EFFECTS OF FEEDING BREWERS GRAINS, MAIZE STARCH, AND OMEGA 3 FATTY ACIDS ON GROWTH PERFORMANCE, MEAT QUALITY ATTRIBUTES, AND BLOOD STRESS INDICATORS OF VEAL

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I. OBJECTIVES

From to 2008 to 2018, the veal production in the United Sates decreased from 143 to 76 million pounds. Therefore, research focusing on developing and promoting veal production in the US is needed. In this study, we evaluated the effects of feeding starch and omega 3 oils on growth performance, blood stress indicators, pH, tenderness, sensory attributes, and fatty acid profile of veal as a feeding strategy to improve animal welfare and overall veal quality.

II. MATERIALS AND METHODS

Twenty-three veal calves approximately 2 mo old and 94.67 ± 12.07 kg were randomly assigned to one of 3 dietary treatments (Control $n = 7$, Starch, $n = 8$, and Omega 3 $n = 8$ animals per treatment). Diets included the following: milk replacer, 200 g of brewers grain, and mineral supplement (Control); Control + maize starch (Starch); and Control + 3% of omega 3 (Omega 3). All animals were individually fed and offered *ad libitum* amounts of milk replacer. Diet composition changed among treatments mostly on ethereal extract and energy content. Calves were fed for 68 d, and blood samples were collected during exsanguination for creatinine and cortisol analysis. After slaughter, hot carcass weight was recorded as well as weight after 24 h (cold carcass weight). Values of pH were assessed using a Hanna® pH meter (Hanna Instruments, RI), and instrumental color (L^*, a^*, b^*) was recorded by using a CR-400 Konica Minolta® (Konica Minolta Sensing Inc., Osaka, Japan) color reader. Approximately 24 h postmortem, the *M. longissimus dorsi et lumborum* was excised from the loins and aged for 14 d. Steaks (2.5 cm) were fabricated and evaluated for proximate composition, fatty acid profile, Warner-Bratzler shear force, and sensory attributes. Data were analyzed as a completely randomized design using the GLIMMIX procedure of SAS (SAS Institute Inc., Cary, NC). When significance was detected at $P \leq 0.05$, means were separated using LSMEANS.

III. RESULTS

Dietary treatments did not affect hot carcass weight, cold carcass weight, pH, moisture, color, Warner-Bratzler shear force, sensory attributes, and creatinine. Veal from calves fed Control and Omega 3 diets were significantly fatter than veal from calves fed Starch. Calves fed Starch and Omega 3 had lower levels of blood cortisol compared to calves fed Control. Veal from calves fed Control had the highest concentrations of C20:2n6, C22:4n6, and C20:3n3, whereas feeding Starch increased C18:2n6 and C20:4n6 compared to Omega 3 and increased C22:5n3 compared to control. Veal fed Starch also showed higher total omega 6 when compared to veal fed Omega 3. Feeding Omega 3 increased the deposition of eicosapentaenoic acid (C20:5n3) and docosahexaenoic acid (C22:6n3) fatty acids.

IV. CONCLUSION

Supplementing veal calves with maize starch and omega 3 oils does not affect growth performance and veal quality attributes. Animals fed supplemented diets had lower blood cortisol levels. Feeding milk replacer with brewers grains with or without maize starch increased omega 6 fatty acid deposition in the lean, whereas feeding Omega 3 favored deposition of eicosapentaenoic acid and docosahexaenoic acid. Feeding management is a viable strategy to decrease blood cortisol and manipulate nutritional values of veal.

Keywords: omega 3, quality, stress, veal