**Revista Brasileira de Zootecnia**
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ISSN 1806-9290
www.sbz.org.br

**R. Bras. Zootec., v.40, n.6, p.1333-1338, 2011**

# Use of cactus pear (*Opuntia ficus indica* Mill) replacing corn on carcass characteristics and non-carcass components in Santa Inês lambs[1]

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**ABSTRACT** - The objective of this study was to evaluate the biometric and morphometric measures, regional composition, carcass characteristics and non-carcass components of Santa Inês lambs submitted to levels of corn replaced by cactus pear in the diet. It was used 45 Santa Ines non-castrated male lambs, with average initial live weight of 25.50 ± 0.48 kg as a completely randomized block design with five treatments (0; 25; 50; 70 and 100%) and nine replicates. There was an effect of the diet on slaughter weight, empty body weight, hot and cold carcass, cold carcass weight, shoulder weight and loin weight. Cactus pear can replace up to 75% of corn in diets for feedlot Santa Inês lambs, without compromising production, carcass characteristics and production of non-carcass components.

Key Words: *buchada*, carcass dressing, production systems, retail cuts, semiarid

# Utilização da palma forrageira (*Opuntia fícus-indica* Mill) em substituição ao milho sobre as características de carcaça e componentes não constituintes da carcaça de cordeiros da raça Santa Inês

**RESUMO** - O objetivo neste trabalho foi avaliar as medidas biométricas e morfométricas, a composição regional, as características de carcaça e os componentes não constituintes da carcaça de cordeiros Santa Inês, submetidos a níveis de substituição do milho por palma forrageira na dieta. Foram utilizados 45 cordeiros não-castrados da raça Santa Inês com peso vivo inicial de 25,0 ± 0,48 kg, distribuídos em delineamento de blocos ao acaso com cinco tratamentos (0; 25; 50; 75 e 100%) e nove repetições. Houve efeito da dieta sobre o peso ao abate, peso do corpo vazio, peso de carcaça quente e fria, peso da paleta e peso do lombo. A palma forrageira pode substituir até 75% do milho em dietas para cordeiros da raça santa Inês em confinamento, sem comprometer a produção, as características da carcaça e a produção de componentes não constituintes da carcaça.

Palavras-chave: buchada, cortes comerciais, rendimento de carcaça, semiárido, sistemas de produção

## Introduction

Nutrition is an important factor that influences the quantitative characteristics of animal and carcass. However, in the semi-arid region of Brazil, the shortage of fodder in the dry season causes a drastic reduction of energy nutrients for animal maintenance and husbandry.

In sheep finishing, the use of concentrate is maximized in order to increase the energy density of diets, and corn is one of the major ingredients used as energy source. In northeastern Brazil, much of this corn is imported from other Brazilian regions reaching high values, which increases the production costs. Thus, an alternative would be to use an energy source less costly and available in the region (Melo et al., 2003).

Cactus pear is a viable alternative for sheep finishing due to its ability to store water and being adapted to environmental conditions of arid regions (Lüttge, 2004). With respect to its nutritional value, cactus pear is an excellent energy source, rich in minerals and vitamin A. It has high concentration of non-fibrous carbohydrates (Wanderley et al., 2002) and total digestible nutrients (Melo et al., 2003).

This cactus has an average of 26% neutral detergent fiber (NDF); however, this component has low physical

*Received June 14, 2010 and accepted December 15, 2010.*
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effectiveness, requiring the association of the cactus with roughage to correct the NDF in order to avoid ruminal disorders.

Regarding the quantitative carcass characteristics, the types of cuts made are determined by the consumer market, according to geographic region, customs and food habits of the population (Oliveira et al., 2002). The weight and yield of these cuts are influenced by nutrition plan, sex, weight, age (Clementino et al., 2007) and animal genotype (Mendonça et al., 2003).

