# RESEARCH ON ASSESSMENT OF SENSORY BEEF MEAT SLAUGHTERED IN NE REGION

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**Abstract**

*Mainly sensory characteristics of cattle meat meet a number of factors that contribute to consumer acceptability in terms of its' repeatedly use. Therefore, identification of these factors attracted the attention of many researchers, knowing that tenderness, texture and flavor of meat are considered to be some of the most important physical and organoleptic characteristics thereof.*

*In order to assess the sensory point of view of cattle were studied four groups (youth and adults ♂, respectively ♀ youth and adult) from which was harvested the Longissimus dorsi muscle. Baking samples that were previously prepared in the form of side 3cm cubes and sensory evaluation was conducted in a room with lights designed to mask the color differences that is not clear.*

*By the overall analysis of texture parameters allowing higher values sensory assessment, we concluded that groups from young cattle are in principle positive appreciated as being less harsh resistance to the mastication being appreciated by a lower score. Of descriptors taste, its persistence has reached the highest values (53.95 ± 4.12), represented by the group L3. At the opposite is the acid taste that was perceived by tasters, with an average score.*

**Key words:** cattle, flavor, senzory

## INTRODUCTION

The flavor of the meat resulting from the combination of tastes fundamental (sweet, bitter, sour, salty and umami), from water soluble compounds and odor derived from a variety of substances in food since his debut from various reactions to which it is subjected. Taste and aroma associated to cattle meat are those that generally develops during heating.

Cattle meat flavor that develops when heated depends on the amounts and proportions of the present precursor compounds. Meat is composed of water, proteins, lipids, carbohydrates, minerals and vitamins. Of these proteins, lipids and carbohydrates plays a role in the development of flavor, because they include many compounds which are able to develop important flavor precursors thereof in the heat treatment. [2], [3]

Compounds that cause different tastes and odors have different thresholds of perception. Sweet taste in the meat comes from sugars, amino acids and organic acids. Sour flavor comes from amino acids linked by organic acids. The inorganic salts and the sodium salt of glutamate and aspartame generates salinity. Bitter taste is probably due hypoxanthine, anserina, carnosine and some amino acids. [1]

## MATERIAL AND METHODS

Samples were subjected to sensory analysis represented by *Longissimus dorsi* muscle samples collected at 24 hours of slaughter. After collection, the samples were frozen at - 20 °C, and when the taste take place it were thawed at 4 °C for 24 hours.

Baking the samples, which have been previously prepared in the form of cubes with a side of 3 cm was performed in an electric oven preheated to 120 °C for 20 minutes. This time is necessary to achieve the temperature of 75°C in the center of each sample, temperature monitored by a thermocouple type K.

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At the end of the cooking stage, the samples were identified, coded and served warm to tasters. Sensory evaluation was conducted in a test chamber senses with lights designed to mask the color differences that is not clear. To support the theory of this experiment took five panelists, each of these testing two samples in 5 sessions (repetitions), their responses are reported in a linear scale of 0 - 100 points.

## RESULTS AND DISCUSSIONS

The answers given by the tasters, after completing a subjective assessment questionnaire provide a linear scale from 1-100, they were noted and processed as indicators and statistical significance in Table 1 or Table 2.

The texture of the cattle meat were obtained values of the dispersion of the standard error of the mean between 2.4 - 5.41, calculated values for the coefficient of variation is quite high (18.14 to 34.79) indicating a lack of homogeneity character.

As regards the initial juiciness of analyzed lots, there were no significant differences between L1 - L2 respectively L2 - L4, but among the cattle of the same sex and different ages were obtained significant differences, due mainly to differences age, noting that subsequent persistence juiciness not show significant differences between any of the 4 groups.

Age differentiated on slaughter of the animal's life and work were made between males to have a significant differences in terms of *Longissimus dorsi* muscle hardness, L4 being considered for this descriptor with a minimum score of 41.06 and a maximum of 76.64.

