

CONTINUING DEBATE: CHROMIUM IN SOW DIETS

In 1997, the Committee on Animal Nutrition from the National Research Council reviewed available research reports and concluded that responses to dietary additions of chromium (as chromium tripicolinate, CrP) were inconsistent and unpredictable. However, the committee admitted there is increasing evidence to suggest dietary chromium may alter metabolism of gilts and sows such that reproductive performance is improved.

Initial university reports suggested that addition of 200 ppb chromium as CrP in sow diets increased litter size and piglet survivability to weaning. For chromium to exert its beneficial effects on sows, a loading period of at least six months was required. Also, to get a response in the first parity, gilts had to be pre-loaded with chromium via a developer diet prior to entering the breeding herd.

Last year, data were published from a large-scale field trial that used 48,000 sows fed 0 or 200 ppb chromium as CrP during a 12-month test period that followed a 6-month loading period. During the loading period, reproductive performance was not different between the two treatments. However, during the test period, sows fed CrP gave birth to 0.22 more total pigs/litter compared to control sows. Akey Inc. conducted field trials (1997) with two different customers that generated more than 10,000 farrowing records. In one trial, litter size (total born) was not affected by feeding CrP. In the other trial, litter size increased numerically by 0.18 total born pigs.

Why do we see such different results between farms? Several explanations should be considered. First, if litter size is already high (i.e., above 10.8 live born), response to CrP may be so slight that producers cannot measure it. Sows may already be close to maximum genetic potential and not able to respond further to chromium. Second, poor health status or management challenges may interfere with or mask sow response. Third, some producers cannot feed replacement gilts separately or mature gilts are purchased from an outside source. In either case, gilts are not pre-loaded prior to breeding herd entry. Thus, no response is detected during the first two parities. Producers may decide they are not getting any benefit from feeding this trace mineral and discontinue it before it has adequate time to work.

Because of inconsistencies in reproductive performance, use of chromium as CrP remains controversial, and widespread use was further curtailed by its high price. Until last fall, it cost more than \$6/ton of complete feed to add 200 ppb chromium as CrP. In August 2000, some patent royalties on the product expired, resulting in a substantial price reduction that reduced cost to about \$2/ton. However, skepticism remains in terms of blanket adoption of CrP in all replacement gilt and sow diets. This begs the question: What do we have to lose and what is the potential payback for feeding CrP at its new reduced price? To answer this question, an economic analysis is in order.

Replacement Gilts Assume replacement gilts consume approximately 540 lb of feed during the pre-loading period of development from 100 to 280 lb body weight. Since adding 200 ppb chromium as CrP costs \$2/ton of complete feed, cost is \$0.54/gilt. Not all gilts will be selected for the breeding herd, however. Assume a worst-case selection rate of 50%, and CrP costs \$1.08/selected gilt.

Sows Assume a sow consumes one ton of feed annually and stays in the herd two years. At \$2/ton, it will cost an extra \$4 to feed 200 ppb chromium as CrP during her lifetime. Further assume the sow is producing an average of 2.2 litters per year or 4.4 litters per lifetime. If she responds to chromium as per published reports, we may expect 0.20 extra pigs/litter or 0.9 pigs/sow/lifetime. If preweaning mortality averages 10%, sows would produce an extra 0.8 weaned pigs per lifetime. If death loss from wean to market is 5%, sows would produce 0.75 extra market pigs per lifetime.

Weaned Pigs Total cost of feeding CrP throughout a sow's lifetime (from pre-loaded selected gilt through 4.4 parities) would be \$5.08. If a weaned pig is worth \$30 on today's market, producers would receive \$24 for every \$5 spent on CrP, a 4.8 to 1 return.

Marketed Pigs Total cost of feeding CrP throughout a sow's lifetime (from pre-loaded selected gilt through 4.4 parities) would be \$5.08. If pigs are sold at 260 lb body weight and market price is \$42/cwt, producers would receive \$109/pig marketed. However, sows are producing an extra 0.75 market pigs per lifetime so extra revenue would be \$82/sow. If fixed costs plus feed costs from wean to market are \$54/pig (\$40 for 0.75 pigs), producers would realize \$42 for every \$5 spent on CrP, an 8.4 to 1 return.

If sows do not respond as per published reports, producers would spend \$5/sow lifetime with no return on investment. Risk/reward analysis tells us that CrP is a technology worth considering, especially for producers of market weight pigs. As a general guideline, CrP should be fed in herds with less than 10.8 live born/litter. Herds that average more than 10.8 live born may not realize an adequate return on their CrP investment.