

Research Application Summary

Feedlot performance of dorper wether lambs fed *Opuntia*-based diets with different nitrogen sources

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Abstract

The performance and carcass characteristics of 45 Dorper wether lambs fed *Opuntia*-based diets with different nitrogen (N) sources were evaluated in the feedlot. Lambs were weighed weekly to determine the ADG and slaughtered when they reached an average target weight of 35 kg live body weight to determine carcass characteristics. There were marked differences in ADG and FCR ($P < 0.05$) between *Opuntia*-based diets. However, lack of significant differences in most of the carcass characteristics considered in this study suggest that carcass quality is not affected by inclusion of *Opuntia* cladodes in diets or by the type of N source used.

Key words: Carcass characteristics, lambs, *Opuntia* cladodes, *Opuntia ficus-indica*

Résumé

La performance et les caractéristiques de la carcasse de 45 agneaux castrés de Dorper de régime alimentaire à base d'*Opuntia* avec différentes sources d'azote (N) ont été évaluées dans le parc d'engraissement. Les agneaux ont été pesés chaque semaine afin de déterminer l'ADG et abattus quand ils ont atteint un poids cible moyen de 35 kg, poids réel pour déterminer les caractéristiques de la carcasse. Il y avait des différences marquées dans les ADG et FCR ($P < 0,05$) entre les régimes à base d'*Opuntia*. Cependant, l'absence de différences significatives dans la plupart des caractéristiques de la carcasse considérées dans cette étude suggère que la qualité de la carcasse n'est pas affectée par l'inclusion de raquettes d'*Opuntia* dans l'alimentation ou par le type de source d'azote N utilisé.

Mots clés: Les caractéristiques de la carcasse, agneaux, raquettes d'*Opuntia*, *Opuntia ficus-indica*

Background

Feedlot diets incorporate substantial quantities of lucerne hay. However, lucerne has a high demand for water and, is therefore

often produced under irrigation. This often limits its use as good quality roughage in feedlot diets thus limiting the profitability and sustainability of sheep feedlot operations. It is therefore important to identify locally available alternative feed sources for ruminant feedlot diets which are affordable but they must also be adapted to drought and harsh conditions in the tropical and subtropical areas. This enables livestock to survive critical periods of feed shortages and still be able to produce good quality meat.

Opuntia ficus-indica meets most of the requirements of drought-resistant fodder crop and it has been well researched as a feed for cattle, goats and sheep (Nefzaoui and Ben Salem, 2001). However, none of these studies have used *Opuntia* as part of the feedlot diets. Therefore, this study focused on evaluating the growth performance and carcass characteristics of Dorper wether lambs fed diets containing inclusion levels of about 1/3 sun-dried and coarsely ground *Opuntia* cladodes of the total diet and two different N sources namely: non-protein nitrogen (NPN) and a natural protein in the feedlot.

Literature Summary

In recent years, there has been an increasing interest in cactus pear (*Opuntia*) as an alternative feed for livestock in the tropical and subtropical regions of the world. According to Santos *et al.* (2003) and Khalafalla *et al.* (2007), the increased importance of cactus pear in these regions is mainly due to their drought resistance, high biomass yield, palatability, salinity tolerance and soil adaptability. Furthermore, *Opuntia* converts water to dry matter or digestible energy far more efficiently than grasses and legumes (Azocar, 2001; De Kock, 2001) and can be fed to livestock as fresh forage, stored as silage or mixed with other feedstuffs to form a balanced ration. These good characteristics of *Opuntia* species are of particular interest to animal scientists and livestock producers especially considering the climatic changes predicted for coming decades.

Previous studies by Zeeman (2005), Einkamerer (2008) and Menezes (2008) at the University of the Free State, Bloemfontein demonstrated that sun-dried and coarsely ground *Opuntia* cladodes can replace a substantial part of lucerne hay (up to 360 g/kg) in diets for young Dorper wether lambs. Additional N was included as an NPN source (feed grade urea). These studies showed that sun-dried and coarsely ground *Opuntia* cladodes have a great potential as animal feed with no

Study Description

apparent detrimental effects on water intake, digestibility and growth performance of Dorper wether lambs.

Forty-five weaned Dorper wether lambs, on average weighing 22kg were randomly allocated to three treatment diets. The three treatment diets consisted of a conventional feedlot diet (T0) and two *Opuntia*-based treatment diets containing different additional nitrogen sources, namely: a NPN and natural protein for treatment 1 and 2, respectively. The experiment lasted until lambs reached an average target weight of 35 kg live weight. Their intake, daily weight gain and feed efficiency were determined. At the end of the trials all lambs were slaughtered to determine their carcass characteristics. Data were subjected to analysis of variances (ANOVA) using the General Linear Model (GLM) procedures of SAS (2006).

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The Dorper wether lambs fed treatment 0 and 2, had higher ($P<0.05$) average daily gain (ADG) and better ($P<0.05$) feed conversion ratio (FCR) than Dorper wether lambs fed on T1. Except for the external carcass length, shoulder circumference and pH measured 24 hours after slaughter (pH24), all carcass measurements were similar ($P>0.05$) across all treatments. Dorper lambs fed T2 had the longest ($P<0.05$) carcass length and T1 recording the shortest carcass. Shoulder circumference was higher for T0 than T1 and T2. Although the pH24 was lower ($P<0.05$) for T0 compared to T1 and T2, all measured pH values were within the normal range 5.4 to 5.7.

Recommendation

Sun-dried and coarsely ground *Opuntia* cladodes could substitute lucerne in the feedlot diets of Dorper wether lambs up to 330g/kg. However, because of the relative low crude protein (CP) content of *Opuntia* cladodes, additional N can be supplied as either NPN or natural protein to balance the N content of *Opuntia*-based diets and maintain a final CP level required to promote a desired growth. The economics of feeding such diets should be worked out to determine the one which give the best economic return.

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