Table 1 Descriptive sensory parameters estimators at *Longissimus dorsi* muscle

| Specification | | Analyzed lots | Calculated statistical indicators | | | | Significance differences between lots average (FISHER Test) |
|---|---|---|---|---|---|---|---|
| | | | $\bar{X} \pm s_{\bar{x}}$ | V% | Min. | Max. | |
| TEXTURE | IJ | L1 | 51.01±4.73 | 29.36 | 23.4 | 81.4 | L1-L3; $\hat{F}_{6.72} > F_{0.05\%}(4.41) \rightarrow *$ |
| | | L2 | 53.87±4.49 | 26.37 | 27.4 | 72.15 | L2-L4; $\hat{F}_{0.08} < F_{0.05\%}(4.41) \rightarrow$ n. s. |
| | | L3 | 67.96±4.50 | 20.95 | 46.3 | 94.8 | L1-L2; $\hat{F}_{0.19} < F_{0.05\%}(4.41) \rightarrow$ n. s. |
| | | L4 | 51.79±5.41 | 33.04 | 24.4 | 76.6 | L3-L4; $\hat{F}_{5.27} > F_{0.05\%}(4.41) \rightarrow *$. |
| | PJ | L1 | 32.56±2.98 | 28.96 | 20.02 | 48.42 | L1-L3; $\hat{F}_{1.40} < F_{0.05\%}(4.41) \rightarrow$ n. s |
| | | L2 | 34.7±3.81 | 34.79 | 20.24 | 56.62 | L2-L4; $\hat{F}_{0.13} < F_{0.05\%}(4.41) \rightarrow$ n. s. |
| | | L3 | 38.33±3.83 | 31.65 | 23.34 | 62.28 | L1-L2; $\hat{F}_{0.19} < F_{0.05\%}(4.41) \rightarrow$ n. s. |
| | | L4 | 36.54±3.26 | 28.23 | 22.86 | 58.04 | L3-L4; $\hat{F}_{0.12} < F_{0.05\%}(4.41) \rightarrow$ n. s. |
| | H | L1 | 42.01±2.83 | 21.35 | 29.64 | 56.36 | L1-L3; $\hat{F}_{0.46} < F_{0.05\%}(4.41) \rightarrow$ n. s |
| | | L2 | 41.12±3.58 | 27.52 | 24.53 | 60.34 | L2-L4; $\hat{F}_{8.69} > F_{0.01\%}(8.28) \rightarrow **$ |
| | | L3 | 45.68±4.60 | 31.86 | 28.61 | 75.48 | L1-L2; $\hat{F}_{0.03} < F_{0.05\%}(4.41) \rightarrow$ n. s. |
| | | L4 | 56.95±3.99 | 22.20 | 41.06 | 76.64 | L3-L4; $\hat{F}_{3.41} << F_{0.05\%}(4.41) \rightarrow$ n. s. |
| | C | L1 | 44.55±2.69 | 19.11 | 34.54 | 64.25 | L1-L3; $\hat{F}_{15.69} > F_{0.001\%}(15.38) \rightarrow ***$ |
| | | L2 | 42.42±3.17 | 23.69 | 29.18 | 56.62 | L2-L4; $\hat{F}_{15.69} > F_{0.001\%}(15.38) \rightarrow ***$ |
| | | L3 | 61.41±3.29 | 16.96 | 44.35 | 72.64 | L1-L2; $\hat{F}_{0.26} < F_{0.05\%}(4.41) \rightarrow$ n. s. |
| | | L4 | 61.19±3.51 | 18.14 | 41.28 | 73.48 | L3-L4; $\hat{F}_{0.002} << F_{0.05\%}(4.41) \rightarrow$ n. s. |
| | F | L1 | 28.57±2.24 | 24.90 | 18.94 | 40.26 | L1-L3; $\hat{F}_{11.15} > F_{0.01\%}(8.28) \rightarrow **$ |
| | | L2 | 36.27±2.88 | 25.14 | 22.04 | 46.67 | L2-L4; $\hat{F}_{43.20} > F_{0.001\%}(15.38) \rightarrow ***$ |
| | | L3 | 45.68±4.60 | 31.86 | 28.61 | 75.48 | L1-L2; $\hat{F}_{4.43} > F_{0.05\%}(4.41) \rightarrow *$ |
| | | L4 | 70.32±4.31 | 19.40 | 45.40 | 88.90 | L3-L4; $\hat{F}_{15.24} > F_{0.01\%}(8.28) \rightarrow **$ |

**IJ**= initial juiciness; **PJ =** persistent juiciness; **H**= hardness; **C =** chewability; **F** = fibrousness;
**L1**=youth ♀; **L2**= youth ♂; **L3**=♀ adults; **L4**=♂ adults

For fibrousness parameter were significant differences between groups L1 - L2 and L2 - L4 and distinctly significant differences between L1 - L3 and L3 - L4, achieved due to types of muscle fibers prevailing number in the cattle organism, and thanks to their activitiesbefore slaughter.

