PERFORMANCE OF FEEDLOT STEERS FINISHED WITH DIFFERENT FAT SOURCES IN DIET

DESEMPENHO DE NOVILHOS CONFINADOS TERMINADOS COM DIFERENTES FONTES DE GORDURA NA DIETA

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ADDITIONAL KEYWORDS

Corn silage. Dry matter intake. Fatty acid calcium salts. Weight gain. Whole rice bran.

PALAVRAS CHAVE ADICIONAIS

Consumo de matéria seca. Farelo de arroz integral. Ganho de peso. Sais de cálcio de ácidos graxos. Silagem de milho.

SUMMARY

The objective of this study was to evaluate the effect of different fat sources in finishing diets on performance of feedlot steers. Twenty steers, with average age of 20 months and initial live weight of 260 ± 41.3 kg, were feedlot fed during 126 days. The animals received corn silage as roughage and the tested concentrates were: basic concentrate (BC); basic concentrate + whole rice bran and rice oil (WRB); basic concentrate + 3 % of fatty acids calcium salts (M3) and basic concentrate + 6 % of fatty acids calcium salts (M6). Each treatment had animals with the following genetic group: 1 pure Charolais (CH), 1 pure Nellore (NE), 2 11/16 CH 5/16 NE, 1 21/32 NE 11/32 CH. No significant differences were observed for crude protein, digestible energy, neutral and acid detergent fibers intakes. The animals that consumed 6 % of fatty acid calcium salts presented higher ether extract intake (0.77 kg/day), while those that consume 3 % or whole rice bran and oil showed intermediate value (0.51 kg/day) and the ones that consumed basic concentrated presented lower value (0.25 kg/day). Similar averages were observed for average daily weight gain (1.142, 1.199, 1.365 and 1.391 kg/day, for BC, WRB, M3 and M6, respectively) and final weight (421 kg).

RESUMO

O objetivo deste estudo foi avaliar efeito do uso de diferentes fontes de gordura na dieta sobre o desempenho de novilhos confinados em fase de terminação. Foram utilizados 20 novilhos, com idade média inicial de 20 meses e peso vivo médio inicial de 260 ± 41,3 kg, que permaneceram confinados por 126 dias. Os animais receberam silagem de milho como volumoso e os concentrados testados foram: concentrado base (BC); concentrado base + farelo de arroz integral e óleo de arroz (WRB); concentrado base + 3 % de sais de cálcio de ácidos graxos (M3) e concentrado base + 6 % de sais de cálcio de ácidos graxos (M6). Cada tratamento possuiu animais pertencendo aos seguintes grupos genéticos: 1 puro Charolês (CH), 1 puro Nelore (NE), 2 11/16 CH 5/16 NE, 1 21/32 NE 11/32 CH. Não foram observadas diferenças entre os consumos de proteína bruta, energia digestível, fibras em detergente neutro e ácido. Os animais que consumiram 6 % de sais de ácidos graxos apresentaram o maior consumo de extrato etéreo (0,77 kg/dia), enquanto que aqueles que consumiram a dieta M3 e WRB apresentaram valor intermediário de consumo (0,51 kg/dia) e os que consumiram BC mostraram o menor valor (0,25 kg/dia). Similaridades de valores foram observadas

Recibido: 28-9-12. Aceptado: 25-9-13.

para o ganho de peso médio diário (1,142; 1,199; 1,365 e 1,391 kg/dia, respectivamente para CB, WRB, M3 e M6) e peso final (421 kg).

INTRODUCTION

In order to improve productivity through changes in animal nutrition, different nutritional sources have been evaluated over the years, searching for higher weight gain and lower finishing period and dry matter intake. Enhance animal's weight gain by chances in nutrition, can be obtained by increasing the quantity of supplied concentrate or the use of sources with higher energetic concentration, as fats. However, the use of fats in ruminants feed is restricted, since the rumen is intolerant to higher levels of fat by affecting negatively ruminal fermentation (Van Soest, 1994). According to Kozloski (2002), lipid excess in ruminant's diet can inhibit fermentation and ruminal microbial growth. So, food would remain higher time inside rumen, decreasing dry matter intake, which may reduce animal's performance since nutritional requirements wouldn't be reached.