The use of non-carcass components for the preparation of typical dishes such as *sarapatel* and *buchada* is common in northeastern Brazil (Medeiros et al., 2008). Within a meat production system, these components can provide high economic returns inasmuch as their marketing will add value to the activity, which make up to 30% of the animal (Carvalho et al., 2005).

The objective of this study was to evaluate the biometric and morphometric measures, carcass characteristics, and non-carcass components of Santa Inês lambs fed cactus pear in replacement to corn.

## Material and Methods

The experiment was conducted at the Unidade de Pesquisa em Pequenos Ruminantes do Centro de Ciências Agrárias – CCA/UFPB, located at the municipality of São João do Cariri, PB, micro-region of Eastern Cariri, state of Paraíba, at coordinates 7º 23' 27" S and 36º 31' 58" W. The local climate is classified as Bsh (hot semiarid) according to Köppen classification. Forty-five non-castrated Santa Ines male lambs with average weight of 25.50 ± 0.48 kg were used, confined individually in stalls provided with feed box and drinking trough where they received the experimental diets. The animals were weighed, identified, treated against ecto and endoparasites and vaccinated against clostridial diseases. The weighings occurred every seven days, starting from the beginning of the experiment until slaughter.

The ingredients used were Tifton hay (*Cynodum sp*), soybean meal, corn, wheat bran, limestone, mineral and cactus pear. Diets (Table 1) were formulated to meet the requirements of sheep of 25 kg of LW and daily gain of 250 g/day (NRC, 1985). The treatments consisted of the replacement of corn by cactus pear (*Opuntia ficus-indica Mill*) at increasing levels: T1 = 0%, T2 = 25%, T3 = 50%, T4 = 75%, T5 = 100%. Experimental diets were offered twice daily in the form of complete mixture. The dry matter intake (DMI) was determined by daily measurements of received and rejected food, so as to provide daily surplus of about 10%.

Body measures were obtained by using methodology described by Osório et al. (1998). The animals remained standing on a flat surface, avoiding movement, to be measured with the aid of tape measure and compass. The following measurements were performed: withers height and hip height, body length, chest circumference, leg length, chest width.

Upon reaching approximately 35 kg of live weight (LW), the animals were weighed, thus obtaining the final weight (FW) and submitted to solid fasting of 12 hours. After this period, the animals were weighed again to obtain the slaughter weight (SW) in order to determine the percentage

Table 1- Percentage composition of ingredients in diets (% DM) and in the ration according to the cactus pear levels

| Ingredient (%DM) | Substitution levels (%) | | | | |
|---|---|---|---|---|---|
| | 0 | 25 | 50 | 75 | 100 |
| Cactus pear | 0.00 | 7.00 | 14.00 | 21.00 | 28.00 |
| Ground corn | 28.0 | 21.0 | 14.0 | 7.0 | 0.00 |
| Soybean meal | 17.60 | 17.60 | 17.60 | 17.60 | 17.60 |
| Wheat bran | 11.40 | 11.40 | 11.40 | 11.40 | 11.40 |
| Tifton hay | 40.0 | 40.0 | 40.0 | 40.0 | 40. 0 |
| Mineral salt | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| Limestone | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| Composition of feed % in the DM | | | | | |
| Dry Matter (DM) | 89.46 | 59.34 | 44.40 | 35.46 | 29.52 |
| Organic matter | 90.72 | 89.93 | 89.14 | 88.35 | 87.56 |
| Mineral matter | 5.11 | 5.84 | 6.56 | 7.28 | 8.00 |
| Crude protein | 16.24 | 15.91 | 15.57 | 15.23 | 14.89 |
| Ether extract | 2.38 | 2.25 | 2.11 | 1.98 | 1.85 |
| Neutral detergent fiber (NDF) | 42.60 | 43.98 | 45.36 | 46.74 | 48.12 |
| Acid detergente fiber (ADF) | 20.32 | 21.54 | 22.77 | 23.99 | 25.21 |
| Total carbohydrates (TC) | 76.27 | 76.00 | 75.76 | 75.51 | 75.26 |
| Non-fibrous carbohydrates (NFC) | 37.94 | 36.15 | 34.39 | 32.62 | 30.84 |
| Total digestible nutrients (TDN)[1] | 63.88 | 62.15 | 60.42 | 58.69 | 56.95 |
| Metabolizable energy (Mcal/kg of DM) | 2.30 | 2.24 | 2.18 | 2.12 | 2.05 |

