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Analyzing Methods For Improving Beef Tenderness.

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ABSTRACT

It is 60 years since Warner (1928) presented his results on a mechanical test for meat tenderness. And it is just a few months over 80 years since Lehmann (1907) reported his study of toughness in relation to connective tissue and fiber diameter. These annversaries are more than mere historical milestones; they are disturbing reminders of the pathetically small progress we have made toward tenderness improvement and the routine attainment of tender meat. We are already acquainted (albeit rather superficially) with two early postmortem phenomena, cold shortening and rigor mortis, and with the use of electrical stimulation (ES) to suppress the first of these by accelerating the second. Yet a vast amount remains to be learned of this phase, in relation to both basic knowledge and practical application. What do we really know, for instance. of the role of heat shortening as a toughening agent under mild chilling conditions? To what extent can observations on pre-rigor excised muscles be extrapolated to carcasses? Does tenderness continue to improve with progressively longer stimulation? Why does accelerated glycolysis produce such variable and even conflicting results in different situations? The answers to these and other questions are important both because they will contribute to our knowledge of toughness and tenderness and because they will almost certainly contribute to the practical attainment of tenderness and higher eating quality.

Keywords: beef, cold shortening, tenderization interventions, tenderness, rigor mortis.

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INTRODUTION

Traditions of farming in Russia have developed in such a way that poultry, pigs, sheep were kept for meat, and goats and cows for milk. Old animals, unable to give milk, were sent to slaughter. At this age, meat becomes tough, sinewy and has a specific smell, which is reflected in its substantially low consumption in Russia. For example, in the United Kingdom, the United States, Canada, and Australia, cows, after they stop giving milk, are sent to industrial processing, for the production of stewed animal feed, etc.

Times change, the global trend of a healthy lifestyle determines the behavior of consumers. Together with the rejection of harmful habits, they switch to a healthy diet, read the composition of products, track the amount of protein, fat, carbohydrates consumed and study the information on the effect of food ingredients on their health.

Beef is a unique source of proteins and amino acids, it contains zinc and iron, it is easily digested in the body, it normalizes the acidity level, neutralizing the hydrochloric acid and other irritants in gastric juice. And also, despite the fact that beef is considered dietary meat, it at the expense of its nutritional value saturates the body much faster than other foods. But despite all the advantages, tenderness remains one of the most important characteristics and is considered the main attribute of the quality of red meat. Research constantly supports this concept. Tenderness is highly correlated with the consumer satisfaction rating of the product (r = 85), as well as the taste desirability (r = 86). There is no doubt that tenderness is a critical characteristic of beef and a product that does not meet the expectations of consumers will certainly not be in demand. Accordingly, it is necessary to develop specific methods and technology to achieve the desired goal [1].

It can be assumed that the use of genetics to increase the tenderness of the whole beef will solve the problem, but it must be understood that biological variations will always exist, and even if genetically genetic tendencies could be increased, the cattle still would not remain in the population, the meat of which would not correspond by the index of tenderness [6].

Understanding of biochemical mechanisms and factors underlying the increase of tenderness will allow determining the optimal solution. It was found that the temperature of the carcass, in which the carcass is aged until the stage of rigor mortis, has a significant effect on the tenderness of the meat. Exposure to carcasses for 10 hours at 6, 8 or 10 ° C after slaughter resulted in varying degrees of tenderness. The lower the temperature, the higher the risk of a cold burn. In addition, lower temperatures reduce the degree of degradation of meat protein.

The degree of pH also has a significant effect on the tenderness of the meat. If the meat has a very high pH (above 6.3), then the kalpan (enzymes responsible for the breakdown of proteins during maturation) show the maximum activity that leads to an increase in tenderness. Intermediate pH values (5.8 - 6.3) impart greater rigidity to meat. Rapid lowering of pH makes it possible to obtain a more tender beef than a slow decrease in pH. Meat raw materials with a low rate of falling pH have shorter sarcomeres and a lower degree of proteolysis [5].

The method of hanging carcasses also has an effect on the tenderness of meat, so the carcasses were hanged for the hip joint, possessed greater tenderness than the traditional hanging for the Achilles tendon (hock joint).

Electrical stimulation (low voltage) had a positive effect if the carcass had the potential for cold contraction during cooling (for example, slowly glycolizing muscles or obese carcasses).

A more detailed analysis of the evacuation did not reveal any significant differences in the storage time for the tenderness of the meat.

The most promising ways to increase the tenderness of the meat is seen in the injection of calcium ions and the use of special feed ingredients such as vitamin D (studied by the Texas Technical University and the University of Oklahoma).

Analyzing the above, it can be concluded that tenderness of beef is a complex problem, and it is influenced by four main factors: 1) degradation of muscle fibers; 2) autolysis; 3) the content of connective tissue, and 4) the amount of intramuscular fat or marbling. Since genetic and exogenous factors can influence each of the four stages of the formation of tenderness, the following critical control points are distinguished:

- Genetic regulation of beef tenderness;
- Selection;
- Sewage management - high-calorie diets and age of slaughter;
- Posthumel constriction - decrease in pH and cooling rate;
- Electrostimulation;
- Rigor mortis;
- Cooking.

CONCLUSION

Most of these critical control points are currently used in the production of beef, but there is no system that affects the tenderness of beef based on the correct application of control points.

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