

CHAPTER 1

1 INTRODUCTION

1.1 PROJECT THEME

Meat quality

1.2 PROJECT TITLE

Meat characteristics and the acceptability of chevon from South African indigenous goats

1.3 AIMS

The aims of this study were to:

- Study carcass characteristic and histological, histochemical, metabolic, proteolytic and physical characteristics of chevon from South African indigenous goats of different ages, sex and nutritional history in order to determine the groups that yield meat of acceptable quality.
- Determine the effects of post-mortem ageing and electrical stimulation on quality characteristic of chevon.
- Determine the nutritive value of chevon in terms of fatty acid and amino acid profiles.
- Investigate consumer acceptance of, preference and consumption intent for chevon and determine the age and /or sex groups that are most acceptable.

The following objectives were investigated, namely whether or not:

- 1) sex, age and pre-slaughter conditioning have an effect on carcass and chevon quality of South African indigenous goats.
- 2) length post-mortem ageing and electrical stimulation have an effect on chevon quality.
- 3) chevon is nutritionally well-balanced for human consumption.
- 4) chevon from goats of different ages/sex groups is acceptable to South African consumers.

1.4 MOTIVATION

Goats are the second most populous ruminant livestock in developing countries. Over the past two decades, their population in these countries increased by over 50% and chevon production

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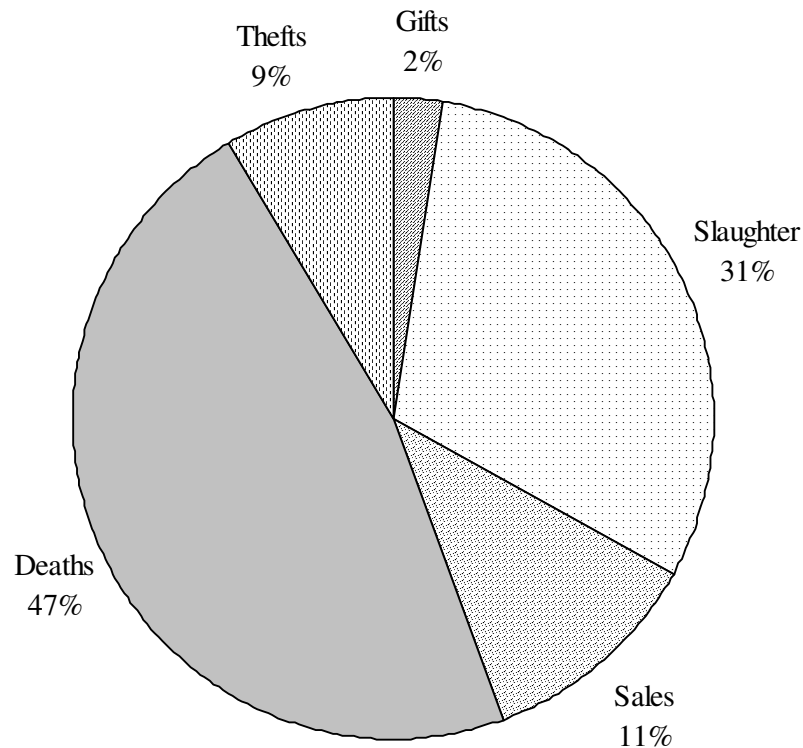
by 121% to 3.44 million tonnes per annum (Morand-Fehr and Boyazoglu, 1999). Thus, chevon will continue to play a prominent role in the supply of animal protein in developing countries.

In southern Africa, goats constitute an important subsystem of animal agriculture particularly for the region's semi-arid and arid areas (Webb, Mamabolo, Du Preez and Morris, 1999). Generally, uncharacterised, indigenous breeds are kept in flock sizes that vary from as small as one to well over a hundred goats (Sibanda, 1992; Bembridge and Tapson, 1993; Simela, 1993; Simela, Ndebele and Ndlovu, 2000a; Webb et al., 1999; Láforte, 1999; Mahanjana and Cronjé, 2000). In these areas goats are often the only dependable and perennial agricultural output. Panin and Mahabile (1997) and Teufel, Kuettner and Gall (1998) showed that for little investment, goats may be an easy income-generating venture for the smallholder farmers, especially those with limited or no off-farm income.