Protected fat emerged as an alternative to decrease negatively effects of free fats at ruminal environment. The decrease of these effects would be associated to the fact that the poliinsaturated fatty acids could pass through the rumen inert, resulting in higher duodenum energetic offer. The fatty acids calcium salts are a kind of protected fat that has the property to dissociate completely at acid conditions of ruminant's abomasum (Ngidi *et al.*, 1990), being the complete dissociation at 5 pH (Sukhija and Palmquist, 1990).

The studies involving fatty acids calcium salts are large in dairy cattle, including studies in ruminal metabolism as well as milk production. Few studies were performed with beef cattle evaluating animal's performance with the use of fatty acid calcium salts (Ngidi *et al.*, 1990; Aferri *et al.*, 2005). So, this study had as objective evaluate the effects of different fat sources in finishing diets on steers performance.

MATERIALS AND METHODS

The experiment was conducted at the Laboratório de Bovinocultura de Corte of Universidade Federal de Santa Maria (UFSM), from July to December of 2007. Twenty steers were used and randomly taken from UFSM's experimental herd. Animals were born at the same season and kept under the same conditions until finishing.

Previously to the adaptation period, the animals were balanced so that all experimental treatments started with similar weight and body condition. At the beginning of the experiment, the steers presented average initials age of 20 months, weight of 262.6 ± 41.3 kg and body condition of 2.54 ± 0.1 points (scale varying from 1 to 5 points), and remained in feedlot per 126 days. The steers received corn silage as roughage and were distributed into four different treatments: basic concentrate (BC); basic concentrate + whole rice bran and rice oil (WRB); basic concentrate + 3 % of fatty acid calcium salts (Megalac-E®) on total dry matter (DM) offered (M3) and basic concentrate + 6 % of fatty acid calcium salts (Megalac-E®) on total DM offered (M6). Each treatment had animals with the following genetic group: 1 pure Charolais (CH), 1 pure Nellore (NE), 2 11/16 CH 5/16 NE, 1 21/32 NE 11/32 CH.

The animals were kept in feedlot, in individual pens with 12 m^2, covered and with paved floor. The individual troughs were of wood and drinkers had water level regulated by automatic float. The animals were adapted to feed management and installation during 21 days, where ectoparasites and endoparasites control was made with subcutaneous application of a commercial product with albendazole sulfoxide, according to producer recommendation.

Basic concentrate was composed by ground corn, wheat bran, soybean meal, urea, common salt and limestone. Roughage:concentrate ratio was 66:34. The diet was calcualted according to NRC (2000) to attend animal's nutrients requirements, aiming for average daily weight gain (DWG) of 1.2 kg/animal, estimating an intake of 2.5 kg of DM/100 kg of live weight. Diets were isonitrogen, with average of 13 % of crude protein (CP) and BC diet had 2.18 % of ether extract (EE), while WRB and M3 were isolipidic, with average of 4.75 % of EE and M6 diet contained 7.30 % de EE. In **table I** are described the ingredients of the experimental diets, expressed in percentual and chemical composition.

The animals were fed twice a day, being the diet equally divided: half at the morning (08:30 a.m.) and the other half at afternoon (14:00 p.m.). The roughage was distributed in the trough and over it the concentrated was spread and both were manual mixed for better diet homogenization. Daily, at morning, the leftovers of the previous day were removed and weighted for offer adjustment, aiming that food supply was 10 % above the voluntary food intake of the previously day. The voluntary food intake was obtained by the difference between the weight of offered feed and the weight of leftovers. During all experimental period, daily, samples of corn silage and feed leftovers were taken. At every batch of concentrate, samples of all used ingredients were taken.

