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Effect of Slaughter Age on Beef Quality

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ABSTRACT

Meat is one of the best proteins which are available to humans. One other thing that makes meat a favourite meal of humans is its taste. The taste and quality of meat are the important focal point to sell meat effectively. An experiment was performed on bulls to determine the effect of slaughter age on meat quality. Upon rigorous testing of various parameters of meat quality like pH, chemical composition, colour, sensory factors, texture, and cooking yield it was found that animals around the age of 19 months produced the best quality meat for human consumption. The control of a factor such as age will help the slaughterhouses and other meat-related businesses to buy the best quality meat for selling to consumers. Hence, this experiment was conducted with both commercial and educational aspects in mind.

Importance of Meat Quality Factors:

There have been several major changes in the meat market, especially for beef as people have started to demand leaner, juicier, and softer meat. Just like any other food product success of beef is also determined by customer acceptability. As consumers begin demanding high-quality and safe meat products it became essential for beef suppliers to consider and improve all the factors that can affect meat quality [17].

Status of Slaughter Age:

The slaughterhouses that buy animals for slaughter have only a few controllable factors at their disposal. A very important factor out of these few factors is the age of the animal being slaughtered. It can be easily declared as the most affecting factor that immediately determines the quality and tenderness of the meat [6, 7, 8]. Consumers also wish to buy meat from younger animals because of the common perception that younger animals have softer and more tender meat [16].

Parameters for the

a. pH:

Some consumers determine the quality of meat on basis of its pH. pH also affects the taste of meat. The results of this experiment related to pH were as follows:

- pH was found to be higher in the latissimus dorsi muscles 5.48 as compared to the gluteus muscles 5.44.
- The pH of carcasses of all ages was very close to each other ranging from 5.44 for the youngest to 5.49 for the oldest calf [9].

These pH readings were taken from the carcass after 24 hours of frozen storage post-slaughtering. This slight difference in pH did not induce a risk of drastic changes in meat quality and flavour. Only a pH value above 5.8 is considered devaluating for meat quality [9].

The important problems related to pH change are the dark red color of the meat, lower tenderness, and increased water-holding capacity. The tenderness of the meat is directly linked to its pH. Meat becomes tender at very low and very high pH. However, at high pH, the meat also becomes dark-colored and elastic. Consumers prefer low-pH meat that is pale and juicy. Age may not affect the pH directly in the case of meat but it is still responsible for a higher quantity of dry matter, lipids, and collagen in older animals [2, 11].

b. Color:

Color is one of the most significant factors considered by consumers when buying meat. People usually prefer lighter, and a bit paler meat as compared to darker and redder. Observations regarding meat color recorded during this experiment were:

- The meat obtained from latissmus dorsi muscles was light-colored but redder than the meat from the gluteus muscles.
- The older calves had darker meat as compared to the younger ones [9].

Meat lightness is directly related to heme iron content in muscles which increases with slaughter age. This explains why older calves had darker meat. The heme iron content in older calves tends to get deposited in muscles this chemical substance captures more light making the meat appear darker. The shades in the meat of nearly the same color may also appear due to pH change and intramuscular fat. [2, 3, 12].

c. Chemical composition:

Determining the nutritive value of meat is important to determine its market value and proportion to the diet. The nutritive value of meat can be determined through an analysis of its chemical composition. Chemical composition testing of these carcasses yielded the following results:

- The chemical parameters of meat light dry matter, fat, protein and ash were not significantly affected by muscle type or muscle interaction
- However, these factors seemed to increase with the increase in slaughter age [9].

The increased nutritional values like increased proteins and reduced cholesterol may be considered healthy for meat but it is not affected much by the slaughter age of animals [2].

d. Sensory characters:

People tend to buy tender, soft meat that is easy to cook, eat, and digest. Tenderness in meat is directly related to consumer satisfaction. In the above-mentioned experiment, the sensory tests for juiciness, tenderness, flavour intensity, and acceptability of meat gave us the following results:

- The tenderness, juiciness, flavour intensity, and acceptability of meat were found to be maximum in samples obtained from a 19-month-old calf's carcass.
- These factors tend to increase till the age of 19 months and started decreasing after that age.
- The highest sensory panel scores were obtained by the sample from a 19-month-old calf's carcass.
- The juiciness and flavour of the latissimus dorsi muscle were found to be greater than that of the gluteus muscle [9].

