# STUDY ON SENSORY AND NUTRITIONAL FACTORS THAT INFLUENCE THE QUALITY OF MEAT

**Diana MARIN**[*]

***Banat's University of Agricultural Sciences and Veterinary Medicine Timisoara, Faculty of Agricultural Management, ROMANIA***

***Corresponding author: Marin Diana e-mail: diana_rachiciu@yahoo.com***

***Abstract.*** *Results after cutting meat quality depends on the quality of live animals. Factors such as species, breed, age, sex determine " classes " of livestock ; maintenance conditions , feeding, transport , conditioning, cutting are all factors that determine for each the class quality.*

***Keywords****: nutritive factors, sensorial factors, quality, meat*

## INTRODUCTION

Under the name of meat usually understands muscle tissue with all tissues with which it is in the natural adhesion (bones, tendons, fascia, lymph nodes, nerves, blood vessels) but commercially point of view, the term includes any part comestible from the animal body, meaning the carcass with four quarters and fifth quarter with the comestible parts (head, legs, compact fat, organs and other viscera) [1,5,6].

The quality of meat results after cutting depends on the quality of live animals. Factors such as species, breed, age, sex determine "classes" for carcass; maintenance conditions, feeding, transport, conditioning, cutting represent all factors that determine for each carcass class carcass "qualities"[2,4].

The nutritional value of meat is different depending on the species, breed, age, sex, state of fattening, anatomical region etc. These factors determine variations in tissue distribution of meat (muscle tissue, connective, fat, bone), the proportion and quality of components of trophic and energetic value [3,7].

The meat has a stimulatory action on the body, causing a massive secretion of gastric juices. Extractive substances from meat, existing or formed during storage and thermal processing have a specific dynamic action of secretions excitement.

## MATERIALS AND METHODS

To achieve this scientific approach we performed studies on identifying the sensorial and nutritional factors that influence the overall quality of the meat.

## RESULTS AND DISCUSSION

SENSORYAL FACTORS INFLUENCING THE GLOBAL QUALITY OF MEAT

In order to establish the class of quality of carcase is used the following elements:

- size of the carcass (weight, size, yield);
- conformation and carcass structure (indices formed body structure regions, the proportion of the tissue, the ratio meat/fat)
- Meat quality.

In assessing meat quality, the sensorial factors (subjective) define the merchandising quality, and the nutritional, technological, hygienic and toxicological ones (objective) define the substantial quality of meats.

Meat color is an important indicator of quality that impresses the consumer. Meat color shows shades from pale pink to red or dark red and express through the intensity, tonality and brightness.

Color intensity is dependent by the quantity of myoglobin, the report myofibrils and sarcoplasmic and the color of fat from meat, witch, varies according to species, breed, age, sex, anatomical region.

Depending on the species, by color, meats are classified in "white" meats, "red" meats and "black" meats.

White meats have a white to pink color, light pink or pink and come from fish, fowls, rabbits and young animals for butcher fed only with milk.

Red meats have different shades of color and come from adult animals for butchers and from hand-footed.

Black meats come from hunted animals and the old butcher animals in poor maintenance condition.

To adult animals, for butchers, the color of meat is dark red, to Buffalo, bright red - to veal, red - pink to sheep and goat and pig.

The color intensity is different depending on *age*, younger animals usually having lighter colored meats than the older: veal meat is pink, the veal - purplish red, and the dark red to adult- animals.

Depending on *sex*, meat has variations in color intensity (known as the gender affects of sarcoplasmic-myofibrils quantitative proportion, so the amount of myoglobin). The meat from castrated male and female is lighter compared to the not castrated males.

Also depending by the quantity of myoglobin we can see changes in color density are, depending on the *anatomical region*, a group of muscle and the muscle or muscle portions. At the same species red color is more pronounced to muscle regions with an intense activity (in order earlier train, posterior train, and lumbar region); is more intense in general, to the flexors and extensors and paler on adductors and abductors.

The amount of hemoglobin, the ratio of muscle tissue/fat and the ratio of oxidized and reduced meat pigments determines the color tone of the flesh. Thus, meat from animals in good shape, with marbling or persiflage will have a lighter color than the poor ones.

Proper conditioning for cutting, proper slaughter of technology with a good bleeding will cause a remanence of hemoglobin within normal limits, with a lighter tonality of meat color.

During storage and technological processing of meats, the color intensity changes depending on the degree of dehydration of the tissue surface (which determines the concentration of pigments) and depending on the state of pigments. The presence of pigments in the oxygen state (oxyhemoglobin, oximioglobină) causes a lighter color tone, while their oxidation (methemoglobin, metmioglobina) determines the darker color tone to brown of the meat.

The pH value, the structure and the condition of heat of the meat (hot, chilled, frozen) influence the physical condition of the proteins of the meat on which depends the brightness, a characteristic of color.