Samples of the diet ingredients and leftovers were kept in freezer at –18 °C until the end of the experimental period. Composite samples of corn silage and leftovers were pre-dried in a forced air oven at 55 °C for 72 hours to determine partially dry matter content. After pre-drying, the samples were ground in Willey mill type, with a sieve of 1 mm screens. Samples of concentrate ingredients, corn silage and leftovers were analyzed for DM, organic matter (OM), ash, CP, EE, neutral detergent fiber (NDF) and acid detergent fiber (ADF) contents. Samples of corn silage and concentrate ingredients also were analyzed for insoluble nitrogen in neutral detergent (INND), insoluble nitrogen in acid detergent (INAD), lignin in acid detergent (LAD) and *in vitro* digestibility of dry matter (IVDMD) and organic matter (IVOMD), with Tilley and Terry (1963) methodology.

DM, OM, ash, total nitrogen (N) and EE content were obtained by AOAC determinations (1995). NDF and ADF were obtained by polyester bag technics, according to Senger *et al*. (2008). The LAD was obtained according to Robertson and Van Soest

Table I. *Participation of ingredients and diet's chemical composition.* (Participação dos ingredientes e composição química da dieta).

	Experimental treatments			
	BC	WRB	M3	M6
Ingredients (%)				
Corn silage	60	60	60	60
Wheat bran	20.6	10.6	25.3	20.7
Ground corn	11.2	8	3.6	3.2
Soybean meal	6	6	5.6	7.6
Whole rice bran	-	12	-	-
Rice oil	-	1.2	-	-
Megalac E®	-	-	3.2	6.3
Limestone	1.2	1.2	1.2	1.2
Urea	0.5	0.5	0.6	0.5
Sodium chlorite	0.5	0.5	0.5	0.5
Chemical composition				
DM, %	58.11	58.65	58.17	58.52
CP, %	13.52	13.06	13.77	13.54
EE, %	2.18	4.72	4.78	7.30
NDF, %	46.16	45.40	46.81	45.55
ADF, %	23.75	23.95	24.26	23.89
Lignin, %	2.91	3.16	3.11	2.96
TDN, %	66.91	68.74	68.41	71.37
DE, Mcal/kg	2.94	3.02	3.01	3.14

BC= basic concentrate; WRB= basic concentrate + whole rice bran + rice oil; M3= basic concentrate + 3 % of fatty acid calcium salts (Megalac-E®); M6= basic concentrate + 6 % of fatty acids calcium salts (Megalac-E®). DM= dry matter; CP= crude protein; EE= ether extract; NDF= neutral detergent fiber; ADF= acid detergent fiber; TDN= total digestible nutrients; DE= digestible energy.

(1981). The INND and INAD were obtained according to Licitra *et al.* (1996). To calculate total digestible nutrients (TDN), Weiss *et al*. (1992) methodology was used. To calculate digestible energy (DE), expressed in Mcal/kg of diet, were used the equations described by ARC (1980), based on *in vitro* digestibility of organic matter (IVDOM) and organic matter (OM), where DE= (IVDOM x MO x 19)/4.18. In **table II** are presented DM, OM, ash, CP, EE, NDF, ADF, INND, INAD, LAD, TDN, IVDMD and IVOMD contents of diets' components.

Dry matter (DMI), crude protein (CPI), ether extract (EEI), digestible energy (DEI) and neutral (NDFI) and acid (ADFI) detergent fiber intakes were calculated as the difference between the values of DM, CP, EE, NDF and ADF offered and leftovers. When these variables were presented in percentual of live weight (LW), the intake of each fraction was divided per 100 kg of LW. The efficiencies were obtained dividing the average daily weight gain (kg/day) per fraction intake (kg/day).

At the beginning and at the end of each experimental period, composed by 21 days, the animals were weighted, after fasting of solid and liquids for 14 hours, at the same time the body condition (BC) was evaluated. The average daily weight gain (DWG) was calculated by the weight gain obtained in all experimental period divided by the number of days of the experimental period (21 days). Feed conversion (FC) was determinated by the division of animals' DMI per DWG. The subcutaneous fat thickness was obtained at *Longissimus dorsi* muscle by the arithmetic average of three points surrounding the muscle.