This could be explained by the fact that older animals have a smaller extent of proteolysis, and their muscle fibber's are longer making the overall texture of meat less tender than the younger animals. On the other hand, younger animals have more collagen fibres. When heated, collagen fibers shrink down, leading to the tightening of muscles and making the meat harder. The fluid loss due to the shrinkage of these collagen fibers is also crucial in reducing meat tenderness [4, 15].

e. Cooking yield:

Cooking yield is also an indicator of meat quality. Higher cooking yield means the tenderness, juiciness and overall flavor of meat also improves by many folds [1]. In the above tests following relation was seen between the age of the slaughtered animal and its cooking yield:

- Cooking yield increased directly with the age of the animal so older animals had a greater cooking yield [9].
- Latissmus dorsi muscles gave more cooking yield than the gluteus muscles [7, 14].

f. Texture:

Texture differences seen in animals of different ages were not very significant. With the age of an animal, texture values increased a bit [13]. In animals of all ages the chewiness, gumminess, hardness, and resilience remained nearly the same. Rather these factors were changed upon changing the region of muscles being tested. It might be possible because younger animals have tender meat and shorter fibers while older animals have longer fibers, and harder meat but a greater number of proteolytic enzymes that help in covering the difference in texture caused due to aging [5].

Conclusion:

This experiment confirmed that age at slaughtering has a major influence on the quality of meat. The slaughterhouses that buy animals for slaughtering should consider this factor crucially to produce the best quality meat within their domain.

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This experiment suggested that animals of age around 19 months produce the best quality meat for consumption. The meat from the animal under testing that was 19 months old got the best scores in nearly all kinds of tests. It means that slaughtering animals of age 25 to 27 months or older will result in poor-quality meat and hence economic losses can occur.

References

[1]. Amha S, 2006. Meat quality of selected Ethiopian goat genotypes under varying nutritional conditions, Ph.D. Thesis. University of Pretoria Pub, Pretoria, South Africa 26.
[2]. Bures D and Barton L, 2012 Growth performance, carcass traits and meat quality of bulls and heifers slaughtered at different ages. Czech. *Journal of Animal Science* 57: 34–43.
[3]. Chambaz A et al., 2003. Meat quality of Angus, Simmental, Charolais and Limousin steers compared at the same intramuscular fat content. *Meat Science* 63: 491–500.
[4]. Crouse JD et al., 1991. The relationship of muscle-fibre size to tenderness of beef. *Meat Science* 30: 295–302.
[5]. Dominguez R et al., 2015. Effect of slaughter age on foal carcass traits and meat quality. *Animal* 9: 1713–1720.
[6]. Dransfield E et al., 2003. Meat quality and composition of three muscles from French cull cows and young bulls. *Journal of Animal Science* 76: 387–399.
[7]. Franco D and Lorenzo JM, 2014. Effect of muscle and intensity of finishing diet on meat quality of foals slaughtered at 15 months. *Meat Science* 96:327–334.
[8]. Hoffman LC et al., 2003. Comparison of six crossbred lamb types: sensory, physical and nutritional meat quality characteristics. *Meat Science* 65: 1265–1274.
[9]. Kopuzlu S et al., 2018. The effects of slaughter age and muscle type on meat quality characteristics. *Archives Animal Breeding* 6: 497-504.
[10]. Lorenzo JM et al., 2014. The effect of livestock production system and concentrate level on carcass traits and meat quality of foals slaughtered at 18 months of age. *Animal* 8: 494–503.
[11]. Mach N et al., 2008. Association between animal, transportation, slaughterhouse practices, and meat pH in beef. *Meat Science* 78: 232–238.
[12]. Mancini RA and Hunt MC, 2005. Current research in meat color. *Meat Science* 71: 100–121.
[13]. Polidori P et al., 2015. A comparison of the carcass and meat quality of Martina Franca donkey foals aged 8 or 12 months. *Meat Science* 106: 6–10.
[14]. Preziuso G and Russo C, 2004. Meat quality traits of longissimus thoracis, semitendinosus and triceps brachii muscles from Chiania beef cattle slaughtered at two different ages. Italian *Journal of Animal Science* 3: 267–273.
[15]. Tornberg E et al., 1994. Influence of aging time, storage-tempereture and percentage lean on the eating quality of pork and its relationship to instrumental and structural parameters. *Sciences des Aliments* 14: 373–385.
[16]. Vergara H et al., 1999. Influence of sex and slaughter weight on carcass and meat quality in light and medium weight lambs produced in intensive systems. *Meat Science* 52: 221–226.
[17]. Vieira C et al., 2007. Breed and ageing extent on carcass and meat quality of beef from adult steers (oxen). *Livestock Science* 107: 62–69.