Productivity indicators such as mortality and utilisation rates (sales and home slaughter) reveal that goat productivity in smallholder farming areas is low. Although 'sales for cash' is always given as the farmers' primary economic reason for keeping goats (Mahanjana and Cronjé, 2000, Simela, Sibanda, Mello and Vaz, 2000b), the proportion of goats that are sold compared to the losses (due to diseases, thefts and predation) is not representative of the importance of goats in income generation (e.g. Figure 1.1). The sales usually constitute less than 20% of all exits from the smallholder flocks while the losses are usually well over 50% of the exits (Figure 1.1; Scoones, 1992; Sibanda, 1992; Simela, 1993; Láforte, 1999). The wastage through deaths and other losses has been reported to amount to 85% of the combined value of the slaughtered and sold animals (Simela et al., 2000b). In Zimbabwe, only 2% of the rural goat flocks ever reach the urban markets (Sibanda, 1992; Simela et al., 2000b).

The findings reported by Simela et al. (2000b) were not unique to Zimbabwe. Similar trends were observed in concurrent studies that were conducted in Zambia (Ahmadu and Lovelace, 2002) and Mozambique (Láforte, 1999), and in earlier studies conducted in Zimbabwe (Scoones, 1992; Sibanda, 1992; Simela, 1993; Pradier, Lecroisey and Gauthier, 1995; Ndlovu and Simela, 1996) and Botswana (Panin and Mahabile, 1997, Seleka, 2001). The poor productivity has been attributed the fact that the rural farmers have limited or no access to formal markets, and hence no incentive to improve their goat husbandry practices (Devendra, 1994; Seleka, 2001).

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NB The data are of 78 flocks from two villages in Matabeleland South province of Zimbabwe, monitored over one year. The average flock size was 25 and the total exits during the survey were 372 goats.

Figure 1.1 Distribution of goats by manner of exit from smallholder flocks (Simela et al., 2000b)

Urban markets are viewed as potentially lucrative markets for chevon (Pradier et al., 1995; USAID/South Africa and ARC, 1998a and b). The development of the urban chevon markets could therefore be an incentive for improving the performance of smallholder goat enterprises. In view of this, studies of goat production and marketing have been undertaken to identify ways by which goat marketing may possibly be improved in Zimbabwe (Pradier et al., 1995), South Africa (USAID/South Africa, 1998a and b) and a number of southern African countries under the auspices of a European Union funded project (European Union Project TS3*-CT94-0312). The major findings in Zimbabwe were that there is a large, unfulfilled demand for chevon in the urban centres (Simela, 2000). At the same time, retailers were dissatisfied with the quality of the chevon. They contended that the carcasses are too small and of low grade, and that the meat is dark and dries up quickly during storage (Simela, 2000).

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In South Africa there are no published estimates of the volume of goats entering the various marketing channels but it is supposed that most are marketed through the informal sector while sales through the formal channels (i.e. auctions, speculators, butcheries and abattoirs) are very limited (Coetzee, 1999). Notable is that the number of goats sold through the formal markets has been declining over the years. For example, in 1997, about 0.55% of the goat population was slaughtered in the commercial abattoirs (Coetzee, 1999; Table 1.1). Although 64% of the goat population is found in the rural areas (Table 1.1) a large proportion of the slaughtered stock came from commercial farms.

Table 1.1 Goat populations, proportion in the rural areas and slaughter rate by Provinces in South Africa

Province	Total no. of goats (November 2003)	% in rural areas (1999 estimates)	Slaughter rate (%)† (1999 estimates)
Western Cape	243 387	0	4.02
Northern Cape	494 979	0	0.15
Free State	70 521	13	4.37
Eastern Cape	3 022 155	59	0.64
KwaZulu-Natal	927 578	86	0.10
Mpumalanga	103 423	59	0.25
Limpopo	1 048 771	95	<0.01
Gauteng	8 349	0	0.58
North West	761 673	86	0.04
Total	6 680 836	64	0.55

† Slaughter rate is expressed as a percentage of the total number of goats.

Source: SAMIC website and adaptation from Coetzee (1999)

From informal interviews with the Red Meat Abattoirs Association (RMAA), South African Meat Industry Co-operation (SAMIC) Provincial Heads and abattoirs in the year 2000, indications were that commercial slaughter had decreased significantly, because none of these organisations was aware of any abattoirs that were slaughtering goats. The reasons given for the decline in commercial slaughter were that the supply of goats to the abattoirs was inadequate to justify regular slaughter and the price of commercially produced chevon was too high for the market.