[1] TDN(%) = (DCP + DNDFcp + DNFC + (DEE × 2.25)-7), equation proposed by Weiss (1999).

of weight loss due to fasting (FW), which was calculated as follows: FW% = (LW-SW) × 100/LW.

Prior to slaughter, the body condition was subjectively determined by palpation on the lumbar region, right after the 13$^{th}$ pair of ribs, assigning score from 1.0 to 5.0 according to definitions of César & Souza (2007).

At slaughter, the animals were stunned by concussion in the atlanto-occipital region, followed by bleeding for three minutes through the section of the carotid artery and jugular vein. The blood was collected in tared container for 3 minutes for subsequent weightings. Then, the animals were skinned and eviscerated to obtain the edible and non-carcass components which were used in the preparation of *buchada* as follows (blood, tongue, lungs, heart, liver, spleen, kidney, empty gastrointestinal tract omentum, head and paw), as described by Costa et al. (2007).

Subsequently, head (section in the atlanto-occipital joint), paws (section in the carpal and tarsal-metatarsal joints) and tail were removed. Then, the hot carcass (HCW), including kidney and renal pelvic-fat, were weighed. The gastrointestinal tract (GIT) was weighed full and empty to determine the empty body weight (EBW), which was used to determine the biological or true yield [TY,% = (HCW / EBW × 100)], according to Cezar & Souza (2007).

The carcasses were chilled for 24 hours ± 4°C in cold chamber, with tarsal-metatarsal joints spaced at 14 cm by means of hooks. After this period, they were weighed to obtain the cold carcass weight (CCW) and calculation of the loss by cooling [LC,% = (HCW - CCW) / HCW × 100]. Then, it was removed kidneys and pelvic + renal fat, whose weights were recorded and subtracted from the hot and cold carcass weight. The hot carcass dressing (HCD,% = HCW/ SW × 100) and cold carcass dressing yield (CCD, % = CCW/SW × 100) were also calculated.

Before the linear and carcass section measurements, subjective evaluation was conducted to determine the carcass conformation, by assigning scores from 1.0 to 5.0 (1.0 for the worst and 5.0 for the best conformation), according to methodology described by Colomer-Rocher et al. (1988). Prior the carcass section, the following morphometric measures were taken: carcass external length; carcass internal length, leg length, thigh circumference, hip circumference, hip width, chest depth and carcass conformation. The Carcass Compactness index (CC) was defined by the cold carcass weight / cold carcass internal length ratio.

After taking the internal and external measures, half right and left carcasses were split into five anatomical regions (retail cuts) using methods described by Colomer-Rocher et al. (1988), considering the following cuts: neck, shoulder, rib, loin and leg.

The individual weights of each cut were recorded to calculate their proportion in relation to the average half-carcasses and to obtain the commercial yield of cuts. The rib eye area (REA) was measured in the *Longissimus dorsi* muscle between the 12$^{th}$ and 13$^{th}$ ribs of the left half carcass. The muscle contour was outlined on plastic sheet and the area was determined through a digital planimeter, using the mean of three readings. The fat thickness measurement was obtained in the *L. dorsi* muscle through digital caliper.

The experimental design used was randomized blocks with five treatments and nine replicates, and the blocks were formed according to the initial weight of animals. Besides the analysis of variance, regression analysis was performed in function of the substitution level of corn by cactus pear in the diet. The criteria used to select the equations were biological behavior, determination coefficient ($r^2$) and significance levels (1 and 5% probability) for the regression parameters obtained by the t-Student test. Statistical analysis was performed by using the SAEG computer program (2001).

