

## EVALUATION OF MEAT QUALITY OF NELLORE FED DIETS WITH FUNCTIONAL OILS OR MONENSIN AND NDFf LEVELS

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**Abstract** – The aim of this study was to evaluate the effect of the use of additives, the increasing levels of neutral detergent fiber from forage (NDFf), and the NDFf\*additives interaction in meat quality traits of the Nellore cattle. Thirty Nellore young bulls, were randomly assigned to the pens, in a 2 × 3 factorial arrangement of treatments. The factors were two food additives: functional oil (500 mg/kg DM, a blend of castor oil and cashew nut shell liquid, Essential, Oligo Basics, Brazil), and monensin (30 mg/kg DM); and three NDFf levels: 6, 9 e 15% on DM basis. After 24 h postmortem, the pH and color were measured and the longissimus muscle was sampled to measure the cooking loss (CL), instrumental tenderness and sensory analysis. There was no NDFf\*additive effect for any trait evaluated. The functional oil increased the instrumental and sensory tenderness, and decreased the color parameters. Levels of NDFf affect the sensorial tenderness and juiciness. Concluding, the blend of castor oil and cashew nut shell liquid affect beef quality and NDFf at 6 % level improve sensorial tenderness and juiciness.

**Key Words** – Functional oil, Fiber levels, Beef quality.

### I. INTRODUCTION

The need for improvement in the animal production and profitability has generated great search for technologies that provide better results for producers and industry. In this sense, high energy diets in finishing cattle in feedlot have been largely used. However, in order to keep ruminal environment healthy, minimizing the negative effects of the high energy diets, studies with food additives have been developed. The most intensively used additive, monensin, is limited in the meat international marketing in some countries and functional oils has been shown as a natural alternative product that demonstrate potential to be studied as modulators of ruminal fermentation. Some authors reported the effect of function oil on ruminal healthy and digestibility. However, there are few data describing effects on beef quality. Therefore, the aim of this study was to evaluate the influence of the additives, the increasing levels of neutral detergent fiber from forage (NDFf), and the NDFf\*additives interaction on beef quality traits of Nellore cattle.

### II. MATERIALS AND METHODS

Thirty Nellore young bulls, were randomly assigned to the pens, in a 2 × 3 factorial arrangement of treatments. The factors were two feed additives: functional oil (FO, 500 mg/kg DM, a blend of castor oil and cashew nut shell liquid, Essential, Oligo Basics, Brazil), and monensin (MON, 30 mg/kg DM), and three NDFf levels, 6, 9 and 15% on DM basis. After 105 days in feedlot, the animals were slaughtered and after 24 h postmortem, the pH and color were measured and longissimus muscle was sampled to measure the cooking loss (CL), instrumental tenderness (SF) and sensory analysis (SA) [1]. All statistical analyses were conducted using SAS version 9.1.2 for Windows (SAS Institute Inc., Cary, NC, USA). Data was analyzed as a completely randomized design with a 2 × 3 factorial arrangement, using the MIXED procedure. The model included the fixed effect of additive, NDFf level and Addit\*NDFf interaction. Significance was declared at  $P \leq 0.05$ .

### III. RESULTS AND DISCUSSION

There was no effect of additives\*NDFF interaction for all meat quality parameters (Table 1). The functional oil decrease by 6.55 % the SF ( $P = 0.05$ ), decreased  $L^*$  ( $P = 0.02$ ),  $a^*$  ( $P = 0.02$ ), and  $b^*$  ( $P = 0.01$ ) color, and improved by 13 % the sensorial tenderness, compared to monensin treatment. There was a quadratic effect of the NDFF level ( $P < 0.01$ ) on sensorial tenderness, where tender meat was founded in animals fed 6 % of NDFF, there was also a linear effect ( $P < 0.01$ ) for juiciness, with better score for 6 % of NDFF. The castor oil and cashew nut shell liquid has been described as antimicrobial agent, which could be used as ionophore for ruminant diets [2]. There was some data reporting the effect of functional oil in ruminal environment, increasing the fiber digestibility and keeping the ruminal pH stable. However, there is a lack of data reporting the effect of castor oil and cashew nut shell liquid on meat quality. Santos [3] fed beef cattle with functional oil vs monensin and monensin plus virginamycin and did not found any difference for beef traits, such as pH, color, CL and tenderness between the types of additive.

Table 1. Effect of food additives and NDFF levels on meat quality parameters.

Trait	Additives		% of NDFF			SEM	P value		
	MON	FO	6	9	15		ADIT	NDF	ADIT*NDF
pH (24 h)	5.4	5.6	5.5	5.4	5.7	0.07	0.12	0.06	0.40
<i>Color</i>									
$L^*$	36.8	34.3	35.2	35.9	35.4	0.79	0.02	0.84	0.29
$a^*$	16.1	15.1	15.3	15.8	15.7	0.32	0.02	0.57	0.29
$b^*$	12.8	11.7	12.3	12.5	12.1	0.35	0.01	0.65	0.55
Cooking loss (%)	20.2	21.2	19.7	20.3	22.2	1.27	0.53	0.42	0.40
Tenderness (kg)	59.8	55.9	55.9	63.7	60.8	0.43	0.05	0.46	0.13
<i>Sensorial panel</i>									
Tenderness	4.6	4.0	3.9	4.9	4.5	0.16	0.05	<0.01 <sup>(Q)</sup>	0.06
Juiciness	4.2	4.1	3.7	4.3	4.3	0.13	0.39	<0.01 <sup>(L)</sup>	0.38
Flavor	3.7	3.9	3.6	3.9	3.9	0.13	0.12	0.20	0.61
Aroma	3.7	3.9	3.8	3.9	3.8	0.11	0.08	0.65	0.54

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#### IV. CONCLUSION

Concluding, the blend of castor oil and cashew nut shell liquid affect beef quality and NDFF at 6 % level improve sensorial tenderness and juiciness.

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