Table II. *Percentual averages of dry matter (DM), organic matter (OM), ash, crude protein (CP), ether extract (EE), neutral detergent fiber (NDF), acid detergent fiber (ADF), insoluble nitrogen in neutral detergent (INND), insoluble nitrogen in acid detergent (INAD), lignin (LAD), total digestible nutrients (TDN) and* in vitro *digestibilities of dry matter (IVDMD) and organic matter (IVOMD) of diets' components.* (Médias percentuais da matéria seca (DM), matéria orgânica (OM), cinzas (ash), proteína bruta (CP), extrato etéreo (EE), fibra em detergente neutro (NDF), fibra em detergente ácido (ADF), nitrogênio insolúvel em detergente neutro (INND), nitrogênio insolúvel em detergente ácido (INAD), lignina (LAD), nutrientes digestíveis totais (TDN) e digestibilidades *in vitro* da matéria seca (IVDMD) e da matéria orgânica (IVOMD) dos componentes da dieta).

Content, %	Diets' components						
	Corn silage	Wheat bran	Corn	Soybean meal	Whole rice bran	Rice oil*	Megalac E®*
DM	38.9	84.6	88.3	87.4	88.6	99.9	95
OM	93.9	95.5	99.1	93.0	88.3	-	95
ASH	6.1	4.5	0.9	7.0	11.7	-	5
CP	5.7	15.9	8.5	42.0	12.7	-	-
EE	1.7	2.7	2.9	2.2	14.2	99.9	84.5
NDF	54.1	35.4	12.3	20.94	26.37	-	-
ADF	30.2	13.2	0.8	12.2	12.9	-	-
INND	0.18	0.49	0.13	0.68	0.42	-	-
INAD	0.11	0.10	0.02	0.16	0.13	-	-
LAD	3.04	4.45	0.00	2.83	5.78	-	-
TDN	63.17	70.71	88.85	74.85	79.47	184.0	163.5
IVDMD	55.99	71.85	94.44	89.20	80.44	-	-
IVOMD	60.87	75.44	95.24	90.51	81.79	-	-

*Values obtained from NRC (2001).

The complete randomized block experimental design was used, with four treatments with five animals each one, being blocking criterion the animals' genetic group. The data collected were analyzed with PROC MIXED. The averages were compared by *t* test by LSMEANS. All statistical analysis used SAS (2001) as statistical package. The variables were also analyzed by contrast test with SAS (2001).

RESULTS AND DISCUSSION

The dry matter intake (DMI), expressed in kg or in % of LW, wasn't influenced by tested sources of fat **(table III)**, being observed average intake of 9.77 kg/day during the experimental period. Aferri *et al.* (2005) compared cottonseed or fatty acid calcium salts in relation to a control diet and verified that animals that consumed fatty acids calcium salts had lower DMI in relation to the ones that consumed cottonseed. Ngidi *et al.* (1990), evaluating the inclusion of 0, 2, 4 and 6 % of fatty acid calcium salts in finishing steers diet, observed a quadratic behavior of DMI with the increase of fatty acid calcium salts level. This result was attributed to a possible lower acceptability

Table III. *Means, variation coefficients (VC) and probabilities (p>F) of nutritional fractions intakes and efficiencies of tested treatments.* (Médias, coeficientes de variação (VC) e probabilidades (p>F) do consumo das frações nutricionais e da eficiência das dietas).

