

# Journal of Animal Science

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## **Effect of maternal fish oil and seaweed extract supplementation on colostrum and milk composition, humoral immune response, and performance of suckled piglets.**

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<http://jas.fass.org/content/88/9/2988.abstract>

Doi:10.2527/jas.2009-2764

PMID: 20453086 [PubMed - indexed for MEDLINE]

## Abstract

An experiment with a 2 × 2 factorial arrangement of treatments (n = 10 sows/treatment) was conducted to investigate the effect of maternal dietary supplementation with seaweed extract (SWE: 0 vs. 10.0 g/d) and fish oil (FO) inclusion (0 vs. 100 g/d) from d 109 of gestation until weaning (d 26) on sow colostrum and milk composition, humoral immune response on d 5 and 12 of lactation, and suckling piglet performance. Furthermore, the influence of dietary treatment on the phagocytic activity of whole blood white cells at weaning was examined. The SWE (10 g) contained laminarin (1 g), fucoidan (0.8 g), and ash (8.2 g) and was extracted from a *Laminaria* spp. The FO contained approximately 40% eicosapentaenoic acid and 25% docosahexaenoic acid. The SWE-supplemented sows had greater colostrum IgG ( $P < 0.01$ ) and milk protein ( $P < 0.05$ ) concentrations on d 12 of lactation compared with non-SWE-supplemented sows. Piglets suckling SWE-supplemented sows had greater serum IgG ( $P < 0.01$ ) and IgA ( $P < 0.05$ ) concentrations on d 5 and IgG concentrations on d 12 ( $P < 0.05$ ) of lactation compared with those suckling non-SWE-supplemented sows. In contrast, FO supplementation exerted a suppressive effect on piglet serum IgA concentrations on d 5 of lactation ( $P < 0.05$ ) compared with non-FO-supplemented diets. Dietary FO supplementation enhanced the n-3 PUFA proportion of sow milk ( $P < 0.001$ ) and piglet serum at weaning ( $P < 0.001$ ). Piglets suckling SWE-supplemented sows had a greater percentage of *Escherichia coli* phagocytizing leukocytes ( $P < 0.05$ ) and a reduced percentage of *E. coli* phagocytizing lymphocytes ( $P < 0.01$ ) compared with non-SWE-supplemented sows. Piglets suckling FO-supplemented sows had a greater percentage of leukocytes ( $P < 0.05$ ) and lymphocytes ( $P < 0.05$ ) phagocytizing *E. coli* compared with non-FO-supplemented sows. However, total leukocyte, lymphocyte, monocyte, and neutrophil numbers were not influenced by sow dietary treatment. Average piglet weaning weight and ADG between birth and weaning were not influenced by sow dietary treatment. In conclusion, the current study demonstrates that SWE supplementation from d 109 of gestation until weaning enhanced colostrum IgG concentrations and circulatory IgG concentrations in suckled piglets on d 5 and 12 of lactation. Furthermore, the percentage of leukocytes and lymphocytes phagocytizing *E. coli* at weaning increased in piglets suckling FO-supplemented sows, indicating an enhancement of immune function against presenting pathogens. However, the combination of SWE and FO bestowed no positive effect on immune responses investigated in the current study. Copyright © 2011 by the American Society of Animal Science.

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