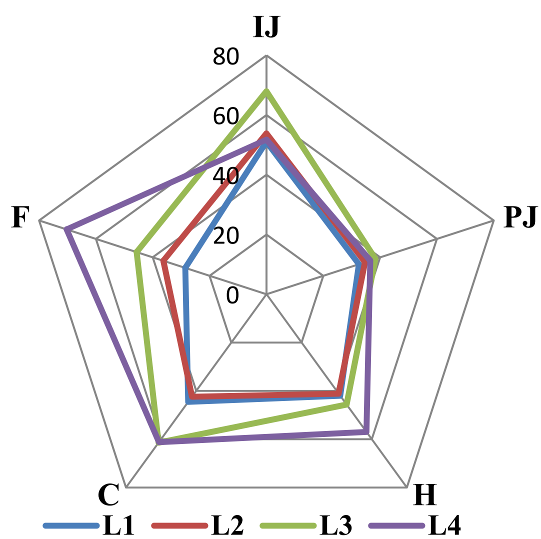
By analyzing the overall parameters of texture (Fig. 1) which allow the assessment of higher values sensory, we can conclude that the lots from the young cattles are in principle positively assessed as being less hardness, because the resistance to the mastication was appreciated by a lower score (44.55 ± 2.69, 42.42 ± 3.17 respectively).

After cooking meat samples, various flavors data resulting from volatile compounds (smell) and taste, the highest values being affected by the smell of beef and their metallic taste.

Aiming and analyzing sensory qualities of the cattle meat, the tasters perceived the scent of brothbeing stronger at L4 group (11.64 ± 1.32), opposite being placed young males (4.98 ± 0.73) .

Regarding the sweet smell test subject expressed muscles were significant differences between groups of males only, with a minimum average recovered to young males (32.48 ± 2.82).

Significant differences were found for the smell of beef between groups L1 - L3, this feature mainly due to the age, the environment and animal food in their lifetime.




**IJ**= initial juiciness**; PJ =** persistent juiciness**; H**= hardness; **C =** chewability; **F** = fibrousness; **L1**=youth ♀; **L2**= youth ♂; **L3**=♀ adults; **L4**=♂ adults

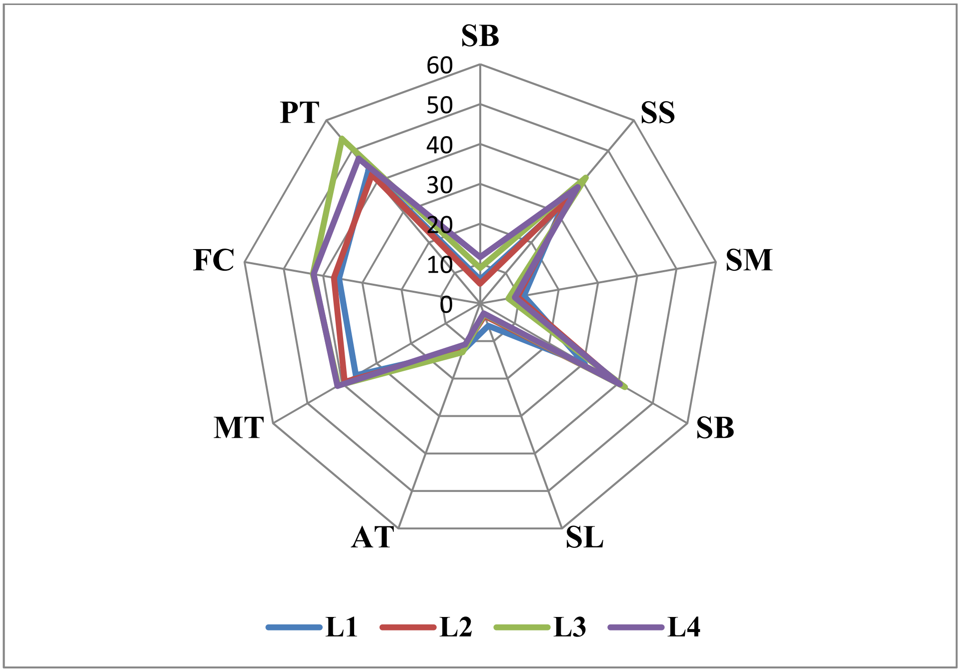
Figure 1 - The average values for cattle meat texture parameters

Table 2 Statistical significance on sensory evaluation of *Longissimus dorsi* M.

