

ANIMAL SCIENCE

Title: Effects of supplementing transition sow diets with 3 levels of zinc on pre-wean mortality and lifetime productivity of pigs under commercial rearing conditions - **NPB#18-036**

Investigator: Pedro E. Urriola

Institution: University of Minnesota and Schwartz Farms

Date Submitted: July 31, 2019

collaborators: Julia Holen, Jae Cheol Jang, Mark Schwartz, Jerry Shurson, and Lee Johnston

revised

Scientific Abstract

Stillbirths and pre-weaning mortality are the primary cause of suboptimal survival. We tested a dietary intervention to decrease stillbirth and pre-weaning mortality by feeding zinc at the end of gestation. Starting on day 75 of gestation, gilts and sows ($n = 333$) were assigned randomly to one of three dietary treatments: **1) Control** – sows fed a corn-soybean meal-based diet to supply 275 mg/d of zinc from Zn as 175 ppm diet $ZnSO_4$ and 100 ppm AvailaZn™ (CON); **2) Intermediate** – to supply 577 mg of zinc/d from Control + 240 ppm supplemental Zn as $ZnSO_4$ (INT); and **3) High** – to supply 1,154 mg/d zinc from Control + 470 ppm supplemental Zn as $ZnSO_4$ (HI). At about day 75 of gestation, sows received dietary treatments until the day before farrowing. At farrowing, individual piglets were weighed and identified with an ear-tag. Cross-fostering events were kept within dietary treatments at the current farm management procedures. At weaning, pigs were weighed and counted to calculate average daily gain. The difference between pigs weaned and born alive was recorded as pre-weaning mortality. The statistical model considered the fixed effects of treatment and the random effects of sow parity after data were tested for outliers, equal variances, and normal distribution. There were no noticeable deleterious effects of additional dietary zinc levels on sow feed intake or health. There were no differences ($P > 0.05$) across treatments in total pigs born, born alive, or stillborn. Mortality of low birthweight pigs was greater (38.3%) than normal birthweight pigs (11.4%). Pre-weaning mortality decreased with greater zinc supplementation CON (15.0%), INT (13.2%), and HI (12.2%), while the magnitude of decrease was greatest among low birthweight pigs than normal weight at greater zinc supplementation CON (38.3%), INT (36.4%), and HI (28.1%). This decrease in pre-weaning mortality does not appear to be related to the incidence of low birth weight pigs because this was lower ($P < 0.05$) for sows consuming the intermediate diet (11.6%) when compared to sows fed CON (15.3%) and HI (15.1%). Despite differences in birth weight and pre-weaning mortality, there were no differences in individual piglet gain or weaning weight across treatments. A subset of pigs ($n = 450$, $n \approx 150$ /treatment) were selected at weaning to follow post-weaning performance. There were no differences on the final body weight, days to market or carcass characteristics of pigs born from sows on supplemental zinc compared to the current program. In conclusion, zinc for gestation-lactation transition sows may be at greater requirement to decrease pre-weaning mortality but the specific mechanisms of action are still unknown.

These research results were submitted in fulfillment of checkoff-funded research projects. This report is published directly as submitted by the project's principal investigator. This report has not been peer-reviewed.

For more information contact:

National Pork Board • PO Box 9114 • Des Moines, IA 50306 USA • 800-456-7675 • Fax: 515-223-2646 • pork.org