## Results and Discussion

Biometric measurements (Table 2) were not affected (P>0.05) by the inclusion of cactus pear in diets. These results confirm that these measures are not influenced by nutritional management, provided the animals are slaughtered with the same final weight (Rosa et al., 2002).

Body length (64.47 cm), withers height (65.35 cm), hip height (67.71 cm), chest width (19.27 cm), leg length (32.94 cm) hip width (17.66 cm) values suggest measurements of compact animals. Body condition score (3.32) was considered very good, considering the genotype studied. The body score indicates the amount of muscle and adipose tissue in relation to the bone mass proportion. This indicates the best time for slaughtering the animals.

The carcass morphometric measurements were not affected (P>0.05) by the substitution of corn by cactus pear in the diet of lambs (Table 3). These results are related to weight established for slaughter (± 33 kg). For diets with 75 and 100% of cactus pear, the slaughter weight and therefore the cold carcass weight slightly reduced compared to other levels used, slightly affecting the carcass conformation. The carcass conformation level had an average score of 2.89, which is considered satisfactory.

Carcass compactness (CC) was not influenced by diet (P>0.05), showing mean value of 0.23 kg/cm. The CC found in this study showed significant values, indicating good deposition of muscle tissue per unit of carcass length. In absolute terms, it was observed that the CC of lambs fed 75 and 100% of cactus pear were slightly lower than those fed with the other diets. This occurs in response to the lower cold carcass weights due to the increased levels of cactus pear in the diet.

Slaughter weight decreased linearly (P<0.05) with the substitution of corn by cactus pear (Table 4). Consequently, there was also a decrease (P<0.05) of empty body weight (EBW), hot carcass weight (HCW) and cold carcass weight (CCW). The increased levels of substitution of corn by cactus pear caused a reduction in energy density of diets, which ranged from 2.3 to 2.05 Mcal/kg DM, and other nutrients, influencing the development and tissue deposition of lambs.

Energy consumption level can change the partition to use this energy for the synthesis of protein or lipids, or in terms of tissues, in the development of muscle and adipose tissue (Ferreira et al., 1998). For the NRC (1985), for each kilogram of gain in empty body weight, there is a requirement of 1.2 Mcal of metabolizable energy for protein and water deposition and 8.0 Mcal of metabolizable energy for fat and water deposition.

Table 2 - Biometric measures of Santa Inês lambs fed increasing levels of cactus pear in diets

| Variable | Substitution level (%) | | | | | X | CV (%) |
|---|---|---|---|---|---|---|---|
| | 0 | 25 | 50 | 75 | 100 | | |
| Corporal length ,cm | 62.72 | 64.67 | 63.83 | 64.22 | 66.94 | 64.47ns | 6.51 |
| Withers height (cm) | 65.11 | 64.56 | 66.28 | 64.89 | 65.78 | 65.32 ns | 4.66 |
| Hind height (cm) | 67.22 | 67.33 | 68.50 | 67.78 | 67.72 | 67.71 ns | 4.42 |
| Thoracic width (cm) | 19.11 | 19.61 | 19.28 | 19.50 | 18.84 | 19.27 ns | 5.58 |
| Leg length (cm) | 32.78 | 32.89 | 33.00 | 32.83 | 33.22 | 32.94 ns | 3.39 |
| Thoracic perimeter (cm) | 69.44 | 69.56 | 70.44 | 70.33 | 70.11 | 69.98 ns | 3.79 |
| Hind width (cm) | 17.94 | 17.33 | 17.17 | 17.83 | 18.00 | 17.66 ns | 7.29 |
| Leg perimeter (cm) | 31.67 | 32.56 | 32.67 | 32.67 | 32.45 | 32.40 ns | 7.34 |
| Body condition (1-5) | 3.41 | 3.39 | 3.36 | 3.25 | 3.19 | 3.32 ns | 13.19 |

ns - (P>0.05), X = average; CV = coefficient of variation.

