# R-ZETA® ADDITIVE FATTENING DIETS IMPACT ON MEAT QUALITY CATTLE

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#### I. INTRODUCTION

Intensive cattle management systems encourage the inclusion of high amounts of cereal grains in the diet to increase energy input for improve animal performance. Nevertheless, since ruminants did not evolve by ingesting large amounts of non-structural carbohydrates, a series of metabolic disturbance may become a concern, and negatively impact rumen and animal health [1]. Self-feeders resulted in a homogeneous feeding pattern along the day and farmers used as an option to minimize digestive issues [2]. Large list of feed additives is added to beef cattle diets with expected benefits based on physical, chemical, and biological impacts. In addition to performance, it is important to evaluate the quality of the meat obtained. Thus, the aim of this study was to evaluate the meat quality from Hereford steers fattened with diets offered on self-feeders with intake regulators, salt (NaCI) or commercial compound additive r-zeta® (Los Vascos S.R.L).

### II. MATERIALS AND METHODS

This research was carried out at the INTA Agricultural Experimental Station, located in the city of Concepción del Uruguay, Entre Ríos, Argentina (32°48'S, 58°34W). All animals were cared for in accordance with acceptable practices and experimental protocols reviewed and approved by the INTA Institutional Animal Care and Use Committee (N° 11). Forty-eight Hereford steers (7.4 to 8.7 months old and 220.5 ± 17.3 kg body weight) were allocated into two treatments according to the intake regulators: Control (diet formulated with 43% whole maize grain, 40% ground maize grain, 20% protein concentrate and 7% salt) and r-zeta® (pelletized balanced feed with inclusion of the aforementioned additive). R-zeta® is a multifactorial additive owned by Zorion US LLC and produced by Los Vascos SRL company in Coronda, Santa Fe province, Argentina. Its composition consists of specific flavorings for ruminants that regulate consumption, products that minimize thermal stress, enzymes, microorganisms that modulate the microbiota, liver protectors and anti-inflammatories. In all cases, diets were formulated to be isonitrogenous and isoenergetics and went offered in self-feeders. The animals were slaughtered when they reached 370 - 390 kg of BW. Half-carcasses were kept in cold chambers for 24 h (internal temperature <5 °C) and were moved to commercial packing house where samples were extracted and analyzed in the Meat Industry Lab (University of Entre Ríos). The chromatic meat and fat characterization were performed using Minolta colorimeter, operating in the CIE system (L\*, a\*, b\*). Marbling was determined by visual comparison according to the standards of the Official United States Standards for Grades of Beef (USDA, 2018). Warner- Bratzler shear force (WB, N) was determined with a Stable Micro System texture analyser with a Warner-Bratzler cell. The average of six cylinders of 1.3 cm diameter was recorded with automatic temperature control and a temperature recorder with penetration sensor was used to follow the thermal process inside the samples. Thawing losses were calculated from the difference between initial fresh weight and weight after thawing (samples refrigerated for 24 h until reaching 4 °C in the center of the steak). Cooking losses (drip and evaporation) were determined by subtracting sample weight before and after cooking and expressed as percentage of the initial sample weight. Fat content of meat (on wet basis) was determined, in duplicate, by Soxhlet methodology using a 2055 Soltex and stove. Protein content of meat (on wet basis) was determined, in duplicate, by Kjeldahl methodology using a 2200 Kjeltec Auto Distillation-Foss Tecator equipment. Moisture was determined by rapid method 120 °C - 2 h, in guadruplicate. Statistical analysis was analyzed by ANOVA using software Infostat. Means were compared by the Tukey test ( $\alpha$ = 0.05).

#### III. RESULTS AND DISCUSSION

The meat quality is presented in Table 1. No differences were observed meat color, marbling, tenderness, cooking losses or chemical composition and they are similar to report by other authors [3]. Only two variables differ, fat lightness and thawing losses. In the first case, the intensity of variation of Lightness will could not be detected by the consumers. And in the second, these results cannot explain of thawing losses in the Control group, considering both groups had the same chemical composition.

Traits	Control	r-zeta®	SEM	P value
L* meat	38.1	38.3	0.1	0.5970
a* meat	22.3	22.0	0.4	0.7507
b* meat	17.2	16.8	0.4	0.7001
L* fat	65.9 a	67.8 b	0.4	0.0014
a* fat	12.3	11.7	0.3	0.2954
b* fat	16.9	17.3	0.4	0.6642
Marbling <sup>1</sup>	2.8	2.4	0.2	0.4213
Tenderness (kgF <sup>-1</sup> )	2.9	2.8	0.1	0.5391
Thawing losses (%)	3.6 a	2.1 b	0.4	0.0333
Cooking losses (%)	21.0	22.1	0.8	0.5349
Humidity (%)	74.1	74.1	0.2	0.4074
Fat (%)	2.4	2.4	0.2	0.5898
Protein (%)	22.1	22.1	0.1	0.9943

Table 1 – Quality of the *Longissimus dorsi* with additive r-zeta® on cattle fattening diets.

a, b: means in the rows with a different letter indicate statistical differences (P < 0.05)

<sup>1</sup>: 1= standard. 2= select. 3= choice. 4= prime. 2: measured in the laboratory.

#### IV. CONCLUSION

The results demonstrate that feeding steers with diets that include the additive r-zeta® have not negative impact on the quality of the meat. Furthermore, some attributes such as fat luminosity and thawing losses improved.

## ACKNOWLEDGEMENTS

The authors thank "Los Vascos SRL" for founding the research.

#### REFERENCES

- 1. Silvestre, A.; Souza. J.; Millen. D. (2023). Adoption of adaptation protocols and feed additives to improve performance of feedlot cattle. Journal of Applied Animal Research. 51(1). 282–299.
- 2. Munilla, M.E.; Vittone, J.S.; Biolatto, A.; Romera, S.A.; Teira, G.A. (2023). Behavior, performance and carcass yield of steers with different comfort conditioning during the fattening period. Rev. Prod. Anim. 35(3).
- 3. Tullio, R.; Juárez, M.; Larsen, I.; Basarab, A.; Aalhus, J. (2013). Influence of some meat qualityparameters on beef tenderness. Canadian Journal of Animal Science 94(3):455-458.