| Specification | | Analyzed lots | Calculated statistical indicators | | | | Significance differences between lots average (FISHER Test) |
|---|---|---|---|---|---|---|---|
| | | | $\bar{X} \pm s_{\bar{x}}$ | V% | Min. | Max. | |
| FLAVOUR | SB | L1 | 6.01±0.90 | 47.65 | 2.80 | 11.40 | L1-L3; $\hat{F}_{5.35} > F_{0.05\%}(4.41) \rightarrow *$ |
| | | L2 | 4.98±0.73 | 46.43 | 1.35 | 9.40 | L2-L4; $\hat{F}_{19.27} > F_{0.001\%}(15.38) \rightarrow ***$ |
| | | L3 | 8.90±0.85 | 30.45 | 3.60 | 12.70 | L1-L2; $\hat{F}_{0.78} < F_{0.05\%}(4.41) \rightarrow$ n. s. |
| | | L4 | 11.64±1.32 | 36.06 | 6.40 | 16.40 | L3-L4; $\hat{F}_{2.99} < F_{0.05\%}(4.41) \rightarrow$ n. s. |
| | SS | L1 | 32.48±2.82 | 27.49 | 21.10 | 46.50 | L1-L3; $\hat{F}_{4.50} > F_{0.05\%}(4.41) \rightarrow *$ |
| | | L2 | 35.04±3.68 | 33.22 | 22.40 | 56.60 | L2-L4; $\hat{F}_{0.40} < F_{0.05\%}(4.41) \rightarrow$ n. s. |
| | | L3 | 41.18±2.97 | 22.86 | 30.40 | 60.20 | L1-L2; $\hat{F}_{0.30} < F_{0.05\%}(4.41) \rightarrow$ n. s. |
| | | L4 | 38.08±3.06 | 25.42 | 24.52 | 58.43 | L3-L4; $\hat{F}_{0.52} < F_{0.05\%}(4.41) \rightarrow$ n. s. |
| | SM | L1 | 11.15±0.87 | 24.85 | 8.80 | 18.20 | L1-L3; $\hat{F}_{14.84} > F_{0.01\%}(8.28) \rightarrow **$ |
| | | L2 | 9.51±0.80 | 26.64 | 5.60 | 13.10 | L2-L4; $\hat{F}_{0.35} < F_{0.05\%}(4.41) \rightarrow$ n. s. |
| | | L3 | 7.21±0.52 | 22.97 | 4.60 | 10.20 | L1-L2; $\hat{F}_{1.91} < F_{0.05\%}(4.41) \rightarrow$ n. s. |
| | | L4 | 8.85±0.76 | 27.16 | 5.20 | 12.40 | L3-L4; $\hat{F}_{3.12} < F_{0.05\%}(4.41) \rightarrow$ n. s. |
| | SM | L1 | 30.28±2.87 | 30.04 | 12.40 | 40.00 | L1-L3; $\hat{F}_{9.61} > F_{0.01\%}(8.28) \rightarrow **$ |
| | | L2 | 39.56±2.65 | 21.18 | 22.10 | 47.60 | L2-L4; $\hat{F}_{0.04} < F_{0.05\%}(4.41) \rightarrow$ n. s. |
| | | L3 | 41.95±2.42 | 18.27 | 24.20 | 48.60 | L1-L2; $\hat{F}_{5.62} > F_{0.05\%}(4.41) \rightarrow *$ |
| | | L4 | 40.43±3.04 | 23.84 | 28.70 | 52.30 | L3-L4; $\hat{F}_{0.15} < F_{0.05\%}(4.41) \rightarrow$ n. s. |
| | SL | L1 | 5.94±0.55 | 29.40 | 2.30 | 8.10 | L1-L3; $\hat{F}_{28.90} > F_{0.001\%}(15.38) \rightarrow ***$ |
| | | L2 | 3.27±0.31 | 30.44 | 1.60 | 4.40 | L2-L4; $\hat{F}_{3.49} < F_{0.05\%}(4.41) \rightarrow$ n. s. |
| | | L3 | 2.83±0.17 | 19.46 | 2.00 | 3.50 | L1-L2; $\hat{F}_{17.55} > F_{0.001\%}(15.38) \rightarrow ***$ |
| | | L4 | 2.59±0.18 | 22.08 | 1.40 | 3.20 | L3-L4; $\hat{F}_{0.85} < F_{0.05\%}(4.41) \rightarrow$ n. s. |
| | AT | L1 | 12.55±0.54 | 13.75 | 10.90 | 15.80 | L1-L3; $\hat{F}_{0.31} < (4.41) \rightarrow$ n. s |
| | | L2 | 11.86±0.56 | 15.06 | 9.70 | 14.50 | L2-L4; $\hat{F}_{1.48} < F_{0.05\%}(4.41) \rightarrow$ n. s. |
| | | L3 | 13.02±0.61 | 14.94 | 10.30 | 16.40 | L1-L2; $\hat{F}_{0.77} < F_{0.05\%}(4.41) \rightarrow$ n. s. |
| | | L4 | 10.91±0.53 | 15.51 | 8.80 | 13.60 | L3-L4; $\hat{F}_{6.64} > F_{0.05\%}(4.41) \rightarrow *$ |
| | MT | L1 | 35.97±1.83 | 16.15 | 30.30 | 46.50 | L1-L3; $\hat{F}_{2.36} < (4.41) \rightarrow$ n. s |
| | | L2 | 39.23±2.79 | 22.52 | 31.70 | 58.90 | L2-L4; $\hat{F}_{0.29} < F_{0.05\%}(4.41) \rightarrow$ n. s. |
| | | L3 | 41.14±2.81 | 21.66 | 31.6 | 58.6 | L1-L2; $\hat{F}_{0.94} < F_{0.05\%}(4.41) \rightarrow$ n. s. |
| | | L4 | 41.33±2.65 | 20.30 | 33.70 | 62.80 | L3-L4; $\hat{F}_{0.002} < F_{0.05\%}(4.41) \rightarrow$ n. s. |
| | FC | L1 | 35.93±1.45 | 12.76 | 32.20 | 44.70 | L1-L3; $\hat{F}_{5.20} > F_{0.05\%}(4.41) \rightarrow *$ |
| | | L2 | 37.24±1.91 | 16.27 | 28.60 | 45.30 | L2-L4; $\hat{F}_{3.35} < F_{0.05\%}(4.41) \rightarrow$ n. s. |
| | | L3 | 42.58±2.52 | 18.76 | 36.70 | 59.40 | L1-L2; $\hat{F}_{0.29} < F_{0.05\%}(4.41) \rightarrow$ n. s. |
| | | L4 | 42.42±2.07 | 15.49 | 38.40 | 60.0 | L3-L4; $\hat{F}_{0.002} < F_{0.05\%}(4.41) \rightarrow$ n. s. |
| | PT | L1 | 43.61±3.63 | 26.35 | 30.40 | 63.90 | L1-L3; $\hat{F}_{3.52} < F_{0.05\%}(4.41) \rightarrow$ n. s |
| | | L2 | 42.21±2.86 | 21.47 | 31.30 | 62.40 | L2-L4; $\hat{F}_{1.31} < F_{0.05\%}(4.41) \rightarrow$ n. s. |
| | | L3 | 53.95±4.12 | 24.20 | 36.60 | 73.90 | L1-L2; $\hat{F}_{0.09} < F_{0.05\%}(4.41) \rightarrow$ n. s. |
| | | L4 | 47.45±3.56 | 23.76 | 34.70 | 68.60 | L3-L4; $\hat{F}_{1.41} < F_{0.05\%}(4.41) \rightarrow$ n. s. |

