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Evaluation of Flavored Mono-sodium Glutamate in Swine Starter Rations¹

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Summary

Suckling pigs (2 to 4 weeks old) offered a choice of diets containing either flavored or unflavored mono-sodium glutamate (F-MSG or MSG) consumed 3.5 times more of the flavored than of the unflavored diet. Likewise, litters of suckling pigs offered only F-MSG diets consumed 3.5 times more than litters offered only the MSG diet. After weaning, pigs with access to F-MSG during the preweaning phase exhibited an initial and continued preference for the F-MSG diet by consuming 3.8 times more of it than of the MSG diet in preference trials. Preweaning feeding of pigs altered initial post-weaned preference patterns, as pigs with access to only the MSG diet did not prefer the F-MSG ration until the second week of the preference trial.

In the second experiment, weaned pigs fed a flavored starter diet (flavor only) consumed significantly more feed per day and gained significantly faster than pigs fed either the F-MSG or MSG diets used in experiment I. Pigs fed the flavored ration consumed more feed per day than pigs fed the unflavored ration, but not significantly more. The feed:gain ratio of all treatments; flavor, F-MSG, MSG, and basal diet were similar.

Procedure

Experiment I.

A. Pre-weaning phase. Eleven litters were offered both a flavored (F-MSG) and an unflavored ration commencing at two weeks of age; six of the litters were offered only the flavored ration and five litters, only the unflavored ration. Pigs were weighed at two and four weeks of age. Feed consumption per litter was measured.

B. Post-weaning phase. Two groups of 20 pigs each were randomly selected from those litters offered both the flavored and unflavored rations during the pre-weaning phase.

¹. Flavor products and financial support supplied by Feed Flavors, Inc., Wheeling, Illinois.

An additional two groups of 20 pigs each were randomly selected from those pigs offered only the flavored ration, and another two groups of 20 pigs were randomly selected from the pigs offered only the unflavored rations during the preweaning phase.

In all six preference pens, two, two-hole self feeders were used to offer the the pigs either the flavored or the unflavored rations. Feeders were rotated each day to prevent habit or proximity to waters from biasing the results. Each pen had access to two automatic waters.

Pigs were housed in the controlled-environment nursery wing of the KSU Swine Research facility. Pens are separated by solid partitions. Floors are concrete slats with 1-inch slotting above an oxidation ditch. Each pen is 11' x 10', which allowed each pig approximately 5.5 square feet of space.

Each preference trial was conducted for four weeks. Total pounds of each type of feed consumed were recorded. Basal rations used are detailed in table 30.

Experiment II.

A. Pre-weaning treatment: All pigs used in this experiment received an unflavored basal ration from 2 thru 7 weeks of age.

B. Post-weaning study: Seventy-two weaned pigs were allotted to the following 4 treatment groups with replicates. Pigs were allotted to remove sex, breed, and litter effects. The four treatment groups were:

- a. basal ration plus 3 lbs. of monosodium glutamate per ton of feed (F-MSG).
- b. basal ration plus 3 lbs. of flavored monosodium glutamate per ton fo feed (F-MSG).
- c. Basal ration plus 1 lb. of flavor per ton of feed (FLAVOR).
- d. Basal ration (BASAL).

Pigs were housed in the controlled-environment nursery wing of the KSU Swine Research facility, 9 pigs per 5' x 11' pen with an automatic waterer and a two-hole self feeder. The duration of the feeding trial was four weeks.

Results and Discussion

Experiment I.

The preweaning performances of litters are presented in table 31. Six litters (41 pigs) offered a preweaning ration containing only mono-sodium glutamate (MSG) ate an average of 1.6 lbs. (.24 lb. per pig) during the two weeks. The six litters (44 pigs) offered the flavored mono-sodium glutamate (F-MSG) ration consumed 6.1 lbs. or .84 lb. per pig for the two week period.

The eleven litters (79 pigs) having access to both the rations (MSG and F-MSG) exhibited similar preference patterns. They consumed 3.6 times more F-MSG ration than the ration containing only MSG.

The results of the post-weaning preference trials are shown in tables 32, 33, and 34. Pigs fed MSG during the preweaning phase exhibited no preference between rations the first seven to ten days of the trial, but during the last two and one-half weeks, they consumed more of the F-MSG ration, 2.5 and 2.4 times more F-MSG than MSG by groups 1 and 2, respectively.

The pigs fed F-MSG during the preweaning phase preferred F-MSG throughout the post-weaning phase by consuming 4.1 and 4.0 times more F-MSG feed by groups 3 and 4, respectively (table 33).

Pigs that had access to both the MSG and F-MSG rations during the preweaning phase also exhibited a continued preference for the F-MSG by consuming 4.1 and 3.0 times more F-MSG by groups 5 and 6, respectively, (table 34).

Experiment II.

Performances of weaned pigs are presented in table 35. Weaned pigs started on trial averaging approximately 40 lbs each.