Table 3 - Carcass morphometric measurements of Santa Inês lambs according to the cactus pear levels in diets

| Variable | Substitution level (%) | | | | | X | CV (%) |
|---|---|---|---|---|---|---|---|
| | 0 | 25 | 50 | 75 | 100 | | |
| Internal carcass lenght (cm) | 62.68 | 62.89 | 62.83 | 62.33 | 62.78 | 62.7 ns | 3.24 |
| Leg length (cm) | 41.78 | 41.22 | 41.78 | 42.11 | 41.89 | 41.96 ns | 2.87 |
| Leg perimeter (cm) | 28.50 | 27.89 | 28.00 | 27.39 | 27.00 | 27.75 ns | 7.16 |
| Hind perimeter (cm) | 52.78 | 52.33 | 54.33 | 51.83 | 51.22 | 52.50 ns | 7.08 |
| Hind width (cm) | 21.03 | 18.72 | 19.14 | 19.89 | 17.11 | 19.18 ns | 18.40 |
| Thoracic depth (cm) | 27.17 | 26.89 | 27.67 | 27.33 | 27.11 | 27.23 ns | 4.45 |
| Thoracic perimeter (cm) | 68.56 | 69.50 | 68.94 | 68.00 | 68.72 | 68.74 ns | 3.3 |
| Conformation grade (1-5) | 3.00 | 3.11 | 3.22 | 2.44 | 2.67 | 2.89 ns | 41.57 |
| Carcass compactness (kg/cm) | 0.24 | 0.24 | 0.24 | 0.23 | 0.23 | 0.23 ns | 6.98 |

ns - (P>0.05), X = average; CV = coefficient of variation.

Table 4 - Carcass characteristics of Santa Inês lambs according to the cactus pear level in the diet

| Variable | Substitution level (%) | | | | | CV (%) | Regression | $r^2$ |
|---|---|---|---|---|---|---|---|---|
| | 0 | 25 | 50 | 75 | 100 | | | |
| Final weight (kg) | 35.88 | 35.77 | 35.91 | 36.04 | 35.22 | 3.49 | $Y=35.76^{ns}$ | - |
| Slaughter weight (kg) | 33.82 | 33.41 | 33.00 | 32.59 | 32.18 | 4.53 | Y=33.82-0.016*P | 0.72 |
| Empty body weight (kg) | 29.63 | 29.18 | 28.73 | 28.28 | 27.82 | 3.87 | Y=28.63-0.018**P | 0.71 |
| Hot carcass weight (kg) | 15.50 | 15.25 | 15.00 | 14.75 | 14.50 | 6.21 | Y = 15.50-0.010*P | 0.59 |
| Cold carcass weight (kg) | 15.15 | 14.95 | 14.75 | 14.55 | 14.35 | 5.38 | Y=15.15-0.008*P | 0.53 |
| Hot carcass yield (%) | 45.73 | 46.15 | 46.30 | 46.20 | 46.84 | 5.64 | Y=46.24ns | - |
| Cold carcass yield (%) | 44.80 | 44.77 | 44.74 | 44.71 | 44.68 | 5.70 | Y=44.74ns | - |
| Biological or true yield (%) | 51.84 | 53.98 | 52.48 | 52.53 | 53.35 | 4.05 | Y=52.81ns | - |
| Cooling losses (%) | 2.25 | 1.96 | 1.66 | 1.36 | 1.03 | 5.82 | Y=2.25-0.0116*P | 0.63 |
| Fasting losses (%) | 5.94 | 6.66 | 7.38 | 8.09 | 8.81 | 24.26 | Y=5.94+0.028**P | 0.89 |
| Rib eye area ($cm^2$) | 10.66 | 10.41 | 10.92 | 9.73 | 10.05 | 11.20 | Y=10.35ns | - |
| Fat thickness (mm) | 0.756 | 0.739 | 0.648 | 0.711 | 0.729 | 39.88 | Y=0.715ns | - |

ns: (P>0.05); *(P<0.05); **(P<0.01); X = average; CV = coefficient of variation.

