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### **Quotient of "marble" as a quality factor of beef**

**The purpose.** To study physico-technological and cooking characteristics of beef of cattle of different breeds.

**Methods.** Comparative assessment of physical, chemical, biochemical and organoleptic indicators of meat of bull-calves of different direction of productivity.

**Results.** The beef of breeds Red steppe and Sharole is suitable for cooking and prolonged storage. The quotient of "marbling" testifies to the level of its fatness, juiciness and odor.

**Conclusions.** Grading of fatness of cattle according to "marbling" requires further clarification. Implementation of quotient of "marbling" of beef will speed up development of beef cattle husbandry in Ukraine and will promote more complete sufficing of the population in high-quality meat

**Key words:** beef, fatty tissue, "marble", gustatory and cooking properties.

The purpose - to study the physical, technological and culinary properties of beef of cattle of different breeds.

Research methodology. In the research farm "Polivanivka" we formed two groups of 12-month-old bulls of dairy (red steppe) and specialized meat (chalola) breeds of 15 goals. Animals were kept in one room with free access to the exercise area. The feeding diet consisted of traditional for the steppe zone of forage: corn silage, haylage from alfalfa, winter wheat straw, alfalfa hay, mixed fodder and mineral fertilizers. The concentration of energy in the dry matter at different age periods of the cattle was 80-90 MJ per head per day. Animals were raised until the age of 30 months. Their slaughter (5 goals) was spent at 18, 24 and 30 months. At the Krasnogradsky meat processing plant.

A number of indicators have been studied to determine the quality of beef - physical, chemical, biochemical and organoleptic. Particular attention was paid to the topography of fat in carcasses of bulls, which means many properties of meat [5, 7, 8].

Research results. The determining indicator of meat productivity of cattle is the mass of carcasses [6, 11]. The carcasses of experimental animals of a specialized breed of meat differed from the peers of the milk with more complete and rounded hips, well-obtimated lumbar and spinal parts, developed sternum, and the presence of fat intermuscular and intramuscular layers ("marble"). Puppies of the red steppe breed grew less intensively: the mass of their carcasses for the period from 18 to 30 months of age increased by 90 kg, and charolina by 181 kg (twice as much). The heavier the carcass was for a relatively short period of cultivation, the better its morphological and chemical composition, the higher quality of meat and the more economically expedient cultivation of such animals. The most valuable part of the carcass is the muscle tissue on which occupies the main part of it. During the experimental period (12 months), the mass of pulp in the bulls of dairy breeds increased by 81 kg (the coefficient of meatiness varied from 3.7 in 18 months to 4 in 30 months.), Its yield was 77-80%, in Meat - respectively by 147 kg (1.8 times more) and 82-84% (coefficient of meat production - 5,0-5,2). The quality of the muscle tissue (pulp) is determined by the content of fat, protein

and moisture in it. The fattening process in the bovine organism occurs at the same time and unevenly throughout the animal's body [3, 10]. During intensive growing in the first stages of fattening, the fat is first deposited on the internal organs (intracavitary) and has a low nutritional value, then - between the individual muscles (intermuscular) - has a certain nutritional value, then - in the subcutaneous tissue (irrigation) - practically it has no nutritional value and only until the end of fattening - in the muscles (intramuscular). The fat contains unsaturated fatty acids, which give the beef a tenderness, juiciness, taste and good culinary properties, it stores vitamins A and D. Meat acquires "marbling", which is highly valued in the consumer market. The dynamics of fat accumulation is closely related to the age of the animal: the older it is, the more fat accumulated in it, and the energy value of the carcass increases (Table 1). The body as a result of reduced metabolism with age less consumes calorie intake for energy production for life support and more directed to the synthesis (deposition) of fat. That is, the deposition of fat in the body of animals increases from the moment when the caloric intake of the diet begins to exceed the energy costs of the organism. Ability to deposition of fat is one of the signs of rapidity genotype. The total mass of fat in the carcass of Bugites of the Red steppe breed increased by 1,9 times during the period under study, in the Charolais by 1,5 times, in particular by irrigation - by 56% and 25% respectively. The growth rate of the proportion of total fat in carcasses in dairy animals is 36.3, in meat - 5.5%. In all ages, the proportion of the mass of intramuscular fat in the total fat mass in the cattle of the red steppe breed was several times lower than that of Charolais, and by the end of the study it was 26, in meat - 73%. At the same time, watering - on the contrary: respectively 74 and 27%. The share of watering mass in the total mass of fat of carcasses of dairy bulls for the whole of the studied period was almost three times higher than that of peers of meat breed. Specific gravity of intramuscular fat in carcass and pulp until the age of 30 months. In meat bulls was 4 times larger, and watering - twice less than in dairy. In this regard, the classification of fattening and its corresponding assessment of the cost of cattle for less valuable watering, we believe, does not meet the consumer's demand and needs to be clarified. With the age of the bulls, the proportion of dry matter in the average sample of meat increased due to increased protein and fat. The moisture content of bovine meat from dairy breeds decreased from 77.6 to 73.1% during the study period, and from 76 to 72.4% in meat, respectively. Moreover, the growth rate of fat was twice as high as the increase in protein. Previously, the best beef was considered to be that in dry matter which contained approximately the same amount of protein and fat (1: 1). Currently, consumers prefer lean and meat-rich meat to a ratio of protein and fat 1,2: 1. Low fat meat is a dietary product and is widely used in the treatment and prevention in sanatorium and medical institutions. In our study, the proportion of protein in the body of experimental bulls with age tended to decrease due to a significant increase in absolute fat mass and a relative increase in protein. We share the opinion of some scientists who consider it normal when the amount of intramuscular fat in the pulp is 10-20% (in our experiment in milk bulls - 1,1-3,4, in meat - 11,7- 13.5%). In developed countries, marbled beef is in high demand [1, 2, 4]. Of course, tasting the quality of the product depends largely on the national traditions and personal taste characteristics of the consumer. In view of this we conducted a survey of over 2 thousand respondents in Ukraine, and the vast majority of them preferred "marbled" beef. The different proportion of intramuscular fat in the pulp of bullfighting bulls makes it possible to classify beef by "marbling" and similarly to the meatiness ratio of carcasses (the ratio of mass of muscle and bone tissue) to determine the coefficient of "marbling" of beef (the ratio of the mass of internal fat and Mass of pulp), which indicates the proportion of internal fat in the meat. For example, in our studies, the coefficient of "marbling" of beef from red-steppe breeds at the age of 18 months. Was 1.1, in the Charolais - 11.7; In 24 months -

