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Assessment of the Nutritional Value of Beef Obtained from Aubrac Raised in a Semi-Intensive System

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Abstract

The aim of this study was to assess the nutritional value and chemical composition of beef obtained from Aubrac cattle raised in a semi-intensive system. Samples of meat were collected from various muscle regions and analyzed to determine their physical and chemical properties, including protein, fat, water, and collagen content. The results showed that the meat from Aubrac cattle had a higher nutritive-biological value, as compared to other breeds of cattle. The protein content in all four regions of the meat was found to be approximately 21.6%, while the minimum fat content was 2.6% and the water content was aproximately 75%. These values may vary depending on factors such as breed, age, diet, and level of activity of the animal. The findings of this study suggest that the semi-intensive system used to raise Aubrac cattle can positively influence the quality of the meat. Overall, the results of this study suggest that Aubrac beef has a unique nutritional value and chemical composition, making it a desirable choice for consumers who are looking for high-quality, nutritious meat.

Introduction

The Aubrac breed is a type of cattle originating from the southern region of France, particularly from the Aveyron, Lozère, and Cantal departments. This is a meat and milk breed that is highly appreciated for the superior quality of its meat, known for its excellent taste and fine texture.Aubrac is a large breed, with the average weight of adult cows being around 650-700 kg and adult bulls being around 1000-1200 kg.These cattle are well adapted to the environmental conditions of their region of origin, being able to survive in difficult climate and rugged terrain.They are also considered to be quite resistant to diseases and poor grazing conditions.

The Aubrac meat is considered to be of very good quality, known for its excellent taste and fine texture. It is a juicy meat, rich in nutrients and with a low content of saturated fats, making it a healthy choice for consumption. Beef primarily contains water, protein, and fat, as well as a range of vitamins and minerals essential for human health. Generally, the protein content of meat varies between 15% and 25%, while the fat content varies between 5% and 25%, depending on the type and part of the animal. It is important to note that the chemical composition of beef can vary depending on the breed of the animal, its diet, and the processing techniques used.

