

Kansas Agricultural Experiment Station Research Reports

Volume 0
Issue 10 *Swine Day (1968-2014)*

Article 878

1992

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Recommended Citation

Lauren, J L.; Goodband, Robert D.; Tokach, Michael D.; and Nelssen, Jim L. (1992) "Evaluation of expelled soybean meal in swine finishing diets," *Kansas Agricultural Experiment Station Research Reports*: Vol. 0: Iss. 10. <https://doi.org/10.4148/2378-5977.6718>

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Evaluation of expelled soybean meal in swine finishing diets

Abstract

Thirty crossbred finishing gilts (initial weight = 150 lb) were used to evaluate the effects of feeding expelled soybean meal (41% analyzed CP) or conventionally extracted soybean meal (46.5% analyzed CP) on growth performance. Gilts were fed a control diet containing conventionally processed soybean meal or diets containing expelled soybean meal formulated to replace conventionally extracted soybean meal on either a guaranteed protein basis or an analyzed protein basis. Thus, the effects of possible variation in the protein content and quality of expelled soybean meal as a result of expeller processing could be established. Gilts fed either diet containing expelled soybean meal had decreased average daily gain (ADG) and average daily feed intake (ADFI) and tended to have poorer feed efficiency (FIE) than gilts fed conventionally processed soybean meal. Although not statistically different, gilts fed the expelled soybean meal diet formulated on a guaranteed protein content basis tended to have poorer ADG than those fed the expelled soybean meal formulated on an analyzed protein content. These results suggest that improper processing and the potential variation present in expelled soybean meal used in this experiment resulted in decreased pig performance.; Swine Day, Manhattan, KS, November 19, 1992

Keywords

Swine day, 1992; Kansas Agricultural Experiment Station contribution; no. 93-142-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 667; Swine; G-F; Performance; SBM; Process

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**EVALUATION OF EXPELLED SOYBEAN MEAL
IN SWINE FINISHING DIETS**

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Summary

Thirty crossbred finishing gilts (initial weight = 150 lb) were used to evaluate the effects of feeding expelled soybean meal (41% analyzed CP) or conventionally extracted soybean meal (46.5% analyzed CP) on growth performance. Gilts were fed a control diet containing conventionally processed soybean meal or diets containing expelled soybean meal formulated to replace conventionally extracted soybean meal on either a guaranteed protein basis or an analyzed protein basis. Thus, the effects of possible variation in the protein content and quality of expelled soybean meal as a result of expeller processing could be established. Gilts fed either diet containing expelled soybean meal had decreased average daily gain (ADG) and average daily feed intake (ADFI) and tended to have poorer feed efficiency (F/G) than gilts fed conventionally processed soybean meal. Although not statistically different, gilts fed the expelled soybean meal diet formulated on a guaranteed protein content basis tended to have poorer ADG than those fed the expelled soybean meal formulated on an analyzed protein content. These results suggest that improper processing and the potential variation present in expelled soybean meal used in this experiment resulted in decreased pig performance.

(Key Words: G-F, Performance, SBM, Process.)

Introduction

Prior to solvent extraction, soybeans were processed by expeller procedures to remove the oil. Today, solvent extraction is the most

common method of extracting soybean oil; however, the expeller process is still being used in some areas. In the expeller process, the soybeans are cracked, dried, and transported to a tempering device, which stirs them for uniform heat processing. The soybeans are then fed into an expeller barrel, which presses the oil from the beans. The soybeans leave the barrel and are ground. The expeller process leaves the beans with approximately 5% fat. In solvent extraction, the beans are cracked and then heated to 140°F for 10 min. Soybeans are then allowed to cool to 113°F, hexane extracted, volatilized, and dried. From the dryer, the beans are conveyed to a toaster, cooled, and ground, leaving them with less than 1% fat. This experiment was conducted because of producer inquiries as to the value of expelled soybean meal as a replacement for conventional soybean meal.

Procedures

Expelled soybean meal was purchased at a local elevator in northeast Kansas. The expelled and conventional soybean meals were analyzed for percentage protein and diets formulated to .65% lysine (Table 1). Lysine was assumed to be a fixed percentage of total protein in both soybean meals. A third treatment was formulated using the guaranteed protein content of the expelled soybean meal to provide an equal protein (lysine) substitution for the protein in conventionally processed soybean meal. This arrangement of treatments allowed for a direct comparison of the protein quality of the two soybean meal sources (replacement on analyzed values), as well as assessing the effect on pig performance of potential varia-

tion in protein content. Thirty gilts averaging 150 lb were assigned randomly by ancestry and weight to one of three dietary treatments in a randomized complete block.

Results and Discussion

Gilts fed either diet containing expelled soybean meal had decreased ($P < .05$) average daily gain compared to gilts fed conventionally processed soybean meal. Although not statistically different, gilts fed the expelled soybean meal diet formulated on a guaranteed basis tended to have decreased ADG compared to expelled soybean meal formulated on an analyzed basis. This indicates that improper processing was the primary factor resulting in decreased pig

performance; however, because the actual protein content was below the guaranteed value, this also tended to influence pig performance. This resulted in an 18 to 24% reduction in ADG. Gilts fed either expelled soybean meal diet had decreased ($P < .10$) average daily feed intake compared to those fed conventionally processed soybean meal. Feed efficiency was 10 to 14% poorer for gilts fed the expelled soybean meal diets. These results indicate that the expelled soybean meal used in this experiment was an inferior protein source compared to conventionally processed soybean meal. This does not apply to all expelled soybean meals; however, like any alternative feed ingredient, it should be thoroughly tested and analyzed before inclusion in swine diets.

Table 1. Diet Composition^a

Ingredient, %	Conventional SBM	Expelled SBM ^b guaranteed basis	Expelled SBM ^c analyzed basis
Milo	81.93	80.82	79.97
Soybean meal (46.5% CP)	15.39	—	—
Expelled soybean meal	—	16.40	17.26
Monocalcium phosphate	1.05	1.07	1.06
Limestone	.93	1.01	1.01
Salt	.30	.30	.30
Vitamin premix	.25	.25	.25
Trace mineral premix	.15	.15	.15
Total	100.00	100.00	100.00

^aAll diets were formulated to contain .65% lysine, .65% Ca, and .55% P.

^bConventional SBM replaced with expelled SBM on guaranteed protein (43%) content basis.

^cConventional SBM replaced with expelled SBM on an analyzed protein (41%) basis.

Table 2. Effect of Expelled Soybean Meal on Pig Performance^a

Ingredient, %	Conventional SBM	Expelled SBM ^b guaranteed basis	Expelled SBM ^c analyzed basis	CV
Daily gain, lb ^d	2.11	1.61	1.72	6.7
Daily feed intake, lb ^e	6.85	5.71	6.23	8.7
Feed efficiency	3.27	3.59	3.73	9.0

^aA total of 30 gilts; two gilts per pen and five pens per treatment. Trial duration was 28 days.

^bConventional SBM replaced with expelled SBM on guaranteed protein (43%) content basis.

^cConventional SBM replaced with expelled SBM on an analyzed protein (41%) basis.

^dConventional SBM vs either Expelled SBM ($P < .05$).

^eConventional SBM vs either Expelled SBM ($P < .10$).