

PROJECT SUMMARY



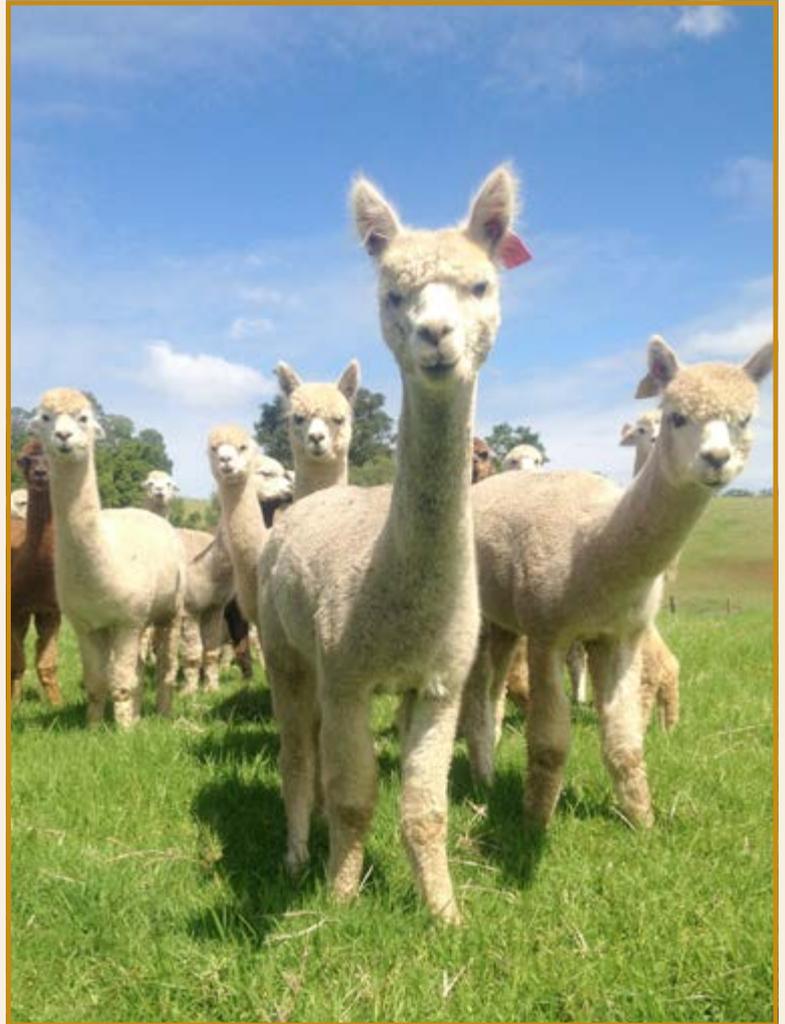
**RURAL
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Research & Development
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Factors impacting Australian alpaca meat and methods to improve quality

Background

The sustainable expansion of the Australian alpaca industry, predominantly a pasture based system, requires the development of a market for meat in addition to traditional fibre to improve commercial returns. Establishment of an alpaca meat industry will likely increase the demand for otherwise unprofitable animals and lead to genetic gains across the industry. For successful entrance into the competitive red meat market, it is important that key production traits common to red meat industries, such as beef and lamb, are taken into consideration to ensure the supply of a consistent quality product. However, there is a paucity of information on alpaca meat, especially in terms of carcass composition and yield, and the impact of gender and age on these traits.



Aims/objectives

The following aims/objectives align with the two experiments in this study:

1. To investigate the relationships between slaughter age (18, 24 and 36 months) and sex of alpacas under Australian conditions by comparing nutrient, carcass and sensory parameters associated with meat quality and furthermore investigate the benefits of value adding processing techniques such as electrical stimulation, on alpaca carcasses.
2. To compare carcasses from alpacas grazed under two different feeding systems (pasture only vs. pasture + supplementary feeding) to assess variation in overall carcass and meat quality parameters. In addition, tender stretching was applied as a carcass suspension method on a sub-set of carcasses to establish the effect of this value-adding technique.



Methods used

Experiment 1:

An investigation into the effects of slaughter age, gender and electrical stimulation, on alpaca carcass quality and sensory parameters.

Alpaca carcasses from 50 animals representing three different age groups (18, 24 and 36 months) and two gender groups (castrated males vs. female) were subject to the same nutrition, environment, and husbandry procedures for 4 months prior to slaughter and assessment for quality traits and yield. At slaughter carcasses were split down the vertebral column with one half electrically stimulated prior to chilling. After 24 hours in a cool room the cold dressed percentage was measured prior to removing samples from the *longissimus thoracis et lumborum* (loin) and *semimembranosus* muscles from the stimulated and non-stimulated halves of each carcass.