Characteristic	Treatments BC	WRB	M3	M6	VC	p>F
DMI, kg/day	9.87	9.88	9.69	9.63	9.31	0.9595
DMILW, %	2.90	2.97	2.83	2.85	6.03	0.6075
CPI, kg/day	1.46	1.43	1.47	1.44	9.05	0.9376
CPILW, %	0.43	0.43	0.43	0.43	5.71	0.9985
CPE, kg LW/kg CP	0.78^{b}	0.85^{ab}	0.93^{a}	0.97^{a}	10.81	0.0349
EEI, kg	0.25^{c}	0.51^{b}	0.51^{b}	0.77^{a}	8.51	<0.0001
EEILW, %	0.07^{c}	0.15^{b}	0.15^{b}	0.23^{a}	4.69	<0.0001
EEE, kg LW/kg EE	4.60^{a}	2.38^{b}	2.72^{b}	1.82^{c}	13.56	<0.0001
DEI, Mcal	28.47	29.52	28.55	29.99	9.20	0.7672
DEILW, %	8.36	8.83	8.24	8.84	5.82	0.1575
DEE, kg LW/Mcal ED	0.033^{c}	0.035^{bc}	0.041^{a}	0.038^{ab}	10.80	0.0417
NDFI, kg/day	5.51	5.45	5.41	5.31	9.30	0.9387
NDFILW, %	1.62	1.64	1.58	1.57	6.09	0.6969
NDFE, kg LW/kg NDF	0.21^{c}	0.22^{bc}	0.25^{ab}	0.26^{a}	10.57	0.0120
ADFI, kg/day	2.87	2.90	2.85	2.82	9.30	0.9614
ADFILW, %	0.85	0.87	0.83	0.83	6.04	0.5768
ADFE, kg LW/kg ADF	0.40^{c}	0.42^{bc}	0.48^{ab}	0.49^{a}	10.68	0.0156

^{abc}Means followed by distinct letters, on same line, differ (p<0.05) by Proc Mixed.
BC= basic concentrate; WRB= basic concentrate + whole rice bran + rice oil; M3= basic concentrate + 3 % of fatty acid calcium salts (Megalac-E®); M6= basic concentrate + 6 % of fatty acid calcium salts (Megalac-E®).
DMI= dry matter intake; DMILW= DMI per 100 kg of LW; CPI= crude protein intake; CPILW= CPI per 100 kg of LW; CPE= protein efficiency; EEI= ether extract intake; EEILW= EEI per 100 kg of LW; EEE= lipidic efficiency; DEI= digestible energy intake; DEILW= DEI per 100 kg of LW; DEE= digestible energy efficiency; NDFI= neutral detergent fiber intake; NDFILW= NDFI per 100 kg of LW; NDFE= NDF efficiency; ADFI= acid detergent fiber intake; ADFILW= ADFI per 100 kg of LW; ADFE= ADF efficiency.

of calcium salts, or to chemotactic intake controls, or to depressed ruminal motility induce by long chain fatty acids at duodenum.

According to NRC (2000) and Van Soest (1994), the regulation of animal's intake is complex and not fully known, being influenced by several factors as: physiological factors (body composition, sex, age, lactation, pregnancy and frame), environmental factors, forage offer, growth promoters, additives, diet composition and lack of any diet nutrient, besides caloric density and animal production. Van Soest (1994) assumes that bovines consume until reach satiety and thus, with higher energetic diets animals would consume less to obtain the energetic quantity necessary to production, in relation to animals that consume diets with lower energetic level. But this is not always a constant, often it is observed in diets with high energy, consumption of digestible energy may decline due to lack of effective fiber in concentrates, lack of rumination and potential ruminal acidosis (Van Soest, 1994).

