

INCREASED IMMUNITY IN WEANED PIGLETS BY DAILY DOSING OF *D*-ALPHA-TOCOPHEROL IN THE DRINKING WATER

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The critically important role of vitamin E, i.e., alpha-tocopherol, in enhancing both humoral and cell-mediated immunity has been demonstrated in various species. In weaned piglets, however, the utilization of acetate-form of supplemental vitamin E in feed is less than 10% during the 1st week following weaning, and only approximately 20-25% during the 2nd and 3rd week post-weaning. This results in critically low concentrations of plasma alpha-tocopherol. A clinical field study was conducted to measure the effectiveness of liquid natural-source vitamin E (*d*-alpha-tocopherol) in weaned piglets with a history of *E. coli* diarrhea. Three hundred ten 28-day old weaned piglets were divided into two groups, i.e., a control group of 155 piglets and a treatment group of 155 piglets with each group consisting of 4 pens of approximately 40 piglets per pen. All piglets received dl-alpha-tocopheryl acetate in the diet (125 mg/kg). The natural Vitamin E treated piglets received an extra daily administration of a *d*-alpha-tocopherol (NATUR-E Micelle, 500 I.U. *d*-alpha-tocopherol per ml, NETTOVET A/S) at a dose of 1 ml per 200 kg body weight for 10 days after weaning. The product was mixed with drinking water daily and offered in drinking troughs placed in the test pens. All piglets had equal access to the water troughs. Control piglets were also offered non-fortified water through drinking troughs. To entice intake of water, a small amount of milk replacer was added to the water for both groups. Plasma samples were collected at random from 10 piglets in both groups at weaning, and 1, 2, and 3 weeks following weaning and analyzed for alpha-tocopherol. Oral antibiotic treatment through drinking water (Neomycin Sulphate) was used only in pens with clinical signs of diarrhea. At weaning and prior to treatment, mean plasma alpha-tocopherol concentration was 4.5 mg/l in both groups. In control piglets, mean plasma alpha-tocopherol decreased to 1.4 mg/l and 1.2 mg/l at 1 and 2 weeks after weaning, respectively. In test animals, the supplementation of natural alpha-tocopherol through drinking water resulted in mean plasma alpha-tocopherol of 2.7 mg/l at 1 week following weaning. Since daily supplementation stopped 10 days after weaning, weeks 2 and 3 mean plasma alpha-tocopherol levels decreased to 2.0 mg/l and 1.4 mg/l, respectively. Vitamin E supplementation appeared to reduce incidence and severity of diarrhea. Control piglets first showed severe diarrhea 3-4 days after weaning, and 12 piglets died during the first two weeks (7.7% mortality). Vitamin E-supplemented piglets first showed signs of diarrhea 9 days post-weaning, and 3 piglets died during the 2nd week of weaning (1.9% mortality). Under the study condition employed, it can be concluded that daily addition of natural alpha-tocopherol to the drinking water to weaned piglets at a dose of 1 ml per 200 kg body weight for 10 days following weaning had a positive impact on plasma vitamin E status and subsequently immunity. Compared to control animals, the onset of diarrhea in test animals was postponed up to 6 days and was less severe; and mortality due to diarrhea was statistically significant reduced ($p=0.017$, relative risk=1.65).