Hot carcass dressing, cold carcass dressing and biological yield were not affected (P>0.05) by the addition of cactus pear in the diet.

The loss by cooling arising from loss of moisture during cold storage were influenced (P<0.05) by experimental treatments. The average found was 1.65%, which is considered normal according to literature (Araújo Filho et al., 2007). The average for sheep is 2.5%, with a range of variation from 1 to 7%. These variations were due to genotype, sex, fat cover, temperature and humidity in the cold chamber.

The rib eye area (REA) was not affected (P>0.05) by the addition of cactus pear in the diet, with mean value of 10.35 $cm^2$. Rib eye area is used to predict the amount of carcass muscle because of its high correlation with the proportion of muscle. However, studies have shown that this variable should be used with other traits to better evaluate the carcass muscle composition (Silva & Pires, 2000).

A linear decreasing effect was obtained for the half-carcass (P<0.05; Table 5). This behavior was expected, as it is a representation of 50% of the total cold carcass weight that also presented linear decreasing effect.

The weights of cuts were not affected (P>0.05) by the substitution of corn by cactus pear in the diet, nor were their respective yields (Table 5), except for shoulder and loin weights, which showed linear decreasing behavior (P<0.05).

The leg, which is considered one of the prime cuts of lamb carcass, showed average weight of 2.39 kg and in relative terms, contributed with the highest yield (32.56%). These values are due to the greater amount of muscle tissue in this cut in relation to other anatomical regions of the carcass.

The sum of the yields of leg, loin and shoulder was 59.37%. Silva Sobrinho et al. (2005) reported that in sheep breeds for meat production, this sum must show a minimum value of 60%. The value found in the present study demonstrates that Santa Ines lambs fed different cactus pear levels in diets showed values close to those of more specialized breeds for meat production.

It is observed minimal numerical differences among treatments (Table 5). This similarity can be enhanced by the law of anatomical harmony by Boccard & Dumont (1960) which reports that in carcasses with similar weight and amounts of fat, almost all regions of the body are found in similar proportions, regardless of the conformation of the genotype studied.

There was no significant effect (P>0.05) of the inclusion of cactus pear on the non-carcass components, sum of the *"buchada"* components and *"buchada"* yield in relation to the slaughter weight (Table 6).

The use of organs and viscera in the development of products such as *"buchada"*, which is a typical dish in northeastern Brazil, represents an important economic alternative (Costa et al., 2006). To prepare this dish, blood, liver, kidneys, lungs, spleen, tongue, heart and part of the omentum are used, as well as rumen, reticulum and empty GIT, except for large intestine. In some places, head without the mandibles and paws are also included. All these components are submitted to a rigorous cleaning and pre-cooking process, for better food safety (Medeiros et al., 2008).

The total weight of non-carcass components used in the preparation of "*Buchada*" was (5.84 kg), which represents about 17.7% of the slaughter weight of Santa Ines lambs fed different cactus pear levels in the diet.

