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The Effects of KemTRACE® Chromium Propionate on Breeding and Lactating Gilts and Sows

KemTRACE® Chromium Propionate is registered with the Canadian Food Inspection Agency as a chromium supplement for growing and finishing Duroc swine intended to improve average daily gain when fed continuously from weaning to finishing. Chromium supplied as a trace nutrient (ppb) has been demonstrated to improve sow reproductive and piglet performance when supplied in gestation and lactation sow diets (Hagen et al., 2000). Studies were conducted to prove the efficacy of KemTRACE Chromium Propionate in sows and piglets. A study was performed in sows located in Canada to determine the effects of feeding KemTRACE Chromium Propionate to sows through two consecutive reproductive cycles. There were five hundred (500) Hypor sows utilized in the trial. During the first reproductive cycle, sows ate more feed (13.35 vs. 12.97 lbs., P<0.03) when fed chromium from chromium propionate. This resulted in more pigs born per litter (12.9 vs. 12.3, P<0.02) and an increase in the number of pigs weaned (10.5 vs. 10.0, P=0.05). In the second reproductive cycle there were no differences observed in feed intake however number of pigs born increased (12.8 vs. 13.5, P<0.05) and live pigs born increased from 11.8 to 12.7 (P<0.05) when sows were supplied chromium from chromium propionate. This study showed that feeding KemTRACE Chromium Propionate improved sow and piglet performance when fed to sows in lactation and gestation at a rate of 200 ppb. The sows produced and weaned more piglets, thus creating a viable economic return to the producers.

KEYWORDS: KemTRACE Chromium Propionate, Sow, Reproduction

Introduction

Chromium (Cr) is an essential nutrient for swine and humans (Vincent, 2000) as a component of glucose tolerance factor which enhances the responsiveness of cells to insulin.

In two well controlled trials conducted in the United States, Lindemann et al. (1995 and 2004), observed that Cr supplementation significantly increased pigs weaned per sow per year by 1.4 to 2.2 respectively. In a more extensive (48,000 sows), but less controlled study, (Hagen et al., 2000), the response of 0.7 more pigs were weaned per sow per year. In a two-location study, comprising sites in Manitoba and Ontario, a significant improvement in pigs weaned in response to 200 ppb supplemental Cr from Chromium Propionate was reported (presently submitted for publication).

Metabolic studies have shown an improved clearance of glucose in swine fed supplemental Cr (Guan et al., 2000). Impaired glucose clearance has been demonstrated in sows pre-farrowing (Pere et al., 2000) and in other classes of swine fed diets of high glycemic index (Wenk and Lindemann, 2000). Cr appears to have no metabolic effect beyond its role as part of glucose tolerance factor (GTF). A positive animal response is only expected when dietary Cr is limiting in the control diet and an improvement in GTF function has the opportunity to improve carbohydrate and/or fat metabolism. These criteria appear to be met in the case of sows fed typical Canadian diets.

Materials and Methods

A total of five hundred (500) sows of Hypor genetic stock were utilized in this study. The study was conducted within a commercial sow unit in Canada. The sows were housed in gestation and lactation crates as is standard throughout the North American swine industry. The sows were handled in a manner consistent with the commercial system. Diets were formulated using corn, soybean meal and a mineral pre-mix as the major components. In addition, wheat was included (4.7-12.7 % depending on stage) as well as fat added at 7.0% in the lactation diets. There were two dietary treatments:

control and control plus 200 ppb of Cr added from KemTRACE Chromium Propionate (Kemin Industries, Des Moines, IA). The Cr in the Cr treatment group was provided prior to gestation and throughout the entire trial (both gestation and lactation). All diets were supplied as pellets.

Sows and gilts entered the trial prior to breeding or in the gilt developer, respectively. They remained on the study through two consecutive gestation and lactation cycles.

Results and Discussion

Feeding KemTRACE Chromium Propionate resulted in improved sow performance in this study. The sows ate more in the first reproductive cycle (Table 1). There were more pigs born regardless of the reproductive cycle, and there tended to be more pigs weaned in both reproductive cycles as well (Table 1 & 2).

Table 1. The effect of feeding KemTRACE Chromium Propionate during the first reproductive cycle

Item	Control	Cr from CrProp at 200ppb
Sow Feed Intake (lbs./day)[a]	12.97	13.35
Total Pigs Born/Sow[b]	13.1	13.8
Pigs Weaned /Sow[c]	10.0	10.3

[a] P=0.03, [b] P=0.01, [c] P=0.05

Table 2. The effect of feeding KemTRACE Chromium Propionate during the second reproductive cycle

Item	Control	Cr from CrProp at 200ppb
Sow Feed Intake (lbs./day)	12.16	12.66
Total Pigs Born/Sow[a]	12.8	13.5
Live Born Pigs/Sow[b]	11.8	12.7
Pigs Weaned /Sow	10.21	10.4

[a] P=0.03, [b] P=0.01

Conclusions

The inclusion of KemTRACE Chromium Propionate in sow gestation and lactation diets increased the numbers of pigs weaned per sow per year from 24.0 to 24.7 pigs in the first reproductive cycle and to 24.5 pigs in the second reproductive cycle, respectively. The increases attributed to number of pigs weaned would translate into return on investment (ROI) numbers in excess of 15 to 1.

In addition, the sows after eating more and maintaining a better energy balance in the first reproductive cycle were better able to maintain full productivity in the second reproductive cycle even though their feed intake during lactation was similar to the control sows. This is most likely a result of sows maintaining a better energy status through the first lactation due to higher feed intakes.

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