Respectively 1.4 and 12.2; In 30 months - 3.4 and 13.5. The introduction of this ratio in practice will help accelerate the development of meat cattle, will allow the manufacturer to advertise their products and sell

them more expensive, and the buyer, of course, choose what he likes in view of his financial capacity. In all studied periods of age, the caloric value of the carcasses of bulls of dairy breeds was higher, but due to irrigation, while in charolma due to intramuscular and intramuscular fat ("marble"), which increases its attractiveness to the consumer (Table 2) . The chemical composition of beef is related to the age of animals. The nutritional benefits of it depend not only on the content of protein and fat in it, but also on the moisture [5, 7, 8]. In the practice of the meat processing industry, there is an indicator of "maturity" of meat: the ratio between fat and water (the norm is 1: 20-25 and more). The theoretical basis of this is that with the age of animals in the tissues there is an increase in fat content, caloric content, the appearance of "marble". In our studies, the indicator of "maturity" of meat in the bulls of the breed of Charole was: at the age of 18 months. - 1:21 - 22; 24 months - 1:23 - 24 and 30 months. - 1: 25-26 (for 100 parts of water in muscles 25-26 parts of fat). The bulls of the red steppe breed are respectively 1: 9-10, 1: 10-11 and 1: 15-16. The higher the content of dry matter in the average sample of meat and the lower moisture content at one and the same age, the earlier the animal "ripens" for slaughter. Charolese breed meat has good cuisine characteristics (Table 3). It is known that in the postnatal period, glycogen in the muscles through a series of intermediate reactions turns into lactic and phosphoric acids [6, 11]. They create an active reaction of the medium, which from weakly alkaline to weak acid. At pH <6.5, the greatest proteolytic effect of ketaspins was detected, thereby improving the digestibility of meat. "Marble" of beef helps to increase its acidity, which also has practical value: acidic medium inhibits the development of putrefactive microflora and stops the livelihoods of some pathogenic microorganisms. Meat of experimental bulls during slaughter at 18, 24 and 30 months. Has a weakly acidic medium, can be well stored for a long time without changing the culinary properties. In addition, lactic acid softens the connective tissue that adds to the meat of rigidity, and contains an amino acid oxyproline. In addition, in the connective tissue there is no essential amino acid tryptophan. The ratio of tryptophan and oxoprolin (protein-quality index) becomes more effective due to an increase in the saturation of beef with intramuscular fat ("marble"), which makes it more delicate, with a high consumer property [9, 13]. When evaluating the quality of beef, consider its color [5, 8]. The color of the muscle tissue is influenced by respiratory pigments (myoglobin and hemoglobin). Fresh meat has a purple-red color in the depth of muscle tissue - the natural color of myoglobin in the absence of oxygen (red meat). In our experiment, the intensity of the color of muscle tissue with age of Bugites increased from pink red in 18 months. To dark red in 30 months. Intramuscular fat ("marble") not only does not aggravate the color of beef, but rather somewhat softens its dark shade. Juicy nature depends on the ability of the meat to keep water (moisture content) and the content of intramuscular fat ("marble"), which can be judged by the area of the total, meat and wet spot in the studies conducted samples of meat from animals slaughtered in Different ages. The area of the spots with the age of the animal increases. However, meat of bulls during slaughter at any age due to intramuscular fat had high physiological and technological properties and was suitable for culinary use. The more fat in the meat, the lower the moisture content. Beef, which had more water bound, during heat treatment of moisture (juice) lost less. With the age of animals, increased moisture content and decreased attentiveness. The weld with a high degree of reliability correlates with the tenderness ( $r = 0.78$ ), the weakly bound water ( $r = 0.74$ ), the amount of pressed juice ( $r = 0.70$ ), but negatively with firmly bound water in meat ( $R = -0.68$ ) and moisture-retaining ability ( $r = -0.69$ ), which makes it possible to get the finished dish more juicy and with a bigger output.

The organoleptic characteristics of beef of experimental animals indicate that, with an increase in their age, the score for scent, taste, juiciness and color (up to 4.5 points) is slightly reduced, but this is not a deterioration in quality.

## Conclusions

The physicochemical properties of beef obtained from millet red steppe breed bulls and specialized charola indicate that it is suitable for culinary use and long-term storage. The classification of fattening cattle for watering does not meet the consumer's demand and needs to be clarified. Introduction of the practice of applying the coefficient of "marble" of beef will help accelerate the development of meat cattle and more fully meet the needs of the population in high-quality meat. Meat breeds of cattle should take a worthy place in the breed structure of cattle breeding of Ukraine and thus contribute to the increase of production of high quality beef. Prolongation of the age of bulls up to 30 months. increases the production cycle, resulting in reduced turnover of the livestock, which is very important for ensuring the growth of the number of animals.

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