Steam Pressure Processing of Milo For Growing-Finishing Pigs

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Two trials, using a total of 40 pigs to compare ground milo with milo processed at 20 psi steam pressure for 1½ minutes before grinding, showed no significant differences in rate of gain, feed conversion, or carcass characteristics.

PREVIOUS research at the University of California indicated that steam pressure processing of barley at either 20 or 80 lbs of pressure per square inch (psi) for 1½ minutes did not improve its feeding value for pigs. However, steam treatment has been reported to improve the feeding value of wheat, but not of barley, when fed to rats. Researchers at Purdue reported that although feeding heat-expanded corn to pigs increased the incidence of gastric ulcers, less feed was required per pound of gain than when pigs were fed ground corn. The following studies were conducted to evaluate the effect of steam-pressure processing of milo, a common feed for swine in California.

Two trials were conducted with a total of 40 growing-finishing pigs. In the first trial there were 20 gilts weighing 60 to 80 lbs each, and in the second trial there were 10 gilts and 10 barrows weighing 30 to 50 lbs. In each trial the pigs were stratified according to sire and weight and assigned to one of four 22 × 8 ft pens with concrete floors. Pigs in two pens were fed a diet containing medium ground milo, and pigs in the other two pens were fed a diet containing milo processed at 20 psi for 1½ minutes and then ground. The diets contained 15% protein until the pigs weighed 140 lbs and then they were adjusted to contain 13% protein (table 1). The diets were fed *ad libitum* and were in meal form. The first trial was conducted for 80 days and the second trial for 106 days. Backfat thickness was determined by probing the live hogs in trial 1. The pigs in trial 2 were slaughtered, and determinations made of carcass specific gravity, backfat thickness, carcass length and percentage of lean cuts (ham, shoulder, and loin). The stomachs were examined for esophagogastric ulcers.

The results, summarized in table 2, demonstrate that processing milo at 20 psi for 1½ minutes did not result in an increased rate of gain. There were no significant differences in rate of gain between treatments in either trial; however, in trial 2 the differences approched significance ($P < .05$) in favor of the raw milo. Processing milo did not improve feed conversion. There appeared to be no differences in carcass characteristics between pigs fed processed and raw milo. The average backfat values for the pigs in trial 1 measured 1.37 inches for the pigs fed raw milo and 1.35 inches for those fed processed milo. The data in table 3 indicate there were no differences in carcass characteristics between treatments in trial 2.

No esophagogastric ulcers were observed in any of the slaughtered animals in these tests—in contrast with reports from Purdue indicating that none of the pigs fed heat expanded corn had normal stomachs (cornification, erosion, and ulcers were observed in their tests).

Results of these trials indicate that processing milo at 20 psi for 1½ minutes did not improve the value when fed to pigs. Of course, this does not preclude the possibility that other heat treatments could be beneficial. However, Kansas workers reported that steam rolling milo did not improve feeding value over grinding, and Morrison's "Feeds and Feeding" states that, with the exception of a few feeds such as potatoes, soybeans, and field beans, cooking feed for swine decreases rather than increases its value.

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TABLE 1. INGREDIENT PERCENTAGES, BASAL DIETS FOR PIGS

	Animal weight	
	To 140 lbs	Above 140 lbs
	%	%
Protein	15.1	13.2
Milo	81.0	84.0
Cottonseed meal	6.0	4.0
Soybean meal	3.0	2.0
Meat and bonemeal	4.0	4.0
Alfalfa meal	5.0	5.0
Salt	0.5	0.5
Vitamin-mineral mixture*	0.5	0.5

* Supplied 800,000 IU vitamin A and 100 gm $ZnSO_4$.

TABLE 2. EFFECT OF PROCESSING MILO ON RATE OF GAIN, FEED INTAKE, AND FEED CONVERSION

Milo treatment	Initial weight	Average daily gain	Feed* per lb gain	Average daily intake*
	lbs	lbs	lbs	lbs
		Trial 1		
Raw	74.2	1.60	3.71	5.93
Steamed†	73.0	1.55	3.88	6.01
		Trial 2		
Raw	43.0	1.47	3.81	5.60
Steamed†	34.2	1.35	3.85	5.20

* 90% dry matter.
† 20 psi for 1½ minutes.

TABLE 3. CARCASS CHARACTERISTICS OF PIGS FED RAW OR PROCESSED MILO (TRIAL 2)

Treatment	Specific gravity	Backfat	Length	Lean cuts
				Cold carcass weight
		inches	inches	%
Raw	1.028	1.41	29.6	52.4
Processed	1.030	1.38	29.0	52.7