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OREGANO ESSENTIAL OILS (OEO) SUPPLEMENTATION AND ITS EFFECT ON REPRODUCTIVE PERFORMANCE OF SOW, GROWTH PATTERN OF PIGLETS AND THEIR IMMUNE MEASUREMENTS

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Introduction

It has long been acknowledged that some plant essential oils exhibit diverse functional properties. OEO have been reported to possess antifungal [1], insecticidal [2], antimicrobial [3], and antioxidant [4] activity. Chemical analysis of these oils has shown the principal nutraceuticals constituents to be carvacrol and thymol [5]. Several studies have shown that OEO supplementation positively influenced daily feed intake, daily weight gain, and feed utilization in growing pigs [6] and improved reproductive performance in sows [7]. The objective of this study was to investigate the influence of OEO supplementation on sow and litter performance and immune status during a gestation-lactation cycle.

Materials and Methods

A total of 144 sows were used. Within the first 24 hours after service, sows were randomly assigned to one of two groups: control (corn-soybean meal diet) and oregano (control plus OEO 250 ppm, Regano500®). Blood was collected via jugular vena puncture using a vacutainer tube (Becton Dickinson, Rutherford, NJ) from 6 randomly chosen sows per treatment and their litter at farrowing (piglets were bled before and after suckling), 7, and 14 days of lactation. Colostrum and milk samples were also collected at these days. T lymphocytes were phenotyped ($\gamma\delta$, CD8, CD4) from whole blood and colostrum. Natural cytotoxicity was used as a measure to assess innate functional immunity in all pigs. To evaluate differences in growth rates due to OEO supplementation of sow feed, 630 piglets were individually identified at birth and weighed at 1, 5, 9, 12, 16, and 19 days of age.

Results and Discussion

The number of live born piglets and the litter birth weight were heavier when sows are supplemented with OEO during gestation ($P < 0.05$) (+ 1.2 piglet and 1.8 kg, respectively). Sows fed an oregano diet

during both gestation and lactation improved piglet performance. Litter weaning weight and litter weight gain (kg) were 4.4 and 4.7 kg higher ($P < 0.05$) in sows fed oregano diet compared to control diet. Parameters breeding value sow productivity (BVSP) and sow productivity index (SPI) were higher ($P < 0.01$) in OEO fed sows (103.9 vs 98.1 and 114.1 vs 96.5, respectively). Growth rate of piglets was higher ($P < 0.01$) in sows fed oregano diets during 1-5, 9-12, and 16-19 days of lactation. In blood and colostrums measurements showed that the percentage of $\gamma\delta$ lymphocytes was greater (4% and 3.8%, respectively) in sows fed OEO supplemented diets than control diets. The percentage of CD4 lymphocytes in blood was greater ($P < 0.01$) in sows fed OEO supplemented diets than control diets. The percentage of $\gamma\delta$ and CD4 lymphocytes isolated from piglets before suckling of sows fed oregano diet was greater ($P < 0.01$) than control diets. However, no differences were observed in these piglets after suckling. Lymphocytes isolated from piglets of sows fed OEO supplemented diets demonstrated greater natural killer (NK) activity throughout lactation, and significantly greater NK activity before suckling ($P < 0.01$). The biological growth potential of suckling pigs through the supplementation of OEO is much greater than that achieved in current conventional systems.

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