SUPPLEMENTAL CHOLINE AND DICHLORVOS FOR BRED GILTS

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Story in Brief

Four trials involving 354 crossbred gilts were conducted to study the effect of supplemental feeding of choline and dichlorvos during gestation on subsequent reproductive performance. Gilts receiving choline farrowed pigs with higher individual birth weights. No significant response from feeding choline and (or) dichlorvos to gestating gilts was noted for number of live pigs born, number alive at 21 or 42 days, survival rate, litter birth weight, individual pig and litter weights at 21 and 42 days and the incidence of spraddle leg pigs. The presence of fecal parasite eggs was extremely low in the feces of the gilts and their respective offspring in all treatments when measured in the first two trials. There was no evidence of an interaction of the effects of choline and dichlorvos for any parameters measured in this study.

(Key Words: Bred Gilts, Reproductive Performance, Choline, Dichlorvos)

Introduction

Two nutritional supplements often reported in the literature as being effective in improving performance when fed to gilts and sows during gestation are choline and dichlorvos (2-2 dichlorovinyl dimethyl phosphate).

Supplementation of choline to sow diets has shown an increase in the number of live pigs farrowed and increased pig survival rate. In previous work at the Oklahoma Agricultural Experiment Station (Maxwell et al., 1978), feeding of 350 mg of choline per pound of diet to sows during the gestation period also resulted in increased pig and litter weaning weight. Dichlorvos supplementation to sow diets has been reported to increase the number of live pigs farrowed, number weaned, increased pig and litter birth weights and increased pig or litter weaning weights.

Many studies suggest that supplementation of choline or dichlorvos may improve reproductive performance in gestating swine. However, research apparently has not been conducted to determine if there is an additive or interactive effect when choline and dichlorvos are used together. This experiment was conducted to determine if there was an additive or interactive effect between choline and dichlorvos.

Materials and Methods

Four trials involving 354 crossbred gilts bred to purebred Duroc boars in trials 1 and 2 and crossbred boars in trials 3 and 4 were

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conducted. In each trial, gilts were randomly alloted to four treatments. Treatments were: (1) a 14% crude protein, sorghum grain-soybean meal diet without supplemental choline or dichlorvos (Table 1); (2) diet 1 + 350 mg of choline per lb of diet fed throughout gestation; (3) diet 1 + 250 mg of dichlorvos fed during the last 30 days of gestation (day 90 to 110) and (4) diet 1 + 350 mg of choline per lb of diet fed throughout gestation and 250 mg of dichlorvos fed during the last 30 days of gestation (day 90 to 110). Sows were fed diets at the initiation of the breeding season.

All gilts were housed in outside dirt lots by treatments during gestation and group fed 5.0 lb of feed per head per day. At day 110 of pregnancy, gilts were moved to individual farrowing crates and litters were penned separately until weaning at 42 days. Beginning at day 110, all gilts were fed a 16% crude protein sorghum grain-soybean meal lactation diet without supplemental choline or dichlorvos (Table 1). After day 3 of the lactation period gilts were self fed for the duration of the 42 day lactation period.

In trials 1 and 2, feces from all gilts were examined for gastrointestinal parasites (ascarids, Trichuris, Coccidia, spiruids, strongyles and strongyloides) approximately 30 days before farrowing and before the addition of dichlorvos to treatments 3 and 4. Fecal examinations were again conducted on each gilt and two randomly selected pigs per litter 42 days post-farrowing.

Table 1. Composition of basal diets.

Ingredients	Gestation %	Lactation %
Sorghum Grain	76.95	71.30
Soybean meal, 44%	14.50	20.20
Ground alfalfa hay	5.00	5.00
Calcium carbonate	1.00	1.05
Dicalcium phosphate	1.60	1.50
Salt	.50	.50
Vitamin trace mineral mix[a]	.25	.25
Antibiotic mix[b]	.20	.20
Calculated analysis, as fed		
Crude protein, %	14.01	16.01
Lysine, %	.62	.77
Calcium, %	.85	.85
Phosphorus, %	.61	.60

[a]Supplied 4,000,000 IU Vitamin A, 400,000 IU vitamin D, 19,000 IU vitamin E, 4 gm riboflavin, 20 gm pantothenic acid, 27 gm niacin, 20 mg vitamin B_{12}, 1 gm menodione sodium bisulfite, 25 gm Mn, 90 gm Fe, 90 gm Se, 1180 mg I, 10 gm Cu and 90 gm Zn per ton of feed.
[b]Supplied 40 gm of tylosin per ton of feed.

Results and Discussion

Feeding choline and (or) dichlorvos to gestating gilts produced no significant differences in the number of live pigs born, number live at 21 and 42 days and percentage survival rate (Table 2).