Materials and methods

The material studied consisted of 14 Aubrac cattle (cows and bulls) with an average age of approximately 1-2 years, raised semi-intensive. Four different muscle regions (beef tenderloin, sirloin, round and fore shank) were analyzed for their chemical composition and quality. The analysis of the samples was carried out with the help of the FoodCheck analyzer. Foodcheck Meat and Dairy Products Analyzer is a portable device for rapid food analysis that can be used to check the composition and quality of food products.The device uses near-infrared spectroscopy (NIR) to analyze samples of meat and dairy products. FoodCheck is trusted by hundreds of food producers around the world to improve end-product quality by accurately measuring moisture, protein, fat, carbohydrates, dry matter, collagen, ash, and other important constituents. A major challenge for meat and dairy companies is to produce consistent highquality end-products from natural raw ingredients with significant variability in composition. The FoodCheck provides a fast, reliable, and easy-to-use solution to monitor the entire process from incoming raw ingredients through production and final products to ensure quality and reduce costs.
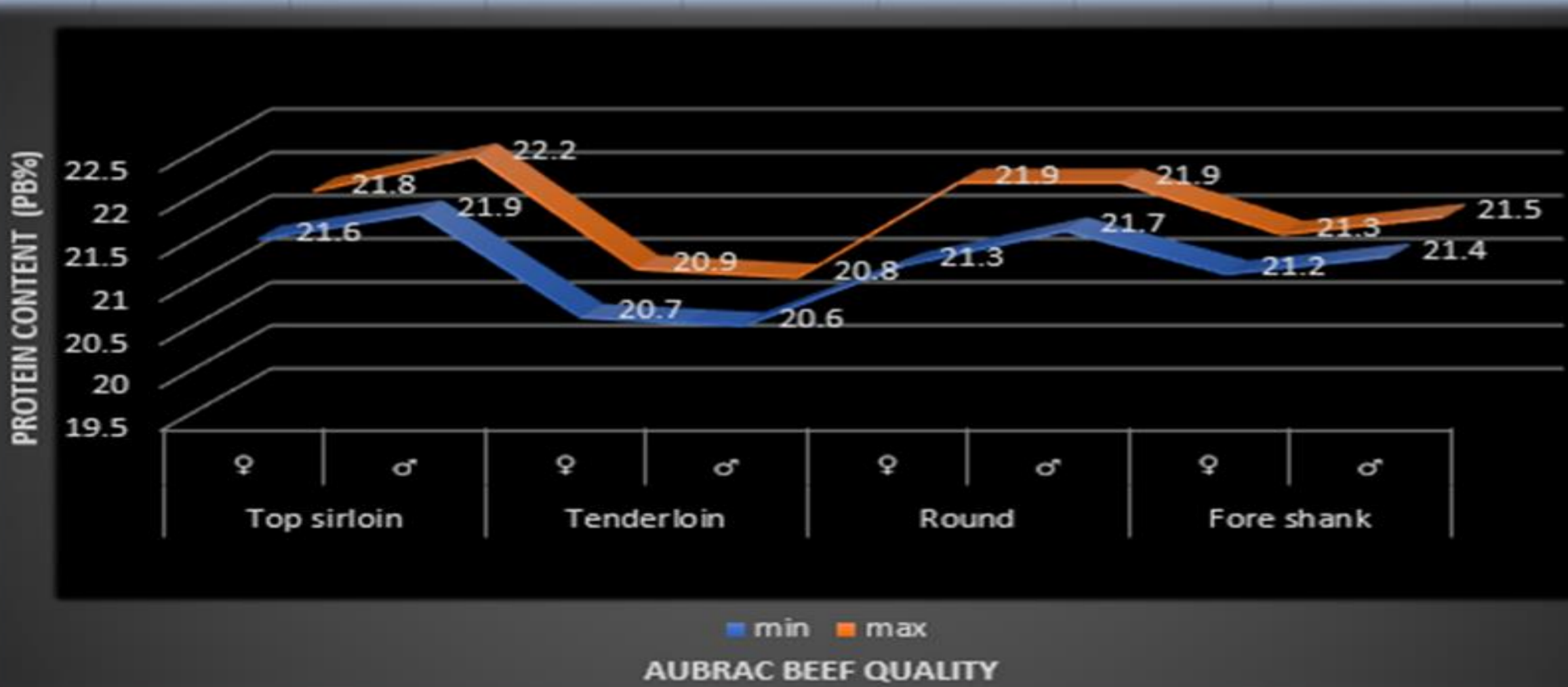
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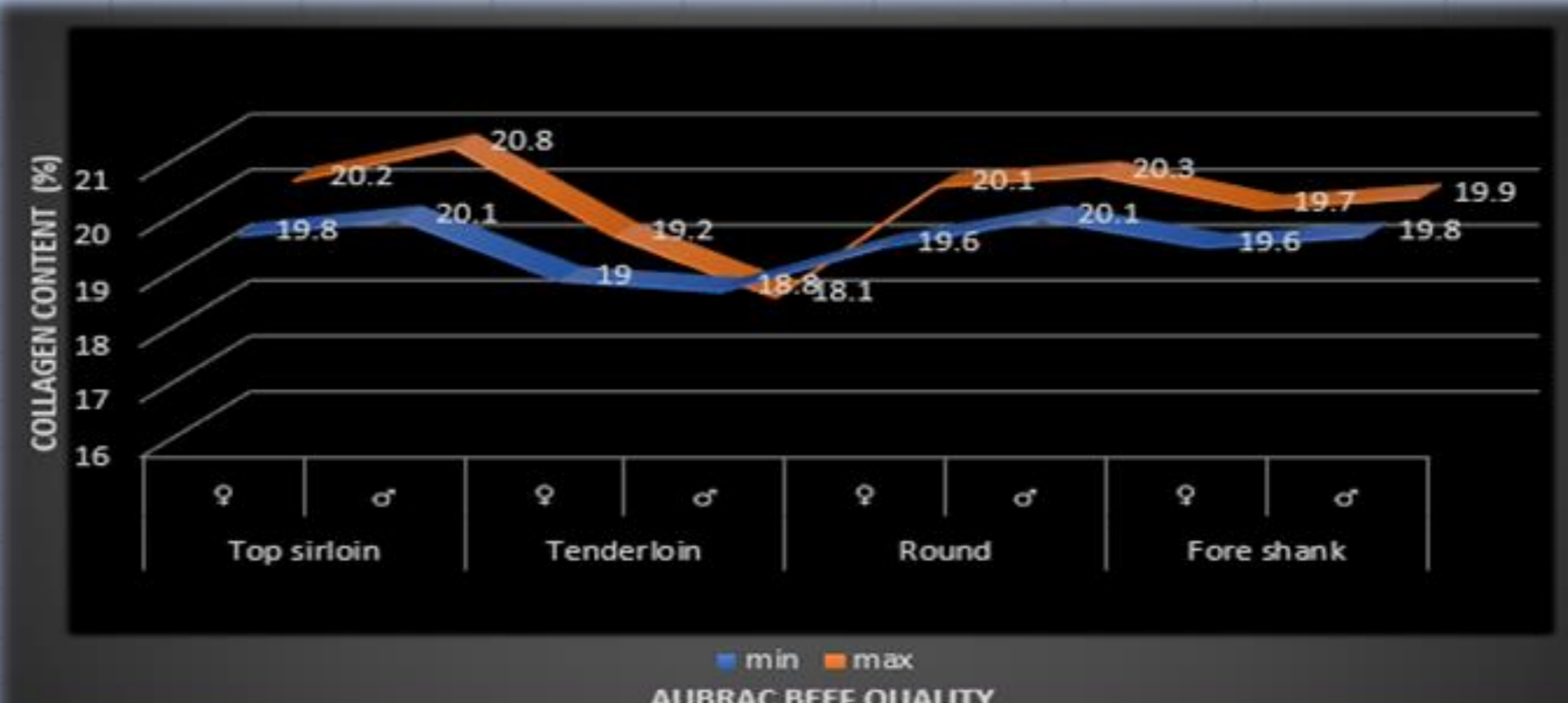