Meat P.S.E. has a lighter color due to intense and rapid decrease of pH after cutting, which causes sarcoplasmatic protein denaturation conferring to fibers translucency particular characters.

Quick-frozen meat is lighter in color, because the light is reflected typically be small ice crystals, izodimensionals compared to the frozen slowly at whom the brightness is low.

**Tenderness of the meat**

Tenderness of the meat (represents the resistance to mastication) is an index of organoleptic quality, important being determined by many factors ante- and post sacrification. Tenderness of the meat is given by the proportion and quality of connective tissues, the proportion and distribution of fat and fiber quality and muscle bundles, vary by species, breed, age and sex of the animal.

The tenderness of the meat is inversely proportional to the amount of collagen tissues. Thus, fish or poultry meat have a better tenderness than the pork, which is tenderer than that of cattle; females and males castrated meat is also tenderer than the uncastrated males, and the meat of young animal has a better tenderness than the old animals.

Marbled and perselated meat, of dense and smooth consistency is better and has better tenderness from the one come from weak animals.

Transformations that occur in meat after slaughter are accompanied by changes in meat tenderness.

Immediately after slaughter, the meat is tender, ownership that is lost in the next 24-74 hours. The installation of rigidity is accompanied by loss of ATP, with the formation of actomyosin hidrofod complex resulting a decrease in hydration of proteins with extreme reduction of the softness of the meat.

During maturation, the meat is tender due to actin and myosin recovery to which is retained potassium, thus increasing hydrophilicity, due to the release of calcium, magnesium, sodium protein system and due to disorganization and weakening the structure of connective tissue proteins.

Quick freezing of meat determines increases of tenderness with 25-50% to frozen meat immediately after slaughter, but has a lower effect to freezing seasoned meat. This is due to the increase in water retention capacity, due to the formation of small crystals of water into the muscle fiber.

To dry salting of the meat to achieve a firm texture, due to both dehydration and coagulation of some protein. When salting is done by injecting salt into meat increases its moisture, improving also tenderness.

Thermal treatment determines increases of tenderness especially because transformation to collagen into gelatin.

**Consistency of meat**

**Initial consistency of meat** is given by the proportion and quality of the tissues that make up. Consistency is closely correlated with the texture of the meat, which depends on:

- sarcoplasmic/myofibrils report;
- smoothness of muscle fibers;
- thick of the muscle bundles;
- the quantity and quality of collagenous tissues;
- distribution of fat.

After the resistance to palpation, the initial composition of meat can be flaccid, soft, semi-hard or hard and dense.

**Flaccid consistency** is characteristic to meat from animals too young, with fine grain thin fibers due to increased unorganized collagenous tissues.

**Consistency is semi-hard-dense** is specific to meat from mature animals to witch has produced a balanced modification of moifibrile-sarcolemma and sarcoplasmic report and collagenous tissues inter-and intrafasciculare, mottling and perselation characteristic to full grain.

**Semi-hard consistency** is specific to meat from older animals, to witch has produced a balance modification of the moifibrile-sarcolemma and sarcoplasmic report and collagenous tissues inter- and intrafasciculaire, mottling and perselation characteristic to full grain.

**Hard consistency** is specific to meat from older animals, in poor state of maintenance, due to coarse grain with excess of collagen tissue, and without inter- and intrafasciculaire fat deposits.

**Further consistency of the meat** is function of the condition in which it is located.

Hot meat, immediately after cutting, has a soft consistency; in stiffness is hard, inelastic, and in maturation phase consistency becomes dense, juicy and elastic. These variations are due to changes in pH evolution that influence meat protein status and degree of hydration.

Consistency of the meat varies depending on the thermal state of this:

- to chilled meat is firm and elastic both at surface and on the section surface, and depressions formed at finger pressure back quickly and completely;
- to frozen meat is hard, by hitting with a hard object gives a clear sound;
- to defrosted meat, consistency is lower compared to the chilled, depressions formed by pressing a finger comes back harder and incomplete.

**Juiciness**

Juiciness is the property of meat to retain a certain amount of intracellular juice, intercellular and intrafascicular. The amount of bound water and fat contained determines the level of meat juiciness. The juiciness of the meat is determined by species, breed, age and fattening. Pig meat is juicier than that of cattle and sheep; the one of the young animals have a higher juiciness than from adult animals; juiciness is directly proportional to the degree of marbling and meat perselation.

**The smell and taste of meat**

The smell of fresh meat is pleasant, the characteristics of each species generally prevails a faint lactic acid smell witch is more pronounced in older animals meat and exhausted.

The taste of raw meat, fresh, is due to both fat and nitrogenous extractive not nitrogenous substances and mineral salts. The specific composition in fat acids of triglycerides, based on the race determines a pronounced smell and taste of animals for meat than those for milk.

