

THE EFFECT OF NUTRITIONAL MANIPULATION ON PRE- AND POSTNATAL RESPONSE BY THE SOW AND HER OFFSPRING

W. Kwansa, D. C. England, and C. Y. Hu

Abstract

Nutritional manipulation may be one method by which the reproductive performance and hence productivity of the sow may be improved. Two studies were conducted. In study 1, changing the pattern of feeding appeared to have no adverse effect on performance of the sow and her offspring. In study 2, short term reduction of dietary energy intake generally had no influence on the peripartal performance of the sow and her progeny.

(Key Words: Porcine, Energy intake, Lactation, Mortality.)

Introduction

Poor survival of pigs from birth to weaning continues to be a major problem in the swine industry. Factors that increase the fat content of sow colostrum, sow body fat, or energy reserves of newborn piglets may improve the survival rates of piglets. One potential means of improving energy stores of the porcine fetus might be to increase maternal energy substrates transferred across the placenta. Study 2 was designed to determine if reduction in the availability of dietary energy shortly before and soon after parturition would affect performance of the sow and her progeny.

Materials and Methods

Study 1: Forty Landrace x Yorkshire (L x Y) crossbreds were allocated to one of two patterns of feeding. The gestation period was divided into three terms. Control sows were fed 2.0 kg/sow/day in the first two terms and 2.5 kg in the last term while treated sows were fed 2.0 kg, 3.5 kg and 1.5 kg daily in the 1st, 2nd and 3rd terms, respectively. Standard OSU gestation diet was used.

Study 2: Control sows were fed the normal lactation diet of the OSU Swine Center while the treated sows were fed an experimental diet diluted with wheat bran to reduce available dietary energy (80% of control). Body weight, backfat thickness, litter size, and blood metabolites were measured in both studies.

Results and Discussion

Study 1. Body weight change of the gestating sow reflected the pattern of feeding. In the 2nd term, treated sows gained 21.87 kg compared to 5.0 kg for the control but in the 3rd term treated sows gained only 3.30 kg as against 18.45 kg for the control

sows. A relatively higher proportion of small piglets were farrowed by treated sows than control sows (Table 1). There appeared to be no treatment effect on sow blood metabolites, litter size, live weight or growth rate of the piglets. Piglet mortality during the first critical days of life tended to be higher for treated litters (Table 2). Neither milk composition nor average milk consumption of piglets was influenced by pattern of feeding of dams during pregnancy.

Study 2: Sow weight changes and backfat depth prior to farrowing (day 105 to 112) and after farrowing (day 0-day 7) were similar. Treated sows consumed slightly less feed in early lactation (day 0-3) than control sows (4.82 kg vs 5.64 kg). Milk consumption appeared not to be affected by the treatment. Plasma free fatty acids (FFA) were similar but treated sows tended to have slightly higher levels at the end of pregnancy (527.05 μ Eq/L) compared to controls (443.22 μ Eq/L). However this difference was not reflected in the FFA levels in neonatal piglets, before their first suckle (Table 3).

Litter sizes were not influenced by treatment but piglets from treated sows tended to have slightly higher mortality rates during the first 3 critical days of life (9.08% for treated vs 5.08% for control) and the same trend was seen in total mortality rate (day 0-21; Table 4).

Results presented are only means. One cannot draw final conclusions on treatment effects until significance of the differences has been tested.

Table 1. Classification of piglets by birth weight (percent of live births).

	Control	Treated
Small piglets (<1.0 kg)	13.0	17.1
Medium piglets (1.0-1.59 kg)	71.3	60.9
Large piglets (> 1.59 kg)	15.7	22.0

Table 2. Piglet preweaning mortality (percent of live births).

	Control	Treated
Day 0-3 (critical period)	9.03	10.83
Day 0-21 (overall)	12.69	16.60

Table 3.

Lactation	Control	Treated
Mean sow feed intake (kg).		
Day 0-3	5.64	4.82
Plasma free fatty acid ($\mu\text{Eq/L}$)		
Gestation day 11.2 (sow)	443.22	527.05
Lactation day 0 (piglet)	428.47	439.84

**Table 4. Classification of piglets by birth weight.
(percent of live births).**

	Control	Treated
Small (<1.0 kg)	20.24	24.86
Medium (1.0 to 1.59 kg)	68.96	67.15
Large (> 1.59 kg)	10.80	7.99
Piglet mortality		
Day 0-3	5.08	9.08
Day 0-7	6.96	10.79