Figure 1. Protein content of Aubrac beef

Figure 2. Collagen content of Aubrac Beef

In Table 1, the total protein content found in Aubrac beef obtained from both male and female cattle is represented, considering four anatomical regions studied. It can be observed that minimal variations were obtained both between sexes and among the muscle regions studied. The values ranged from a lower limit of 20.6% (♂ tenderloin) to an upper limit of 22.2% (♂ topsirloin). Junka et al., 2017 reported in Aubrac beef a protein level of approximately 23.23 ± 0.34. The protein content in beef is influenced by factors such as breed, diet, age, level of activity, and methods of rearing and processing.

Collagen is a protein that is found in the connective tissues of animals, including beef. In beef, collagen is primarily found in the tougher cuts of meat, such as those from the muscles and joints. These cuts contain higher levels of collagen due to the presence of connective tissues. The lowest recorded value was 18.8% (♂ tenderloin) and the highest value was 20.8% (♂ top sirloin). Collagen is also known for its potential health benefits. It is a rich source of amino acids, particularly glycine, proline, and hydroxyproline.
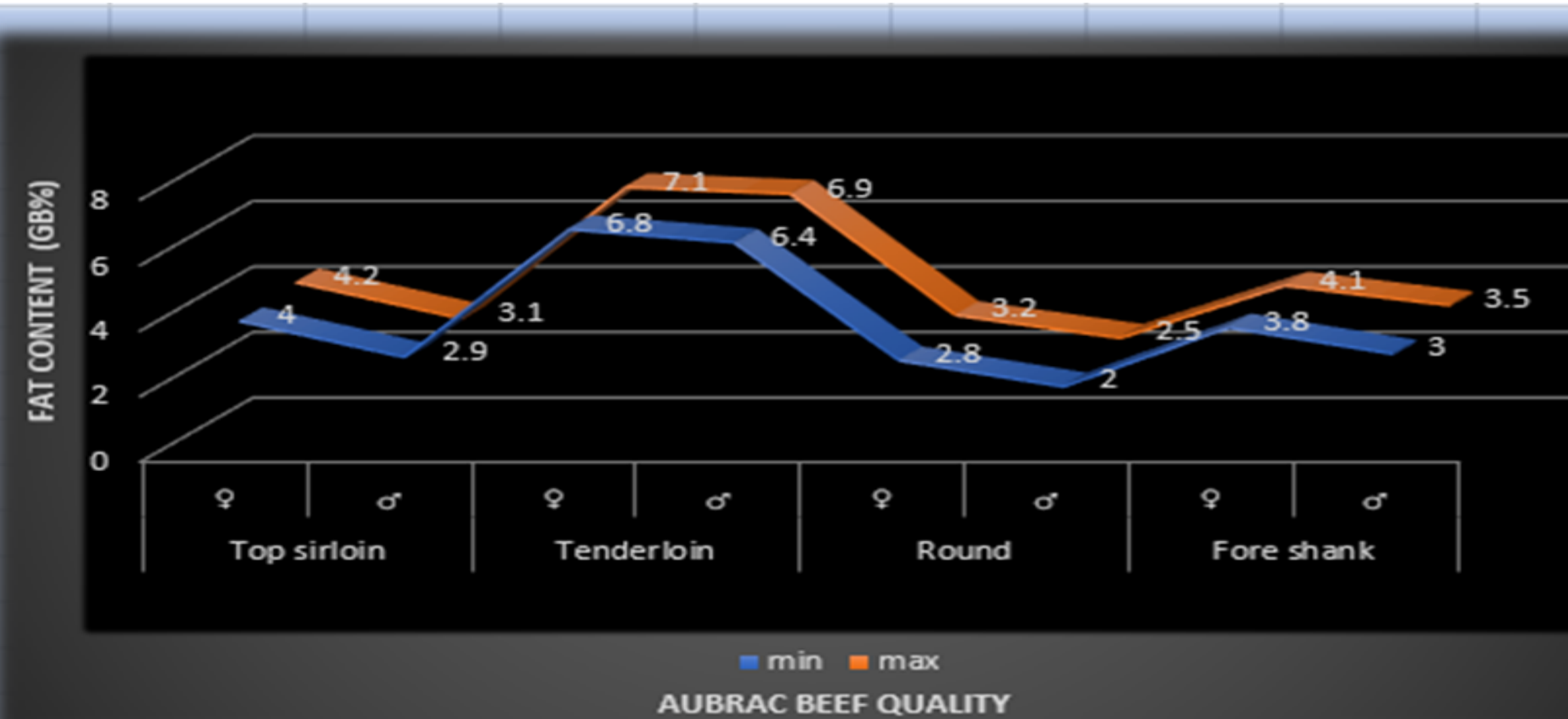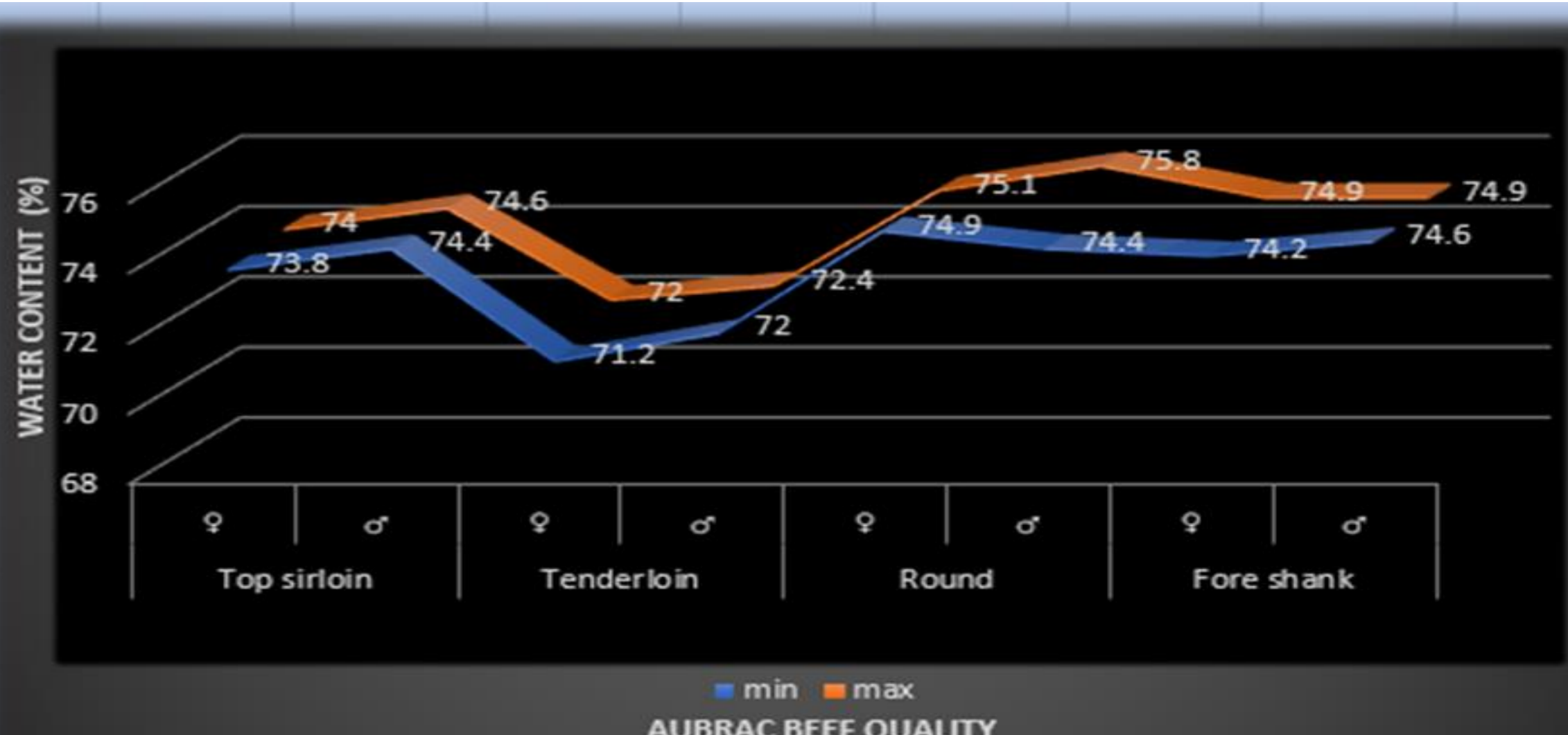

