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Abstract # 130

# Effect of vitamin C and organic zinc and selenium for early gestating sows on antioxidant capacity and piglet birth weight

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## INTRODUCTION

Vitamin C, zinc and selenium are all part of the antioxidant system and oxidative stress in gestation might cause variation in birth weight. Inorganic sources of zinc and selenium has a low availability to the animal, and therefore it was hypothesized that addition of dietary antioxidants given in early gestation in the form of vitamin C and organic zinc and selenium could prevent high levels of oxidative stress by improving the antioxidant capacity of the sow and increase birth weight of piglets.

## MATERIALS AND METHODS

A total of 248 multiparous DanBred Landrace x DanBred Yorkshire sows were allocated to either a Control diet or a Antiox diet with added Vitamin C and partly substitution on inorganic zinc and selenium with organic sources. Sows were fed the two diets from mating to day 50 of gestation. From day 50 and until day 112 all sows were fed the Control diet. See composition of Control and Antiox diets in Table 1. Diets were based on wheat, barley, wheat bran, soybean meal, sugar beet pellets and soy oil.

**Table 1. Composition of diets fed from mating to day 50 of gestation**

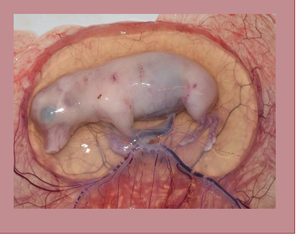
| Composition | Control | Antiox |
|---|---|---|
| Energy (ME), MJ per kg | 12.1 | 12.1 |
| SID protein, g/kg | 95 | 95 |
| SID Lys, g/kg | 4.6 | 4.6 |
| Vitamin C, ppm | 0 | 2000 |
| Zinc oxide, mg/kg | 110 | 10 |
| Organic zinc[1], mg/kg | 0 | 100 |
| Na Selenite, mg/kg | 0.35 | 0.15 |
| Organic Se[2], mg/kg | 0 | 0.20 |

[1]The organic zinc source was an amino acid complex with zinc
[2]The organic selenium was a selenomethionine source

**Registrations on all sows:**
- Back fat thickness (Lean-Meater at P2 site) at weaning, day 14, 45 and 112 of gestation
- Farrowing results in previous and current cycle
- Blood samples from jugular vein at weaning, day 14, 45 and 112 of gestation

**Registrations on fetuses from sows slaughtered at day 50 of gestation:**
- Fetal weight and organ weights
- Characteristics of placenta

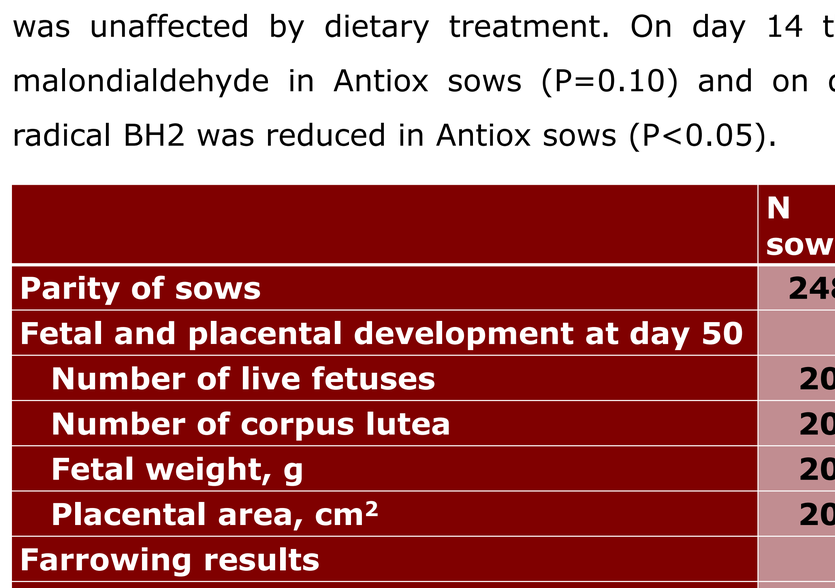
**Registrations on newborn piglets at farrowing on a subsample of litters:**
- Individual birth weight
- Crown rump length (CRL)
- Abdominal circumference (AC)
- IUGR-score
- Sex

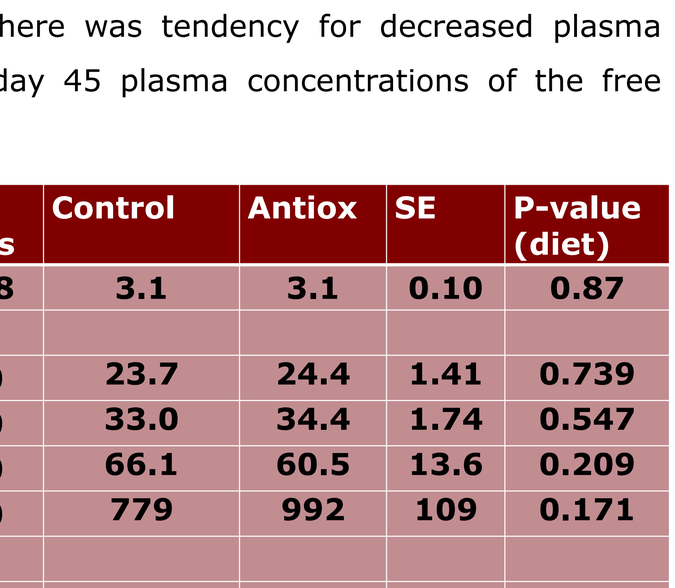


## RESULTS

Back fat thickness of sows and characteristics (CRL, AC, IUGR-score, sex) of newborn piglets was unaffected by dietary treatment. On day 14 there was tendency for decreased plasma malondialdehyde in Antiox sows (P=0.10) and on day 45 plasma concentrations of the free radical BH2 was reduced in Antiox sows (P<0.05).

| | N sows | Control | Antiox | SE | P-value (diet) |
|---|---|---|---|---|---|
| Parity of sows | 248 | 3.1 | 3.1 | 0.10 | 0.87 |
| Fetal and placental development at day 50 | | | | | |
| Number of live fetuses | 20 | 23.7 | 24.4 | 1.41 | 0.739 |
| Number of corpus lutea | 20 | 33.0 | 34.4 | 1.74 | 0.547 |
| Fetal weight, g | 20 | 66.1 | 60.5 | 13.6 | 0.209 |
| Placental area, cm$^2$ | 20 | 779 | 992 | 109 | 0.171 |
| Farrowing results | | | | | |
| Live born | 248 | 19.4 | 19.1 | 0.30 | 0.516 |
| Still born | 248 | 1.6 | 1.9 | 0.20 | 0.366 |
| Average piglet birth weight, g | 56 | 1337 | 1352 | 32.2 | 0.917 |
| Within-litter variation in birth weight, g | 56 | 314 | 288 | 16.0 | 0.226 |




## CONCLUSION

- **Dietary antioxidants did not significantly affect piglet birth weight and with-in litter variation**
- **Dietary antioxidants did affect blood parameters related to antioxidant capacity and oxidative stress**

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