Effects of feeding oregano essential oil to sows on performance of her offspring from weaning through market

Claudia Ariza-Nieto\textsuperscript{2, 3} Roger D. Walker\textsuperscript{2} Martha A. Mellencamp\textsuperscript{1} Samuel K. Baidoo\textsuperscript{2}

1. Ralco Nutrition, Inc., Marshall, MN, USA; 2. Southern Research and Outreach Center, University of Minnesota, Waseca, MN, USA; 3. CORPOICA, Bogata, Colombia

Introduction

It has long been acknowledged that some plant essential oils exhibit diverse functional activities. Oregano essential oil (OEO) has been shown to possess anti-bacterial, anti-fungal, and anti-oxidant activities (1). Analysis of the chemical components of OEO has shown that it contains high levels of carvacrol and thymol. The phenolic nature of these two compounds is responsible for the potent activities associated with OEO. Results from several studies have shown that OEO supplementation positively influences sow reproduction and litter health (2, 3). In this study, we investigated the effects of feeding OEO to sows on performance and carcass characteristics of her offspring.

Materials and Methods

This experiment was carried out at the University of Minnesota Southern Research and Outreach Center. A total of 384 early weaned piglets (d19) from sows fed control (corn-soy) or OEO (control+250 ppm OEO, Ralco Nutrition, Inc., Marshall, MN) diets during lactation and gestation were randomly assigned to 48 pens. Each pen was randomly assigned to one of four dietary treatments: control, antibiotic (Mecadox\textsuperscript{\textregistered} 10kg/ton phase 1 and 2), OEO (1000 ppm phase 1 and 2, 500 ppm phase 3, 250 ppm phase 4 and 5) and antibiotic+OEO. Pigs were weighed at weaning (19d), phase 1 (33d), phase 2 (54d), phase 3 (89d), phase 4 (131d) and phase 5 (152 d). Twenty-seven pigs per treatment were randomly selected for collection of carcass data. Pigs were shipped to a commercial abattoir for slaughter at the end of phase 5. Standard carcass measurements were collected, including carcass weight, carcass yield, fat depth, loin depth, lean percentage, carcass premium score and carcass value.

Results

Analysis of variance showed that sow treatment significantly affected ADG. At the end of phase 1, pigs from OEO-fed sows grew faster than controls (175 v. 153 g/d). When measured over the entire wean-to-finish period, pigs from OEO-sows grew faster than controls (116 v. 112.6 kg) (Table 1). Sow treatment effects were observed for several carcass traits. There was no pig treatment effect observed for body weight or carcass traits, except for a sow treatment by pig treatment interaction for carcass premium (grade index). Carcass value showed that offspring from OEO-sows earned an additional $4.90 when compared with pigs from control sows.

Discussion

In this study, administration of OEO to sows significantly improved her offspring’s post-weaning growth and overall carcass quality and value. The effect of OEO in sow diets was first apparent in the higher litter weaning weights compared with control offspring. OEO-sows had better quality colostrum (more IgG and lymphocytes) than control sows, and this may have contributed to improved weaning weights (2). Study of post-weaning performance showed that the offspring of OEO-sows gained more weight during the first two weeks post-weaning than controls. Pig performance following weaning is a known predictor of subsequent performance. The underlying mechanism responsible for improved post-weaning performance seems likely related to gut structure. OEO supplementation was shown to reduce the negative morphological changes that occur in the small intestine during the post-weaning period (4). Feeding OEO in sow gestation and lactation diets supports nutritional programs designed to increase post-weaning pig performance and subsequent growth through slaughter. Pigs from OEO-fed sows showed clear benefits to the producer in higher carcass weight, greater loin depth, improved premium score and additional value.

Dietary supplementation with OEO to sows significantly increased body weight of offspring at slaughter (116 v. 112.6 kg) (Table 1). Sow treatment effects were observed for several carcass traits. There was no pig treatment effect observed for body weight or carcass traits, except for a sow treatment by pig treatment interaction for carcass premium (grade index). Carcass value showed that offspring from OEO-sows earned an additional $4.90 when compared with pigs from control sows.

Table 1. Effects of OEO in sow diet on offspring carcass characteristics and value.

| Sow diet | Number of pigs | Carcass characteristics | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Body weight (kg) | Carcass weight (kg) | Yield (%) | Fat depth (mm) | Loin depth (mm) | Lean (%) | Grade index | Carcass value ($) |
| OEO | 108 | 116.0 | 88.2 | 76 | 0.77 | 2.85 | 55.5 | 6.6 | 136.80 |
| Control | 108 | 112.6 | 85.6 | 76 | 0.77 | 2.75 | 55.1 | 6.1 | 131.70 |
| P value | not applicable | P<0.05 | P<0.05 | not significant | not significant | P<0.05 | P<0.05 | P<0.05 |