Pigs fed the FLAVOR ration gained significantly faster than those fed either of the rations containing monosodium glutamate or flavored monosodium glutamate. Pigs fed the basal ration and those fed the F-MSG or MSG rations gained similarly.

Average daily feed intake of pigs fed the FLAVORED ration was significantly greater than the intake of pigs fed MSG or F-MSG rations. Pigs fed the basal ration ate more than pigs fed the MSG or F-MSG rations, but .3 lb. per pig per day less than pigs fed the flavored ration; none of these differences was significant.

The pigs that grew faster also had better feed:gain ratios but the differences were not significant.

Table 30. Basal rations fed experimental pigs.

Ingredient, lbs./ton	Pre-wean	Post-wean
Gr. corn	618	1012
St. rolled oats groats	300	200
Soybean meal (44%)	420	300
Meat & bone scraps (50%)	---	90
Alfalfa meal (17%)	---	50
Sugar	200	---
MNC	300	300
Fat	100	---
Dicalcium phosphate	24	10
Limestone	8	10
Salt	4	5
Monosodium glutamate ^{a,b}	6	3
VATM premix ^c	20	20

^a Flavored monosodium glutamate used in Experiment I to flavor ration.

^b Only pig Krave flavor added to flavor ration (Flavor), 1 lb./ton of feed (Experiment II).

^c Premix contained: Vitamin A - 5,000,000 IU; Vitamin D₃ - 600,000 IU; Vitamin B₁₂ - 20 mg; Niacin - 48 gm; Riboflavin - 16 gm; D-pantothenic acid - 32 gm; choline chloride - 160 gm; Vitamin E - 9,680 IU; trace mineral - 908 gm; Terramycin - 100 gm; Furazolidone - 100 gm; arsanilic acid - 90 gm.

Table 31. Pre-weaning Performances of Pigs Fed Indicated Rations (Experiment I).

Treatment	MSG	F-MSG	Access to both	
			MSG	F-MSG
No. litters	6	6	11	
No. pigs	41	44	79	
Wt./pig-2 wk, lb.	7.8	7.6	8.4	
Wt./pig-4 wk, lb.	12.6	12.9	13.2	
Feed consumed/litter/ 2 wk., lb.	1.6	6.1	1.3	4.9
Feed consumed/pig/ 2 wk., lb.	.24	.84	.19	.68

Table 32. Post-weaning Consumption of MSG or F-MSG Ration by Pigs Offered ONLY Unflavored Monosodium Glutamate Diets During the Pre-weaning Phase.

Lbs. Feed Consumed/4 wks.	DIET	
	MSG	F-MSG
Group 1, 20 pigs	471	1174
Group 2, 20 pigs	<u>346</u>	<u>828</u>
Total	817	2002

Table 33. Post-weaning Consumption of MSG or F-MSG Ration by Pigs Offered ONLY Flavored Monosodium Glutamate Diets During the Pre-weaning Phase.

Lbs. Feed Consumed/4 wks	DIET	
	MSG	F-MSG
Group 3, 20 pigs	280	1144
Group 4, 20 pigs	<u>277</u>	<u>1122</u>
Total	557	2266

Table 34. Post-weaning Consumption of MSG or F-MSG Ration by Pigs Offered Both Flavored and Unflavored Monosodium Diets During the Pre-weaning Phase.

Lbs. Feed Consumed/4 wks	DIET	
	MSG	F-MSG
Group 5, 20 pigs	348	1432
Group 6, 20 pigs	<u>354</u>	<u>1068</u>
Total	702	2500

Table 35. Experiment II. Post-weaning Performance by Pigs on Indicated Ration.

Ration:		MSG	F-MSG	Flavor	Basal
Initial wt., lbs.	Rep. 1	42.9	43.8	46.3	45.8
	Rep. 2	37.3	38.4	38.7	38.4
Final wt., lbs.	Rep. 1	76.9	83.1	90.2	83.6
	Rep. 2	63.7	64.8	73.3	70.9
Avg. da. gain, lbs.	Rep. 1	1.21	1.41	1.57	1.35
	Rep. 2	$\frac{.94}{1.08^b}$	$\frac{.94}{1.17^b}$	$\frac{1.23}{1.40^a}$	$\frac{1.17}{1.26^{a,b}}$
Avg. da. feed, lbs.	Rep. 1	2.90	3.10	3.45	3.01
	Rep. 2	$\frac{2.28}{2.59^b}$	$\frac{2.28}{2.69^b}$	$\frac{2.84}{3.14^a}$	$\frac{2.66}{2.84^{a,b}}$
Feed/gain	Rep. 1	2.40	2.21	2.20	2.23
	Rep. 2	$\frac{2.43}{2.41^a}$	$\frac{2.43}{2.32^a}$	$\frac{2.30}{2.25^a}$	$\frac{2.28}{2.26^a}$

^{a,b} Means on the same line with different superscript letters differ significantly ($P < .05$).