The DMI may also be influenced by disturbances resulting from the toxicity of free fatty acids in the rumen, such as rice bran and oil. The use of free fatty acids, or fat in the diet of ruminants is not widely used because it is known that, apparently, the ruminal microorganisms are intolerant to their presence (Van Soest, 1994). Kozloski (2002) comments that fat excess in ruminant diets, higher than 7 %, can inhibit fermentation and ruminal microorganisms' growth, interfering in feed passage flow. As consequence of the decrease in ruminal fermentation, fibers remain higher time in ruminal environment until being degraded, decreasing animals' DMI. So, diet fat content, in this study, possibly wasn't enough to cause negatively effect in ruminal environment and motility when whole rice bran and oil were used. When fatty acid calcium salts were used, with 3 or 6 % of inclusion in total offered diet DM, no decrease in DMI was observed (p=0.9595) caused by lower palatability or chemotactic regulation, as mentioned previously by some authors. When DMI values were analyzed in relation to 100 kg of LW (%) **(table III)**, was observed that animals from all experimental treatments consumed higher then expected (2.5 % of LW), obtaining average of 2.89 % of DMI.

In relation to crude protein intake, expressed in kg (CPI) and in % of LW (CPILW) **(table III)**, these were similar between different sources of fat and control diet (p= 0.9376 and p= 0.9985, respectively). At experiment beginning, diets were balanced in order to be isonitrogen, however, fractions intake may be changed by alteration of DMI. In this investigation, no depressive effects were observed in DMI, keeping CPI similar between experimental treatments (average of 1.45 kg and 0.43 %, respectively for DMI per day and in relation to 100 kg of LW). However, Ngidi *et al.* (1990) studying the inclusion of fatty acid calcium salt observed that a decrease of DMI occurred in diets with higher level of its addition, which was sufficient to reduce the CPI, resulting lower intake of CP as recomended for the category. The CP efficiency (CPE) had a different behavior in treatments (p= 0.0349), showing higher efficiency of consumed CP utilization for animals that consumed 3 or 6 % of fatty acid calcium salts, due to values obtained for average animals' daily weight gain (DWG) **(table IV)**.

Animals that were fed with the diet containing 6 % of fatty acid calcium salt's inclusion showed higher values for ether extract intake (EEI) **(table III)**, consuming 0.77 kg/day and 0.23 %, while the ones that were fed with whole rice bran and oil or 3 % of fatty acid calcium salts presented intermediary values. With no modifications on animals' DMI, the EEI was determined by EE quantity calculated for each diet, being superior for diet with 6 % of fatty acid calcium salts (7.30 % of EE), intermediary and similar value for diets with whole rice bran and oil and 3 % of fatty acid calcium salts (average of 4.75 % of EE), and lower value for diet with basic concentrate (2.18 % of EE) **(table III)**.

However, if the efficiency of the use of EE is considered **(table III)**, animals that consumed basic concentrate presented better efficiency, observing that for each kg of EE consumed occurred a gain of 4.60 kg of LW. Intermediary values were observed for animals that consumed 3 % of fatty acid calcium salts, showing 2.72 kg of LW gain for each kg of EE consumed, not differing from the ones that were fed with whole rice bran and oil (2.38 kg). The animals that consumed 6 % of fatty acid calcium salts presented the lowest EEE, and for each kg of EE consumed the gain was of 1.82 kg of LW.

Digestible energy intake (DEI) was similar between the treatments **(table III)**, being this fact attributed to a similar offer of DE in animals' diet. In contrast, no similarity was observed for digestible energy efficiency (DEE), even with similar consumption of this fraction, the DWG contributed for detection of statistical difference (p= 0.0417).

The NDF and ADF intakes were similar **(table III)** for all treatments. The importance of NDF intake was reported by Fox *et al.* (2004), who observed that the effective content of NDF in a diet may also contribute to stimulate saliva flow, further the increase of chews, rumination and ruminal motility, being important to maintain the correct ruminal pH and fiber digestion. Beyond that, according to Mertens (1992), NDF is the diet component which provides greater estimation of ruminal fill. In relation to ADF, this fraction intake was similar between treatments, with average of 2.86 kg per day. The ADF which contains lignin is associated to diet quality and according to Van Soest (1994), lignin would be related to diet digestibility and plants that present higher lignin contend, tend to be less consumed due to lower intracellular content.