**SB**= the smell of broth**; SS =** sweet smell;**SM**= smell of milk**; SB =** smell of beef; **SL**= smell liver**; AT =** acid taste; **MT**= metallic taste / blood; **FC**= the fat coating in the mouth; **PT**= persistent taste; **L1**=youth ♀; **L2**= youth ♂; **L3**=♀ adults; **L4**=♂ adults.

In figure 2 are plotted the parameters that complete sensory quality of cattle meat resulted after slaughter. Thus, between descriptors taste, its persistence has reached the highest values (53.95 ± 4.12), represented by L3 group. At the opposite charged tasters found the acid taste, with an average score of 10.91 ± 0.53.




**SB**= the smell of broth**; SS =** sweet smell;**SM**= smell of milk**; SB =** smell of beef; **SL**= smell liver**; AT =** acid taste; **MT**= metallic taste / blood; **FC**= the fat coating in the mouth; **PT**= persistent taste; **L1**=youth ♀; **L2**= youth ♂; **L3**=♀ adults; **L4**=♂ adults.

Figura 2 –The average values for cattle meat flavour parameters

## CONCLUSIONS

Results of the juicy meat were influenced by the animal's age (youth and adults significant differences).

Aiming and analyzing sensory qualities of the cattle meat by tasting, the broth flavour was stronger in adult males, opposite being placed the male youth.

Studying the sweet smell expressed by subjected muscles test were significant differences between groups of males only, the lowest average is found at young males.

The high hardness assessment on cattle muscle fiber when chewing take place were obtained in adult females than adult males.

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