The effect of feeding both choline and dichlorvos upon individual pig and litter weights at birth, 21 days and 42 days is shown in Table 3. Gilts on treatments receiving choline (2 and 4) farrowed pigs with higher birth weights ($P<.01$) than did those on the other two treatments. Pigs from gilts on treatments 2 and 4 had average birth weights of 3.11 and 3.09 lb, respectively, vs 3.02 and 3.00 lb for treatments 1 and 3. The litter birth weight of pigs farrowed for gilts receiving choline and (or) dichlorvos (treatments 2, 3 and 4), although nonsignificant, also tended to be heavier than those farrowed by the gilts on the control diet (treatment 1). No significant differences were noted for pig and litter weights at 21 or 42 days. Thus, the increased birth weights of pigs from gilts receiving choline did not result in any increased weights at 21 or 42 days.

The lack of improvement in all the reproductive traits measured by feeding choline to the gestating gilts except for birth weight is in contrast to several previously published research reports including former Oklahoma research (Maxwell et al., 1978).

Likewise, the lack of improvement in all the reproductive traits measured by feeding dichlorvos contrasts with several previously reported research studies. No evidence of any interactive effect for choline and dichlorvos existed in this study. However this study does not eliminate the possibility that the effects of choline and dichlorvos are additive.

It has been reported in the popular press that supplemental choline may be beneficial in correcting the spraddle leg conditions observed under field conditions. A low overall incidence of spraddle legs (6.4,

Table 2. The effect of feeding choline and dichlorvos to gestating gilts upon litter size and survival rate.

	Treatments[a]			
	1	2	3	4
Choline:	0	+	0	+
Item Dichlorvos:	0	0	+	+
No. of litters	87	99	76	92
Avg. no. of live pigs at birth	9.62	9.59	9.92	9.70
Avg. no. of live pigs at 21 days	7.82	7.33	7.60	7.38
Survival rate, %	82.16	77.89	77.27	77.24
Avg. no. at 42 days	7.60	6.22	6.38	7.11
Survival rate, %	79.85	76.60	75.47	74.48

[a]No significant differences were noted among treatments.

Table 3. The effect of feeding choline and dichlorvos to gestating gilts upon pig birth weight and gain.

Item	Treatments 1	2	3	4
Choline:	0	+	0	+
Dichlorvos:	0	0	+	+
No. of pigs	853	929	797	887
Pig birth wt., lb	3.02[a]	3.11[b]	3.00[a]	3.09[b]
Litter birth wt., lb	28.95	29.68	29.86	30.03
Pig 21 day wt., lb	11.58	11.55	11.36	11.18
Litter 21 day wt., lb	90.23	84.76	86.74	82.80
Pig 42 day wt., lb	24.58	24.01	24.06	23.97
Litter 42 day wt., lb	186.10	172.76	177.99	171.26

[ab]Treatment means with different superscripts differ (P<.01).

Table 4. The effect of feeding choline to gestating gilts on the prevalence of parasites in the feces of the gilts and offspring[a].

Item	Treatments[b] 1 Gilts	1 Off-spring	2 Gilts	2 Off-spring	3 Gilts	3 Off-spring	4 Gilts	4 Off-spring
Choline:	0		+		0		+	
Dichlorvos:	0		0		+		+	
No. with ascarids eggs	1	2	2	0	0	0	0	0
No. with Trichuris eggs	0	0	3	2	0	0	0	0
No. with coccidia oocysts	0	4	0	1	0	5	0	0

[a]Number of gilts and (offspring) sampled were 42 (84), 49 (98), 37 (74) and 42 (84) for treatments 1 through 4 respectively.
[b]Fecal spriuid, stronglyle, and strongyloide eggs were not found in any of the animal feces sampled.

7.8, 6.8 and 8.1%) of pigs farrowed were noted for treatments 1 through 4 respectively with no significant differences existing among treatments which agrees with other recently published research reports.

Because dichlorvos is a common swine anthelmintic, the presence of fecal parasite eggs was measured in trials 1 and 2. The presence of fecal parasite eggs were extremely low in both gilts and their respective offspring in all treatments when measured in trials 1 and 2 as shown in Table 4. Only ascarid and Trichuris eggs were recovered in the feces of both gilts and weanling pigs. Coccidia were not found in the gilts examined, but a few of the offspring were passing oocysts, as shown in Table 4. Fecal spriuids, strongyles and strongyloides eggs were not found in any of the animal feces sampled.

These data suggest that internal parasites were not a serious problem in this trial and may lead one to suggest that the lack of effect of dichlorvos may be due to the lack of an internal parasite problem. However, Keasling et al. (1974) stated that the improvement of reproductive performance observed in their study was not the result of anthelmintic action of dichlorvos.

Literature Cited

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