Figure 3. Fat content of Aubrac beef

Figure 4. Water content of Aubrac beef

The fat content in beef can vary depending on the specific cut of meat and the fat distribution within the animal. Generally, beef is classified into different categories based on its fat content: lean, medium, and high fat. Lean cuts of beef, such as sirloin, tenderloin, and round, typically have a lower fat content, usually ranging from 2% to 10%. These cuts are generally considered healthier options due to their lower fat content. t's worth noting that the fat content can also depend on factors like the animal's diet and breed. Additionally, ground beef or minced beef may have varying fat percentages, depending on the specific lean-to-fat ratio chosen during the grinding process.

The water content in beef can vary depending on various factors such as the cut of meat and the fat percentage. Generally, beef contains around 60-75% water. The lowest recorded value for water content in analytical tests was 71.2%, while the highest value was 75.2%.
Fresh beef has a high water content because water is a major component of its cellular structure. It is important to note that the exact percentage of water in beef can vary depending on factors such as the anatomical region of the animal, age, and diet.

Conclusions

In conclusion, beef is a protein-rich food that contains varying amounts of water, fat, and collagen. It is a valuable source of essential amino acids, vitamins, and minerals. The fat content can vary depending on the cut and marbling, while collagen contributes to the texture and tenderness of the meat. Additionally, beef provides a significant amount of water, which is a crucial component of its cellular structure. Overall, beef offers a diverse chemical composition that makes it a nutritious and versatile protein option