

# Slaughter conditions to optimise chevon meat quality

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## Determination of slaughter conditions to optimise chevon visual and eating quality

Industry Sector: Cattle And Small Stock

Research Focus Area: Animal Products, Quality And Value-Adding

Research Institute: Agricultural Research Council – Animal Production Institute

Researcher: Dr L Frylinck PhD

### The Research Team

Title	Initials	Surname	Highest Qualification
Prof	PE	Strydom	PhD
Prof	EC	Webb	PhD Animal Science
Dr	P	Pophiwa	PhD Animal Science
Prof	LC	Hoffman	PhD Animal Science
Ms	GL	van Wyk	MSc (Registered for PhD)
Ms	JD	Snyman	ND Histologie

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## Aims Of The Project

- 3.1.1 To determine the expression of genomic markers in five South African purebred genotypes – Bos indicus
- To determine the optimum slaughter procedures (electrical stimulation for 15 – 60 seconds or delayed/step wise chilling – time determined by optimal pH) for carcasses from castrated and intact male goats of two breed types: Boer Goats and Indigenous Veld Goats (IVG, Eastern Cape Xhosa or Northern Cape Speckled Goats)
- To evaluate the tenderness and connective tissue characteristics in six different muscles m. longissimus thoracis et longissimus (LTL), m. semimembranosus (SM), biceps femoris (BF), supra spinatus (SS), infra spinatus (IS) and semitendinosus (ST) in electrical stimulated carcasses of Boer Goats and IVG from castrated and intact male goats.
- To evaluate the tenderness and calpain system ageing related characteristics in m. longissimus thoracis et lumborum (LTL) and m. semimembranosus (SM) muscles of electrical stimulated and non-stimulated carcasses of Boer Goats and IVG from castrated and intact male goats.
- To evaluate sensory attributes and other meat quality characteristics of chevon from the respective post-slaughter treatments in m. longissimus thoracis et lumborum (LTL) and m. semimembranosus (SM) muscles of electrical stimulated and non-stimulated carcasses of the two breed types; Boer Goats and IVG from castrated and intact male goats

## Executive Summary

The demand for goat meat in South Africa is relatively low because of traditional perceptions of off smells, off flavours and expected toughness. Perceptions also exist that Indigenous Veld Goat (IGV) produce tougher meat than Boer Goat (BG) specially bred to be a meat producing breed. The name indigenous goat is perceived as being small and not suitable for meat production. It is now discovered that some Indigenous Eco-types of Southern Africa, compare well with the Boer goat in size, can also produce good meat products if good farming and rearing practices are followed. Except for the advantage to preserve the indigenous breeds for the future generations, these breeds are well adapted to the harsh climate conditions in Southern Africa and are hardy with minimum need for veterinary intervention. Production and slaughter procedures should be adapted to suit the characteristics such as the low glycolytic potential and low carcass fat of goat carcasses. There is therefore a need to optimise the pre- and post-slaughter procedures in order to optimise the chevon (goat meat) visual and eating quality.

The first aim were investigated by applying different pre- and post slaughter procedures such as castration or not, applying electrical stimulation for 20 and 30 seconds or apply stepwise chilling. The monitoring of the muscle pH and temperature, muscle energy, meat colour and tenderness showed that either controlled step wise chilling or electrical stimulation of at least 30 sec will prevent cold toughening and produce ideal conditions for the intramuscular proteolytic enzymes to optimally function. It was found that castrated animals produced more tender meat than intact carcasses, but that more subcutaneous fat were produced, which could be advantageous to its eating experience. Both breed types: Boer Goats and Indigenous Veld Goats (IVG, Eastern Cape Xhosa or Northern Cape Speckled Goats, showed the same advantage in tenderness and colour if slaughter conditions were optimised.



The intrinsic characteristics of the six different muscles m. longissimus (LTL), m. semimembranosus (SM), biceps femoris (BF), supra spinatus (SS), infra spinatus (IS) and semitendinosus (ST) differed from each other as expected, but castrated muscles had an higher intramuscular fat content – up to 4% than that on intact carcasses – similar in both breed-types tested. Percentage collagen solubility did not differ between the different muscles, but the total collagen measured in each muscle type did differ. Thus is optimal cooking method important.

Evaluating the tenderness and calpain system ageing related characteristics in m. longissimus thoracis et lumborum (LTL) and m. semimembranosus (SM) muscles of electrical stimulated and non-stimulated carcasses of Boer Goats and IVG from castrated and intact male goats confirm that the breed types did not differ in tenderness, but castration do have an advantageous effect on tenderness. It is said for beef that sarcomere length (SL) longer than 1.7  $\mu$ m does not influence tenderness, but in this project it was obvious that the shorter 1.8  $\mu$ m sarcomere length compared to that of our first subproject of 2  $\mu$ m could have influenced meat tenderness. It is said that the calpain system works more effectively when the SL length is longer.

Sensory panel evaluation showed attributes and other meat quality characteristics of chevon from the respective post-slaughter treatments in m. longissimus (LTL) and m. semimembranosus (SM) muscles of electrical stimulated and non-stimulated carcasses of the two breed types; Boer Goats and IVG from castrated and intact male goats. Overall it seems like the sensory panel found the LTL and SM muscles tough, although the shear force measurements was not exactly inline with their findings. As mentioned before, the slaughter conditions could have been chosen better, for instance the ES should have been 30 sec and not 20 sec. Delayed/stepwise chilling could have given better results. I do recommend though that if a future sensory panel study is being done, mutton should be included to remove the possibility of biasness. Although I have no reason to doubt the professionalism of the panel, I do think that there could be a possibility of a negativity towards goat meat.

The evaluation of carcass characteristics and yield of electrical stimulated and non-stimulated carcasses of the two breed types; Boer Goats and IVG from castrated and intact male goats (additional aim) showed more differences between castrated and non-castrated carcasses than between carcasses of the two breed types. The dressing percentages did not differ between the castrated breeds, but was a bit higher that that of the intact carcasses. There was no significant differences in the percentage meat yield between breeds, although the different commercial cuts could differ a bit in sizes, mainly because of different ratios and form of different parts of the carcass that is genotypically expected.

From this project a better understanding is formed on how goat temperament differ from other farm animals, that pre and post slaughter conditions must be adapted to take their unique characteristics into account. A small change in slaughter practice can have a mayor impact on the end product. Information acquired from these and future research should be disseminated to the farmers, producers and specific abattoirs that apply to special slaughter facilities and management for chevon production.

.Development of the market for chevon in South Africa would offer more diversity of species for red meat producers and especially benefit emerging farmers who produce over 90% of the goats in South Africa. There are good indications that goats can yield chevon or kid of acceptable quality to consumers, providing that animals of an appropriate age and sex group are slaughtered, handled and fed well during production and slaughter so as to minimise stress and prevent cold shortening.

*Please contact the Primary Researcher if you need a copy of the comprehensive report of this project – Lorinda Frylinck on [lorinda@arc.agric.za](mailto:lorinda@arc.agric.za)*