	0.025% FL	Control	0.025% FL

EXPERIMENT 1 RESULTS SOW & LITTER PERFORMANCE

Table 2. Effect of Feeding Spiced PA on Sow & Litter Performance

Parameters	Control	PA	SEM	*P*, value
Number litter weaned	19	19	-	-
Sow parity	3.2	3.2	-	-
Number pig born alive/litter	16.47	17.21	0.75	0.49
Number after transfers/litter	14.84	15.42	0.35	0.25
Pre-wean mortality after transfer, %[a]	10.1	11.98	1.86	0.49
Number pig weaned/litter[a]	13.5	13.29	0.29	0.6
Litter weight at birth, kg	26.79	27.43	1.05	0.66
Litter weight at weaning, kg[b]	98.46	94.40	2.58	0.27
Pig birth weight, kg	1.65	1.62	0.06	0.63
Pig birth weight after transfers, kg	1.68	1.65	0.05	0.69
Pig weight at weaning, kg[c]	7.29	7.13	0.12	0.36
Pig gain, birth-to-wean, kg	5.62	5.42	0.13	0.27
Lactation days, days	19.42	19.26	0.25	0.66
Sow weight day 109, kg	283.88	290.69	5.28	0.37
Sow weight changed farrow-to-wean, kg	0.28	0.20	2.50	0.98
ADFI during lactation, kg	8.34	8.58	0.32	0.59
Days to estrus, days	4.58	4.06	0.16	0.02

[a]Covariates were used: [b]Number after transfer; [c]Litter weight after transfer; [d]Pig weight after Transfers & Lactation Days

EXPERIMENT 2 RESULTS NURSERY PERFORMANCE

Table 3. Effect of feeding Spiced PA & Raspberry Peach FL on Nursery Performance

Sow feeding	-PA	-PA	+PA	+PA	SEM	*P*, interaction	*P*, sow feeding	*P*, nursery feeding
Nursery feeding	-PA/FL	+PA/FL	-PA/FL	+PA/FL				
Weight, kg								
Initial	6.80	6.76	6.53	6.58	0.36	0.89	0.19	0.96
Day 8	7.53	7.44	7.30	7.26	0.34	0.65	0.00	0.35
Day 15	9.71	9.66	9.53	9.53	0.41	0.88	0.15	0.90
Day 22	12.97	12.66	12.66	12.47	0.54	0.69	0.21	0.23
Day 42	28.30	28.17	27.94	27.67	0.89	0.77	0.19	0.54
Day 0 – 8 (PH1)								
ADG, kg	0.10	0.08	0.09	0.09	0.01	0.59	0.97	0.16
ADFI, kg	0.15	0.15	0.15	0.15	0.01	0.67	0.45	0.45
Feed:Gain	1.71	1.92	1.93	1.86	0.23	0.20	0.47	0.54
Day 8 – 22 (PH2)								
ADG, kg	0.39	0.37	0.38	0.37	0.02	0.83	0.87	0.33
ADFI, kg	0.47	0.45	0.49	0.47	0.02	0.84	0.14	0.15
Feed:Gain	1.22	1.24	1.3	1.27	0.03	0.50	0.09	0.96
Day 22 – 42 (PH3)								
ADG, kg	0.77	0.78	0.77	0.78	0.02	0.44	0.50	0.99
ADFI, kg	1.12	1.14	1.14	1.10	0.04	0.14	0.60	0.60
Feed:Gain	1.46[cd]	1.46[cd]	1.48[c]	1.45[d]	0.02	0.06	0.52	0.28
Day 0 – 42 (Overall)								
ADG, kg	0.51	0.51	0.51	0.50	0.01	0.74	0.55	0.52
ADFI, kg	0.72	0.72	0.73	0.71	0.02	0.19	0.91	0.27
Feed:Gain	1.40[b]	1.41[b]	1.44[a]	1.41[b]	0.01	0.02	0.01	0.22

12 pens/treatment (10 or 11 pigs/pen; 126 pigs/treatment)
[a-d]Means in the same row with different superscripts differ, $P < 0.05$
[c-d]Means in the same row with different superscripts differ, $P < 0.10$

EXPERIMENT RESULTS FECAL FIRMNESS

Table 4. Effect of feeding Spiced PA & Peach Raspberry FL on Fecal Firmness of Nursery Pigs[1]

Sow feeding	-PA	-PA	+PA	+PA	SEM	*P*, interaction	*P*, sow feeding	*P*, nursery feeding
Nursery feeding	-PA/FL	+PA/FL	-PA/FL	+PA/FL				
	Mean fecal scores by pen							
Day 0-22	3.71	3.66	3.76	3.68	0.02	0.43	0.20	0.01
Day 22-42	3.05	3.08	3.06	3.10	0.04	0.78	0.40	0.40
Day 0-42	3.44	3.42	3.48	3.44	0.02	0.39	0.09	0.10

[1]Pen fecal firmness was scored from 1 to 5 (1: hard, 2: firm, 3: normal, 4: loose, and 5: very loose).

CONCLUSIONS

Data from this study indicated that: 1) Sows fed Spiced PA returned to estrus sooner compared to the control sows, and 2) Feeding Spiced PA and Raspberry Peach FL in the nursery can improve feed efficiency and fecal firmness compared to the control pigs.