ABSTRACT

PhD thesis entitled ***"Researches about the characterization of the meat quality indicators in cattle"*** it is structured in two distinct parts.

The first part contains the study of the reference literature in which are synthesized 3 chapters containing a number of 14 tables and 13 figures and is supported by a thorough bibliographic study with a number of 257 quotes.

The second part represents the part of own researches divided into 9 chapters which lists a number of 121 tables and 34 figures, from which are formulated some scientifical papers published in international congresses.

In the first chapter are edited the stress factors that have a major influence on meat quality. These are usually regarded as being some reflex answers of animals, which are inevitably produced, when there is exposure to unfavorable environmental conditions, being described as the cause of many elements of discomfort, ranging from the occurrence of traumatic injuries and reaching even to death.

The research found in national and international database mentions that, by knowing haematological values is revealed the general state of health of the animal. In addition, their interpretation helps diagnose the conditions in which the disease has evolved through monitoring responses given by the animal following performed treatment.

Knowledge of normal values of biochemical variables in blood serum and other physiological variables is important for the assessment of depreciation of organs and tissues occurred after a suffered disease by the animal as well as to assess the conditions and welfare of the animal pre- slaughter.

Cattle raising in order to produce safe meat food, rich in nutrients, is a defining element of the welfare of the whole world. Therefore, productive practices that optimize sanitation, nutritional quality and palatability of the bovine meat are essential in assessing the quality of meat both for breeders and for customer satisfaction.

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The own researches were structured on the basis of strict targets through which was required the characterization and evaluation both factors with direct implications for the live animal and the technological that will be reflected later at the carcass level.

Bovine meat is an alternative for consumers who find themselves in a class of high appreciation due to its nutritional, sensory and technological properties; but the complex characterization of this meat should be based and supported by scientific arguments.

The objectives that formed the basis of this study were: the study of the transport influence of cattle up to the slaughterhouse and its effects on the individual's physiological balance; the evaluation of haematological and biochemical indicators in order to assess the morphophysiological status of cattle pre-slaughter and achievement assessing of their welfare's concept; stage description technological flow for slaughtering with existing particularities depending on the species under study and their involvement in obtaining consistent carcasses in all aspects; studying quality differences of meat harvested from different muscle tissues came from young and adult cattle of different sex; appreciation of the nutritional - biological value of the meat in order to respect all the requirements and principles demanded by consumers; evaluation of physical - chemical and sensorial parameters of cattle meat by analyzing the most important body regions; establishing the microbial charge of the carcass influenced by the hygiene achievement before slaughter, as well as respect all parameters on the flow of slaughter.

Thus, the part with own researches is structured in nine chapters as follows:

✓ *chapters IV* and *V* present the aim and objectives of this paper, the manner of organizing the researches, the characterization of the institutional framework and the presentation of the experimental scheme, respectively materials and working methods used in order to achieve the proposed objectives;

✓ *chapters VI, VII, VIII, IX, X, XI,* and *XII* present research results calculated through statistical differences and their explanation concerning the influence of the morphophysiologic status on followed blood indicators (*haematological and biochemical parameters*), as well as the influence of the slaughtering technology on productive indicators of cattle meat (*slaughter yield, ratio meat /bones, respectively meat /fat*), physical indicators (*pH, color, texture, tenderness);* chemical indicators *(gross chemical composition);* technological (*losses by boiling*); microbiological (*Salmonella spp., Enterobacteriacea, N.T.G*) and sensorial parameters (*taste, aroma, appearance and texture*).

In order to achieve the proposed objectives and based on the experimental protocol general built, it was necessary to harvest tissue blood from live cattle before slaughter, as well as

muscle tissue from four different anatomical regions derived from carcasses after slaughter: *M. Longissimus dorsi, M. Semitendinosus, M. Trapezius thoracis, respectively M. Biceps brahial*. The experimental batches were in number 4 constituted in: L1 – young females, L2 – young males, L3 – adult females and L4 – adult males.

Researches have started with technological operations pre-slaughter, because the behavior technology applied to animals before slaughtering strongly influences their physiological condition, in particular energetic metabolism of the skeletal muscle which in its turn influences muscle metabolism post - mortem.

Transport to the slaughterhouse is performed by specialized machines with the possibility of division according to the number of transported animals, so that there are one or two compartments. The maximum capacity of transport is 5 cattle / compartment, where live weight is approx. 500 kg / capita animal.

In order to ensure comfort and rest necessary for rebuilding cattle physiological balance, in the slaughterhouse there is a paddock with 20 waiting pens specifically designed for different categories. Cattle are purchased with all legal provided documents: health certificate, property ticket or passport, epizootic and epidemiological analysis of the purchase geographical areas or analysis certificate. These are all measures of control of the purchaser in order to assess the health status of animals, if cattle have benefited of adequate growing conditions or they were treated with antibiotics for therapeutic purposes.

