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Effect of selenium sources on sow productive and reproductive performance and their progeny

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Abstract: Dietary selenium (Se) supplementation is a standard practice, using either an inorganic form, such as sodium selenite (SS) or organic forms, like SeYeasts (SY) or pure forms of selenomethionine (SeMet). Hydroxy-selenomethionine (OH-SeMet) is a chemically synthesized organic Se form and has been proven to be highly efficient in transferring Se from the diet to muscle compared to SS or SY products. The transfer of Se in tissues, in fact, leads to the buildup of a Se reserve as SeMet in the body that participates in maintaining effective antioxidant defenses and supports animal performance, particularly under challenging conditions. This trial aimed to observe the effect of different Se sources on the productive and reproductive performance of sows and on their progeny. 120 sows were allocated in individual cages in one of the three treatments according to the number of parities, number of piglets in previous parturition, body condition score and initial body weight. The experiment lasted 141 days (from the sow's insemination up to the weaning of the piglets at 21 days). A corn-soybean-based basal diet was formulated to meet the nutrient requirements of the sows during gestation and lactation. The Se supplementation was 0.35 ppm of Se either from SS, SY or OH-SeMet. The number of total piglets born showed a tendency ($p = 0.06$) for treatments fed organic Se sources (15.6 OH-SeMet; 15.4 SY vs 14 SS) with no differences on the litter weight at birth. However, sows fed OH-SeMet weaned more piglets (13.4) than the other treatments (12.5 SY and 12.2 SS, respectively, $p < 0.01$). The litter weight at weaning showed no differences among treatments (73.4, 70.4 and 75.9kg for SS, SY and OH-SeMet, respectively). The feed conversion of the sows during lactation was also affected by the Se source, in which OH-SeMet showed a significantly reduced FCR of 2.6 vs 3.0 and 3.1 for SS and SY, respectively ($p < 0.01$). Piglets fed organic sources showed a lower diarrhea incidence (scores 2 and 3) compared to SS ($p < 0.001$), respectively, 5.68 vs 3.28 and 3.27%. The Se levels on sows' colostrum and milk were numerically improved from SS to SY but only significantly higher on OH-SeMet treatment. The same pattern of Se level in the milk was observed in the piglets serum 48h after birth (142, 122 and 228 $\mu\text{g}/\text{kg}$ for SS, SY and OH-SeMet respectively) and at weaning (85, 85 and 117 $\mu\text{g}/\text{kg}$ for SS, SY and OH-SeMet respectively). Feeding pure forms of organic Se, such as OH-SeMet support the productive and reproductive performance of sows and improve the Se status of the progeny. Organic Se also reduces the diarrhea of piglets, compared to SS.