From the nitrogenous extractive substances, the products of degradation of nucleoproteids are important factors that contribute to taste of mature meat.

The most important flavor precursors are amino acids (glutamic acid, glutamine, and glycine), dipeptides and tripeptides, nucleotides - in particular inosine-5-monophosphate (IMP) and its degradation products (hypoxanthine and ribose), glucose, glucosamine, derivatives of monocarboxylic (aldehydes, ketones).

The amount of blood that remains in the meat after slaughter of the animal contributes to finalize taste, giving the meat a taste of blood serum due to mineral salts.

The intensity of taste is amplified after a period of 8 days of maturation. As the meat becomes tenderer, more succulent, the "bouquet" of meat is better highlighted.

Both taste and smell are enhanced to the maximum in the culinary preparation processes, in which case the method of preparation, the time and temperature are important factors.

**SENSORYAL AND NUTRITIONAL FACTORS INFLUENCING GLOBAL QUALITY OF MEAT**

They refer to the content of proteins, lipids, carbohydrates, vitamins and minerals of the meat.

The nutritional value of the meat is given by the content and quality of protein, fat, carbohydrates, vitamins, minerals as well as the water/dry matter and digestibility coefficient.

**Protein content and quality of proteins**

Meat by its proteins is an important source of nitrogenous substances with exceptional biological value with which the body compensates his wear substance. The biological value of meat proteins is conditioned to their amino acid composition, especially the essential amino acids.

From the essential amino acids witch are found in meat proteins with intrinsic special worth be mentioned: valine, lysine, leucine, tryptophan, necessary for maintaining nitrogen balance, are indispensable factors for growth; leucine with ketogenic function; lack of arginine causes delays of spermatogenesis in humans; threonine is lipotopic agent that prevents fat accumulation in the liver; lysine is indispensable for the formation of red blood cells; tryptophan stimulates the synthesis of NAD (nicotinamidadenindinucleotid) and NADP (nicotinamidadenindinucleotid-phosphate) and represents the only source of indolic nucleus.

Essential amino acids from the meat, besides their intrinsic value raise their nutritional value and of other proteins from other sources.

A high content of scleroproteine (connective tissue protein) in the chemical composition of meat decreases its nutritional value. Collagen from connective tissue has a low nutritional value and elastin even negative because the content in methionine and tyrosine is very small, and cystine, cysteine and tryptophan are missing. Also collagen, digestive utilization coefficient is lower than muscle proteins, and for elastin is null.

**The fat content and the quality of those**

Meat lipids are important through energy contribution of fatty acids, the energy required to maintain vital functions. Meat by its lipids has essential fatty acids: linoleic, linolenic and arachidonic. Meat consumption with a high fat content is contraindicated because it causes digestive disorders through the lipids unabsorbed by the body and increases the content of essential fatty acids, helping to increase cholesterol.

**The content in vitamins**

Meat is an important source of vitamins of group B. By its content in riboflavin, pyridoxine, folic acid and vitamin B12, meat plays an important role in human nutrition. Vitamin content of meat in the case of the same species vary insignificantly, the difference consist in meat from different species. So the vitamin content of pork meat is several times higher than that of meat from cattle and sheep.

**The content in mineral substances**

Meat is a rich source of iron, sodium and potassium. Phosphorus, sulfur and chlorine are also found in large quantities and therefore the meat is acidifying. Consumed in too large quantities, it prints to meat juices a tendency to acidosis. Calcium is found in small quantities. Cobalt, aluminum, copper, manganese, zinc, magnesium is found in small quantities and play an important role in the body.

To appreciate the biological value of meat proteins it is used the ***index hydroxyproline/protein*** (hydroxyproline is specific constituent of collagen). The value of this report up to 1.96, indicates a good meat quality, while an index of over 4 defines a meat with large amounts of collagen tissues, deficient in protein so effective.

**Coefficient of digestibility of meat** is high; its assimilation by the human body is 82-83% and 97-98%of the component proteins.

## CONCLUSION

Immediately after slaughter, the meat is tender, propriety that is lost in the next 24-74 hours. The installation of rigidity is accompanied by loss of ATP, with the formation of actomyosin hidrofod complex resulting a decrease in hydration of proteins with extreme reduction of the softness of the meat.

The nutritional value of meat is determined also by the global report between water and dry substance. The value of this report in quality cattle meat is 3, and in the poor animals case tends to 4 dependent on the degree of weakening.

Regardless of the state of fattening the water/protein report is also a valuable indicator for assessing the nutritional value of meat. The limit of this report for a good quality meat is regardless of species and anatomical region a water/protein ratio greater than 4 indicates a low nutritional value meat.

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