

NUTRIENT DIGESTIBILITY OF STARTER SWINE DIETS CONTAINING  
DIFFERENT LEVELS OF FULL-FAT SOYBEAN OBTAINED BY  
EXTRUSION METHOD.

C.M. CAMPABADAL \* AND R. LEDESMA \*\*

\*LABORATORIO DE NUTRICION ANIMAL, ESCUELA DE ZOOTECNIA, UNIVERSIDAD DE COSTA RICA

\*\*ASOCIACION AMERICANA DE SOYA

Full-fat soybean is an excellent source of energy and protein in swine diets. However its nutrient utilization depends of the method of processing (Mc Naughton and Reece, 1981). Combs et al. 1967, reported and improvement in dry matter, crude protein and ether extract digestibility coefficients when raw soybeans were processed at different times and temperatures. Faber and Zimmerman (1973) showed the superiority of extrusion compared with infrared processing of full-fat soybeans. The diets containing the former had highest digestibility coefficients. The objective of this experiment was to determine the nutrient digestibility coefficients of starter diets containing different levels of full-fat soybean obtained by extrusion method.

A total of 450 crossbred pigs with an initial weight of 10 kg were divided in three groups and allotted to 18 pens of 25 pigs each. Three dietary treatments were evaluated: A) full-fat soybean, B) 50% full-fat soybean + 50% soybean meal and C) soybean meal. Feed and water were supplied ad-libitum. The diets contained 18% crude protein and 1% lysine. Vitamins and minerals were supplemented to meet NRC requirements. The experimental period lasted for 28 days.

Pig digestion trials were conducted by the indicator method. Chromium oxide was used as the indicator at a level of 0.25% of the total diet. It was self-fed to the pigs for a fourteen day period. Grab feed and fecal samples were collected twice daily during the last five days of the period. The chromium oxide analyses of feed and fecal were made by the method of Christin and Coup (1954). Nutrient digestibility (dry matter, crude protein, ether extract and energy) were calculated by the formula presented by Maynard et al. (1979).

Performance and digestibility data were subjected to analysis of variance, using a complete randomized design.

There were no significant differences in average daily gain between treatments although pigs receiving full-fat soybean as the only protein source gained slightly lower than the other two groups.

Daily gain was 0.40, 0.428 and 0.410 kg for A, B and C treatments, respectively. Daily feed consumed was nearly the same ( $P < 0.05$ ) for all treatments. However pigs receiving the 50% full-fat soybean + 50% soybean meal diet consumed the highest amount of feed per day. Daily feed intake was 0.81, 0.86 and 0.84 kg for A, B and C treatments, respectively. The amount of feed required per kg of gain was not significantly affected by dietary treatment. Feed conversion for A, B and C groups were 2.02, 2.01 and 2.04 respectively. No significant effect for dry matter and crude protein digestibility coefficient were found between different diets. Dry matter digestibility was 91.06, 89.2 and 92.6% and crude protein digestibility was 90.0, 91.0 and 91.9% for the full-fat soybean diet; 50% full-fat soybean + 50% soybean meal diet and soybean meal diet, respectively.

There were significant differences in ether extract and energy digestibility coefficients. Pigs fed the soybean meal diet gave the highest ( $P < 0.05$ ) ether extract digestibility (83.4%) followed by the 50% full-fat soybean + 50% soybean meal diet (75.2%) and the full-fat soybean diet (64.7%). Similarly, the soybean meal diet gave the highest ( $P < 0.05$ ) energy digestibility coefficient, but their difference was only significant with the 50% full-fat soybean + 50%

soybean meal diet. The energy digestibility coefficients and the digestible energy content of the diets were 73.1, 69.2 and 78.3% and 3514, 3450 and 3402 K cal/kg for the A, B and C dietary treatments, respectively.

Conclusion:

Starter contained different levels of full-fat soybean gave similar performance data and dry matter and crude protein digestibility coefficients than soybean meal diet. However the ether extract and the energy digestibility was decreased with the inclusion of full fat soybean in the started diet.

Selected references: Combs, G. R., C. C. Cinness, T. Berry and H. Wallace. 1967. *J. Anim. Sci.* 26:1067; Faber J. and D. Zimmerman. 1973. *J. Anim. Sci.* 36:902; Mc Naughton, J. and F. Reece. 1981. US Dep. of Agri. ARS. South Central Poultry Research Lab. Mississippi State University. Nutrient Requirement of Swine National Academ Of Science. 1979. Washington, D.C. Christin. K., M. Coup. 1954. *J. Sci. Tech* 36:328.