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Feeding Distillers Grains Plus Solubles with Different Moisture Levels Affects the Fatty Acid Profile of Value-Added Beef Cuts

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Objectives

Finishing beef with corn-based distillers grains (DGS) diets alters fatty acid composition of beef when compared to corn-based diets. Producers utilizing DGS as feedstuff may obtain this byproduct with different moisture levels. In this study, we evaluated the null hypothesis that inclusion of DGS with different moisture levels in finishing diets do not lead to similar deposition of fatty acids in the lean of value-added beef cuts.

Materials and Methods

Crossbred steers (n = 24) were randomly finished with 3 different diets: CORN (0%DGS), Dry DGS (40% DM of DGS with 8 to 12% of moisture; DDGS), and Modified DGS (40% DM of DGS with 45 to 55% of moisture; MDGS). After slaughter, shoulder clods (IMPS 114) were excised from carcasses and transferred under refrigeration to the University of Nevada, Reno Meat Quality Laboratory. After 7 d of aging, the M. Infraspinatus (INF, IMPS 114D PSO1) and M. Teres major (TM, IMPS 114F) were fabricated from the clods and pulverized with liquid nitrogen. Total lipids were extracted by using chloroform and methanol and converted to Fatty Acids Methyl Esters (FAME). Fatty acid profile was analyzed by gas chromatography (Agilent Technologies, model 6890 series) using a capillary column (Chrompack CP-Sil 88- 0.25 mm × 100 m). Oven temperature was programmed from 140 to 220°C at 2°C/min and held at 220°C for 20 min. Injector and detector temperature were maintained at 270 and 300°C, respectively. The carrier gas was hydrogen at a flow rate of 30 mL/min. Fatty acids (FA) were identified by comparison of retention times with known standards. Data were analyzed as a 3 × 2 factorial (diets × muscle) using PROC GLIMMIX of SAS (SAS Inst. Inc., Cary, NC) and when significance was detected at $P \leq 0.05$, means were separated using LSMEANS and DIFF functions.

Results

No interaction between muscle and diet was observed for all fatty acids, except for C6:0. Values of C14:1T ω5, C18:1 Δ11 ω7, C18:2 ω6, C20:3 ω6, C20:4 ω6, total PUFA, and total Omega 6 were significantly higher in TM when compared to INF, whereas C18:1 ω9 levels were significant higher in INF than in TM. Feeding corn significantly increased levels of some saturated and monounsaturated FA including C14:0, C16:0, and C18:1Δ11 ω7 when compared to DGS. Overall, finishing diets containing DGS significantly led to higher deposition of C18:0, C18:2 ω6, PUFA, and total Omega 6 FA. When comparing DDGS versus MDGS, feeding DDGS led to higher concentrations of C14:0, C14:1 ω5, C16:0, and C16:1 ω7 whereas MDGS led to higher C17:0 in the lean ($P \leq 0.05$). Feeding MDGS increased concentrations of C18:1T (ω9 and ω12), Total Trans, and C18:3 ω3 FA in the lean when compared to CORN, whereas beef from steers fed DDGS had higher Omega 6:Omega 3 when compared to CORN.

Conclusion

Inclusion of DGS with different moisture levels differently affected FA profile of beef. When compared to CORN-fed, beef fed MDGS had higher levels of Trans FA and C18:3 w3, whereas beef fed DDGS had higher Omega 6:Omega 3.

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