Analysis of meat quality and yield included nutritional meat quality parameters, and carcass parameters. Colour shelf life of alpaca meat was determined by taking a 2-3cm thick loin sample from each carcass and analysing colour stability over a period of simulated retail display. A full carcass breakdown was conducted to determine the overall volume, and type of useable meat cuts obtained. In addition, a tasting panel evaluated consumer acceptability.

Experiment 2:

Investigation into the meat quality parameters of electrically stimulated alpacas from two different feeding systems.

Fifty six 24 month old castrated male alpacas were randomly drafted into two groups and grazed on either 'improved pasture' or 'improved pasture + supplement' for 4 months prior to slaughter. Pasture samples were collected and analysed at study commencement and monthly intervals throughout the experiment. Once slaughtered, half the carcass was hung normally (at the hock) and the other half tenderstretched (hung by the pelvis). All carcasses were chilled for 24 hours prior to sample collection. Traits analysed included nutritional meat quality parameters, physical meat parameters, and carcass parameters similar to Experiment 1.

Statistical analysis for both experiments was undertaken using a range of statistical models.

Key findings

1. 24 month old castrated male alpacas are optimal for slaughter
2. Medium voltage electrical stimulation at processing helps to prevent cold shortening and improve tenderness
3. Tenderstretching alpaca carcasses improved tenderness in the *semimembranosus* muscle
4. Wet ageing of alpaca meat for 10 days improves tenderness and product consistency
5. Detailed knowledge is now known on alpaca meat quality parameters
6. Grain supplementation provided minimal carcass trait benefits.

Although valuable information has been gained from this project for alpaca producers and processors, there is scope to further improve the eating quality of alpaca meat. The lean nature of alpaca carcasses has implications with respect to chilling post slaughter which has a negative impact on tenderness. Also, processing techniques such as electrical stimulation and tenderstretching were found to have positive impacts on different parts of the carcass. These effects may be complimentary if both techniques are applied to the same carcass at processing.





Tenderstretched alpaca carcasses

Implications for relevant stakeholders:

Producers and processors now have information which will assist in predicting the carcass yield and meat quality traits of alpacas of differing sex (female and castrated male) at three age periods (18, 24 and 36 months). This information will be beneficial to the on-farm and processing aspects of the alpaca meat supply chain.

Recommendations

The alpaca meat industry has been provided with several recommendations and guidelines which can improve eating quality and consumer perception. These are:

1. The optimal slaughter age and gender for alpacas is 24 month old castrated male alpacas. These males exhibit a desirable balance between saleable meat yield and meat quality traits. This age group also links in with current industry practices where animals are classed for fibre traits.
2. Medium voltage electrical stimulation (i.e. 600 mA peak at 68 ms pulse interval and a 1000 μ s pulse width for 40 seconds) is recommended at processing to help prevent cold shortening of naturally lean alpaca carcasses, thus improving meat tenderness and overall consumer eating quality.
3. The application of tenderstretching on alpaca carcasses improved tenderness in the *semimembranosus muscle*, the largest muscles in the hindquarter, and may apply to other muscles in the hindquarter. This technique is recommended subject to further work.
4. Further investigation into the combined effect of applying medium voltage electrical stimulation and tender stretching of alpaca carcasses on carcass traits and meat quality characteristics is required.
5. Wet ageing of alpaca meat for 10 days is recommended to improve alpaca meat tenderness and product consistency.
6. Grain supplementation at 300g/head per day to animals on coastal pastures provided minimal benefit for carcass traits. However, providing a mixed grain ration as a finishing ration prior to slaughter requires further investigation, as well as investigating the impact of improved pastures and forage crops.



Journal publications generated from this work:

Smith, M. A., Bush, R. D., Thomson, P. C., & Hopkins, D. L. (2015). Carcass traits and saleable meat yield of alpacas (Vicugna pacos) in Australia. *Meat Science*, 107(0), 1-11. doi:
<http://dx.doi.org/10.1016/j.meatsci.2015.04.003>

Smith, M. A., Bush, R. D., van de Ven, R. J., & Hopkins, D. L. (2016). Effect of electrical stimulation and ageing period on alpaca (Vicugna pacos) meat and eating quality. *Meat Science*, 111, 38-46. doi:
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