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## Effects of supplementation of omega-3 fatty acids to gilts on subsequent reproductive performance and growth performance of their litters

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### Introduction

Dietary supplementation of omega-3 polyunsaturated fatty acids (n-3 PUFAs) during gestation and/or lactation is reported to increase litter size in pigs (Spencer et al., 2004; Webel et al., 2003) and is believed to be beneficial for reproductive performance in sows (Webel et al., 2004). However, results are inconsistent. This study re-assessed the effects of n-3 PUFA supplementation to gilts during late gestation and lactation on the subsequent reproductive performance and the growth performance of their litters.

### Material and Methods

At day 60 (d60) of gestation 117 pregnant gilts were pair-matched within breed group by weight and litter of origin, and allocated to one of two treatments:

- Control gilts (CON, N=56) fed standard gestation and lactation diets, or
- Treated gilts (FP10, N=61) fed the standard diets supplemented with 84 g/d of Sow Fat Pack 10 (JBS United, Sheridan, IN), a fish-oil based supplement rich in omega-3 fatty acids.

Gilts were fed CON or FP10 diets from d60 of first gestation, through a 21-d lactation, and until euthanasia at d30 of their second gestation. All sows were feed restricted during the last week of lactation (fed 60% of expected feed intake). Sow body weight, and backfat and loin depth, were measured at d60 of gestation, d1 of lactation, 7 days before weaning, at weaning, after last breeding and at d30 of second gestation. Net energy balance during lactation was calculated as reported by Vinsky *et al.* (2006). Individual piglet weights were measured on d1 of lactation, 7 days before weaning and at weaning in all litters, and at the end of the nursery phase in a subset of litters.

After weaning, sows were heat checked twice daily and bred by AI using semen from the same boars for both treatments. 60-72 hours after estimated ovulation a blood sample was taken to assess progesterone levels.

Sows were euthanized on-site at d30 of gestation, reproductive tracts were recovered, and the number, crown-rump length and weight of embryos, placental fluid volume, ovulation rate (CL number) and CL weight were recorded, and embryonic survival was calculated.

### Results

Net energy balance during lactation and sow body composition were not different between CON and FP10 sows. The total number of piglets born ( $13.0 \pm 0.4$  vs.  $12.9 \pm 0.3$ ) and average piglet birth weight per litter ( $1.32 \pm 0.03$  vs.  $1.34 \pm 0.03$  kg) were also not different between treatments. Repeated measures analysis for average piglet weight per litter showed that litters from FP10 sows compared to litters from CON sows were heavier at weaning ( $5.57 \pm 0.10$  vs.  $5.88 \pm 0.10$  kg, respectively;  $P < 0.05$ ) and had improved overall growth performance to the end of the nursery stage ( $P < 0.05$ ). Weaning-to-estrus interval, ovulation rate, and embryo weight/crown-rump length and survival to d30, did not differ between treatments, whereas average weight of the CL's at d30 was higher in FP10 compared to CON sows ( $378.1 \pm 6.9$  vs.  $341.0 \pm 7.1$  mg, respectively;  $P < 0.001$ ). However, blood progesterone level 60-72 h after ovulation was not different between treatments (10.18 and 9.27 ng/ml for CON and FP10 sows resp.).

### Discussion

Supplementing gilt diets with omega-3 fatty acids during late gestation and lactation positively impacted litter weight after birth, but did not affect the most common reproductive characteristics in sows after rebreeding.