Table 5 -Weight and yield of retail cuts of Santa Inês lambs according to the cactus pear levels in the diet

| Variable | Substitution level (%) | | | | | CV (%) | Regression | $r^2$ |
|---|---|---|---|---|---|---|---|---|
| | 0 | 25 | 50 | 75 | 100 | | | |
| Half cold carcass weight (kg) | 7.56 | 7.46 | 7.36 | 7.25 | 7.15 | 5.52 | Y= 7.56-0.004*P | 0.58 |
| Shoulder (kg) | 1.58 | 1.55 | 1.51 | 1.47 | 1.43 | 7.84 | Y= 1.58-0.00413**P | 0.71 |
| Neck ( kg) | 0.87 | 0.87 | 0.87 | 0.87 | 0.86 | 9.13 | Y= 0.870 ns | - |
| Loin (kg) | 0.60 | 0.58 | 0.57 | 0.56 | 0.55 | 9.47 | Y= 0.602-0.00055*P | 0.54 |
| Leg (kg) | 2.44 | 2.42 | 2.39 | 2.36 | 2.34 | 5.69 | Y=2.392ns | - |
| Ribs (kg) | 2.06 | 2.04 | 2.01 | 1.98 | 1.96 | 7.46 | Y=2.010 ns | - |
| Cut yield (%) | | | | | | | | |
| Shoulder (kg) | 18.91 | 18.96 | 19.00 | 19.05 | 19.10 | 3.82 | Y=19.01ns | - |
| Neck ( kg) | 10.21 | 10.33 | 10.44 | 10.56 | 10.68 | 8.73 | Y=10.44 ns | - |
| Loin (kg) | 7.78 | 7.97 | 7.98 | 7.80 | 7.44 | 6.53 | Y=7.80 ns | - |
| Leg (kg) | 32.32 | 32.43 | 32.55 | 32.66 | 32.78 | 3.29 | Y=32.56 ns | - |
| Ribs (kg) | 27.22 | 27.28 | 27.33 | 27.39 | 27.44 | 4.36 | Y=27.33 ns | - |

ns = (P>0.05); *(P<0.05); **(P<0.01); CV= coefficient of variation

Table 6 - Weight of non-carcass components and *"buchada"* yield in function of the different cactus pear levels in the diet

| Variable | Substitution level (%) | | | | | X | CV (%) |
|---|---|---|---|---|---|---|---|
| | 0 | 25 | 50 | 75 | 100 | | |
| Blood (kg) | 1.59 | 1.57 | 1.45 | 1.38 | 1.48 | 13.49ns | 13.85 |
| Spleen (kg) | 0.09 | 0.08 | 0.08 | 0.08 | 0.07 | 0.08ns | 19.73 |
| Heart (kg) | 0.23 | 0.22 | 0.21 | 0.21 | 0.22 | 0.22ns | 12.14 |
| Lungs (kg) | 0.41 | 0.38 | 0.39 | 0.42 | 0.39 | 0.40ns | 19.16 |
| Liver(kg) | 0.65 | 0.63 | 0.63 | 0.64 | 0.61 | 0.63ns | 9.75 |
| Tongue (kg) | 0.11 | 0.11 | 0.11 | 0.11 | 0.10 | 0.11ns | 16.45 |
| Kidneys (kg) | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10ns | 10.98 |
| Empty GIT (kg)[1] | 2.39 | 2.32 | 2.69 | 2.58 | 2.58 | 2.51ns | 1.99 |
| Omentum fat (kg) | 0.34 | 0.29 | 0.26 | 0.29 | 0.25 | 0.99ns | 37.94 |
| Σ "Buchada" (kg)[2] | 5.92 | 5.71 | 5.92 | 5.84 | 5.81 | 5.84ns | 5.64 |
| Buchada:SW (%)[3] | 17.50 | 17.10 | 17.94 | 17.92 | 18.05 | 17.70ns | 8.83 |

ns = (P>0.05)
[1] Empty GIT, rumen, reticulum, omasum, abomasum, large and small intestine.
[2] Σ "*Buchada*" components (edible offals), sum of blood, spleen, heart, lung, liver, tongue, kidneys, empty GIT and omentum fat.
[3] Weight of "*Buchada*" components in relation to the slaughter weight.

## Conclusions

Cactus pear can replace up to 75% of the corn in diets for feedlot Santa Ines lambs without harming production, carcass characteristics and production of non-carcass components.

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