The ADWG **(table IV)** was similar among treatments (p>0.05) being the average across

Table IV. *Averages, variation coefficients (VC) and probabilities of initial and final weights, average daily weight gain (ADWG), initial (IBC) and final body condition (FBC), body condition gain (BCG) and feed conversion (FC) of feedlot steers, receiving different diet fat sources.* (Médias, coeficientes de variação (VC) e probabilidades dos pesos inicial e final, ganho de peso médio diário (ADWG), condição corporal incial (IBC) e final (FBC), ganho de condição corporal (BCG) e conversão alimentar (FC) de novilhos confinados, recebendo diferentes fontes de gordura na dieta).

Characteristic	Treatments BC	WRB	M3	M6	VC	p>F
Initial weight, kg	267.3	260.6	258.6	253.9	8.56	0.8241
Final weight, kg	411.2	411.6	430.6	429.2	7.11	0.6082
ADWG, kg/day	1.142	1.199	1.365	1.391	12.31	0.0635
IBC, points1	2.54	2.55	2.51	2.58	1.93	0.2128
FBC, points1	3.38	3.44	3.44	3.42	5.27	0.8573
BCG, points/day	0.007	0.006	0.007	0.007	20.57	0.6865
FC, kg DMI/kg LW	8.85	9.61	7.68	7.39	19.30	0.1502

[1]Scale varing from 1 to 5 points, were 1= very thin and 5= very fat.
BC= basic concentrate; WRB= basic concentrate + whole rice bran + rice oil; M3= basic concentrate + 3 % of fatty acid calcium salts (Megalac-E®); M6= basic concentrate + 6 % of fatty acid calcium salts (Megalac-E®).

all treatments 1.281 kg/day. According to Di Marco *et al.* (2006), the different body tissues compete by nutrient uptake, partitioning the consumed energy between heat and protein and fat retention. So, nutrients retention as protein and fat tissue only occurs when energetic intake is higher than heat production cost (Di Marco *et al.*, 2006).

In terms of tissue deposition, the energy cost to retain protein and fat is different. According to Di Marco *et al.* (2006), the energy demand to deposit 1g of fat tissue requires 8 kcal, while 1g of protein deposited requires 1.4 kcal. Despite of M6 animals, that consumed 6 % of fatty acid calcium salts, presented higher EE intake, the efficiency of use of this fraction was lower for these animals **(table III)**. This can be attributed to the difference on animals' weight gain composition, M6 animals showed higher carcass subcutaneous fat thickness in relation to the animals from other treatments (5.21 *vs.* 3.51 mm, respectively for M6 and the average across other treatments). So, animals that consumed 6 % of fatty acid calcium salts didn't obtain higher weight gain, even ingesting higher EE quantity by the lower efficiency of use of the energy that came to duodenum, since they deposited higher quantity of subcutaneous fat thickness and showed higher carcass total fat, demanding higher energy quantity for this tissue deposition. The animals' final weight was similar between the treatments (p= 0.6082), since they remained in feedlot equal period (126 days) with similar ADWG.

Aferri *et al.* (2005), working with steers distributed into three treatments (control diet, diet with fatty acid calcium salts and diet with cotton seed), didn't found statistical difference of final weight and average daily weight gain for tested diets. In the same way, Zinn *et al.* (2000) working with different fat levels in diet of finishing steers, didn't verify effect of diets in ADWG and DMI. However, Ngidi *et al.* (1990) analyzing levels of fatty acid calcium salts (0, 2, 4 and 6 % of diet inclusion) verified a quadratic behavior for ADWG.

In relation to final body condition, the animals presented similar values even consuming different diets, obtaining average of 3.42 points.This is the reflex of similar body condition gain among treatments during the experimental period. The animals presented equal feed conversion (p= 0.1502), since both the DMI and ADWG, as observed in **tables III** and **IV**, respectively, didn't differ among treatments.

CONCLUSIONS

Steers performance isn't modified by the inclusion in finishing diets of whole rice bran and oil or fatty acid calcium salts, at level of 3 or 6 % of total diet dry matter, under the specific conditions of this experiment.

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