



## Investigation of the Fatty Acid Profile of the *M. rhomboideus* Derived from *Bos indicus* Cattle

J. M. Valenta<sup>1\*</sup>, C. Wu<sup>1</sup>, K. Modrow<sup>1</sup>, E. Hamilton<sup>1</sup>, and W. N. Osburn<sup>1</sup>

<sup>1</sup>Animal Science, Texas A&M University, College Station, TX, USA

\*Corresponding author. Email: jacobmontanavalenta@tamu.edu (J. M. Valenta)

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### Objectives

Research has shown the *m. Rhomboideus* (Rho) from purebred *Bos indicus* (BI) to be unique in its proximate chemical composition, indicated by increased lipid deposition. Thus, potential for the deposition of mono-(MUFA) and poly-unsaturated (PUFA) fatty acids exists. The objective of this study was to assess the fatty acid composition of the intramuscular (IMF) and subcutaneous (SQF) depots in the Rho from BI crossed cattle.

### Materials and Methods

Three replications of 4 USDA Choice (Ch) and 4 USDA Select (Se) Rho muscles were selected from the right half of split carcasses ( $N = 24$ ). Selection parameters were  $> 7.62$ -cm hump height,  $> 7.62$ -cm width,  $> 25.4$ -cm length, weight range: 2–4-kg. Muscles were removed from carcasses and vacuum packaged. After a 14-d aging period, Rho muscles were fabricated, 2.54-cm serially cut steaks (anterior to posterior), trimmed to 0.254-mm fat thickness. Steaks were assigned identification tags and designated for analysis. Rho steaks were used for proximate composition ( $n = 2$ ), trained sensory analysis ( $n = 2$ ), Warner-Bratzler shear force (WBS,  $n = 1$ ), collagen content ( $n = 1$ ), and fatty acid composition of IMF and SQF ( $n = 1$ ). Steaks for trained sensory analysis were also used for color measurements and cook yield. Data were analyzed using a 2-sample  $t$  test. Sensory data were analyzed using a linear fit model with order as a random effect. All data analyzed using JMP v14.0.0. A predetermined significance level of  $P < 0.05$  was used.

### Results

Total MUFA, PUFA and saturated fatty acid (SFA) percentages of IMF were not significant ( $P > 0.05$ ) between Ch Rho muscles (43, 7.2, 47.1%, 0.89, respec-

tively) and Se Rho muscles (43.0, 6.3, 50.7%, 0.86, respectively). Mean averages across both quality grades for total MUFA, PUFA, SFA, and MUFA:SFA (42.2, 6.8, 48.9%, 0.87, respectively) in Rho IMF were similar to reported FAC averages of *Bos taurus* (BT) *longissimus dorsi* IMF (47.8, 4.4, 47.8%, 1.0, respectively).

Total MUFA percentage (49.1 vs. 45.4%) and MUFA:SFA ratio (1.1 vs. 0.9) were significantly higher ( $P < 0.001$ ) in Ch SQF compared to Se SQF. However, total PUFA percentage (4.3 vs. 3.7%) and SFA (50.3 vs. 47.0%) were significantly higher ( $P < 0.02$ ) in Se SQF compared to Ch SQF. Mean averages across both quality grade for total MUFA, PUFA, SFA, and MUFA:SFA (47.4, 4, 48.6%, 0.99, respectively) in SQF were similar to reported fatty acid averages of BT brisket SQF (56.8, 3, and 35.9%; 1.47, respectively).

Protein content (19.4 vs. 18.6%) was higher ( $P < 0.02$ ) for Ch than Se Rho muscles.  $L^*$  value (50.2 vs. 47.9) was larger ( $P < 0.05$ ) for Se. Ch Rho muscles contained greater amounts ( $P < 0.001$ ) of total, insoluble, and soluble collagen (21.8, 21.5, 0.3 mg/g, respectively) compared to Se Rho muscles (13.8, 13.7, 0.1 mg/g, respectively). Ch Rho muscles were more tender ( $P < 0.001$ ) as determined by WBS values (2.6 vs. 3.1 kg). Trained sensory analysis, pH, fat, moisture,  $a^*$  and  $b^*$  color values between quality grades were not different ( $P > 0.05$ ).

### Conclusion

Differences were not seen for fatty acid composition between Ch and Se Rho IMF fat. However, higher percentages of total PUFA were found in both Ch and Se Rho IMF compared to reported *longissimus dorsi* IMF. Additionally, Ch Rho SQF contained higher percentages of total MUFA. However, Se Rho SQF contained higher percentages of total PUFA and SFA. Higher percentages of SFA were found in both Ch and Se SQF compared to reported brisket SQF SFA values.