Following the slaughter technological flow within the S.C. Doly Com S.R.L company, aimed to identify the technological parameters, as well as compliance with quality management with risks related contamination, involved in obtaining higher quality carcasses.

The results obtained after cattle slaughter and yield perform represented a response to the effort of both processors and breeders, because it reveals the quality of the animal, ameliorating level, environmental conditions in which were reared the animals, their welfare, and administrated food quality. In our case, the experimental groups were characterized by a yield between 49.68 to 56.02%, which indicates a good ratio between obtained carcass weight and live weight of the animal, and distribution of tissues in the carcass considering their mosaic origin.

By determining the acidity of the meat to 12, 24, 72 hours after evisceration they were determined average values of pH between 6.16 ± 0.03(L4 - M. biceps to 12 hours) and 5.55 ± 0.03 (L4 - M. Trapezius thoracis 72 hours), normal values regarding the physiological status of cattle.

Objective characterization of bovine meat color for experimental L1, L2, L3, L4 was achieved by determining the five colorimetric parameters (L *, a *, b *, C, h^o) system features CIEL * a * b *.

Average calculated for brightness (L *) in the *Longissimus dorsi* muscle, varied between 29.42 ± 0.34 units, average belonging to batch L3 and 32.40 ± 0.60 units, average belonging to batch L2. To coordinate the complementary colors red - green (a *) stands out the same situation regarding the award of assigning limits averages calculated interval between 10.59 ± 0.32 units (L1) and 11.81 ± 0.19 units (L4).

Calculating statistic indicator of bovine meat tenderness, determined by Warner Bratzler shear forces, can be appreciated the characteristics of each muscle through the differences in the muscle fibers. Thus, of the four muscle groups analyzed, m. Longissimus dorsi recorded the lowest average values (39.22 ± 0,81N / cm^2), for which it can be classified as the most tender of them.

From the significance of differences between the averages obtained for WBSF, we can see that shear force increased with age, for which there were very significant differences between L1 - L3 and L2 - L4, and significant differences respectively significantly distinct between L1 - L2 and L3 - L4.

Textural characterization profile showed differences in hardness, chewability of batches from anatomical regions analyzed, which is due to intramuscular fat content, of time post mortem energetic metabolism, as well as the connective tissue structure and function, muscle fibers and protein constituent, muscle water.

Following determination of chemical constituents from harvested muscle groups, they were found higher values recorded in young male compared to youth females / adult and adult males for the percentage of meat protein. By analyzing the protein content of *Longissimus dorsi* muscle harvested from slaughtered males and females, it appears that young males recorded the highest values (21.01 ± 0.29%), existing significant differences between L1 - L2 and between L2- L4. The values determined for cattle meat lipids were higher in the batches of adult females (4.28 ± 0.12% L3 =), because with age, food intake is deposited as fat.

Technological evaluation of cattle meat was conducted as boiling losses, losses that were recorded higher values in the batches of youth, due to decreased collagen content.

Bovine meat is one of the main foods involved through the incidence of zoonoses and food-borne outbreaks in humans being the most important pathogens being Escherichia coli

O157: H7, Salmonella, Enterobacteriaceae. They are present in the gastrointestinal tract of cattle and can be transferred to carcasses at the time of slaughter.

Concerning the presence of Salmonella spp. on the carcass surface taken in study, about those that are safe for consumption as it was not detected in any colony of bacteria after microbiological examination. Thus, the obtained data fall within the limit of ISO6579: 2003.

The interval identified on batches taken under study ranged from 1.48 log cfu / cm2 and 2.01 log CFU / cm2, the highest value been found in adult males. Given that ISO 21528-2 admissibility range is 1.5 - 2.5 log cfu / cm^2; all the 4 groups are in accordance.

In total aerobic colony (NTG) are also includes organisms that favor the degradation of meat, and through its calculation can show ways to maintain meat quality. The lot with the highest bacterial load on the surface of carcasses was L1 (4.29 ± 0.16 x 103 log cfu / cm2), opposite pole L4 (3.88 ± 0.08 x 103 log cfu / cm2). All results found for the four experimental batches were within the limits established by ISO 4833-1.

The overall analysis of texture parameters (Fig. 12.1) which allows the appreciation of higher sensorial values, can be concluded that batches derived from young cattle are basically positive appreciated, as less rough, resistance to mastication being appreciated by a lower score (44.55 ± 2.69, 42.42 ± 3.17 respectively).