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The market surveys carried out in 1998 (USAID/South Africa and ARC-ANAPI, 1998a and b) indicated that South African urbanites associate chevon with traditional and religious ceremonies rather than with day-to-day consumption (USAID/South Africa and ARC-ANAPI, 1998a, Figure 1.2i), an observation that was also made by Mahanjana and Cronjé (2000). Although the respondents in the USAID and ARC-ANAPI surveys described chevon as smelly, stringy and tough (Figure 1.2ii); a sizeable fraction from different levels of education, economic and ethnic backgrounds expressed willingness to try out chevon once it was drawn to their attention. Only about 2.5% of the respondents actually consumed chevon on a regular basis. However, some 49% of the survey population consumed the meat occasion or used to eat it, had stopped for some reason but were interested in eating again; or had never consumed the meat but were willing to try it (Figure 1.3).

Despite the general lack of familiarity with, and the negative perceptions of chevon, consumers and trained taste panels in sensory studies have found the meat or its products desirable and of satisfactory quality (Breukink and Casey, 1989; Schönfeldt, Naudé, Bok, van Heerden, Smit and Boshoff, 1993a; Schönfeldt, Naudé, Bok, van Heerden, Sowden and Boshoff; 1993b) except when the meat had been from very young animals (Tshabalala, Strydom, Webb and de Kock, 2003). In that case the chevon was very tough, possibly due to cold shortening.

The studies done thus far establish that prior to the development of the chevon industry in South Africa and the southern African region, there is a need to develop a quality evaluation system for chevon that will ensure that meat of acceptable quality is distributed to the consumers. Doing so entails an understanding of the quality of chevon from the indigenous goats slaughtered under commercial conditions. The knowledge may then be used as a basis for the improvement of the meat. All this should be done to ensure that from the onset, consumers are exposed to chevon of acceptable quality and hence no misconceptions are cultivated.

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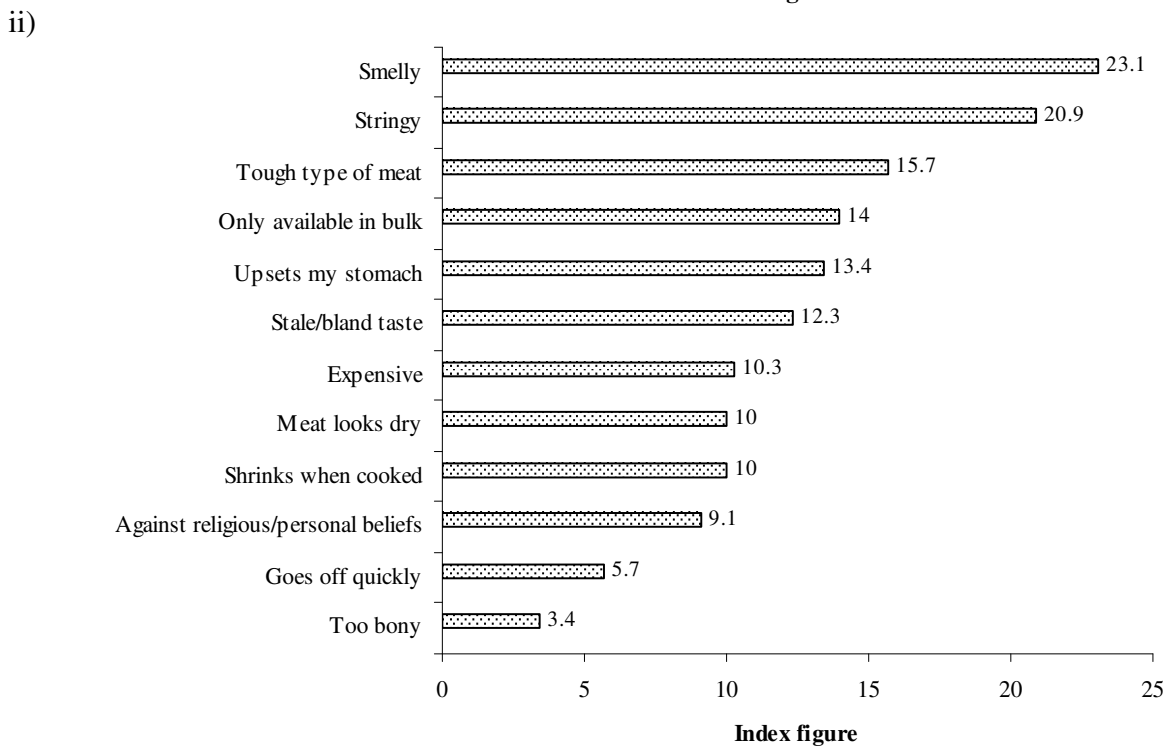
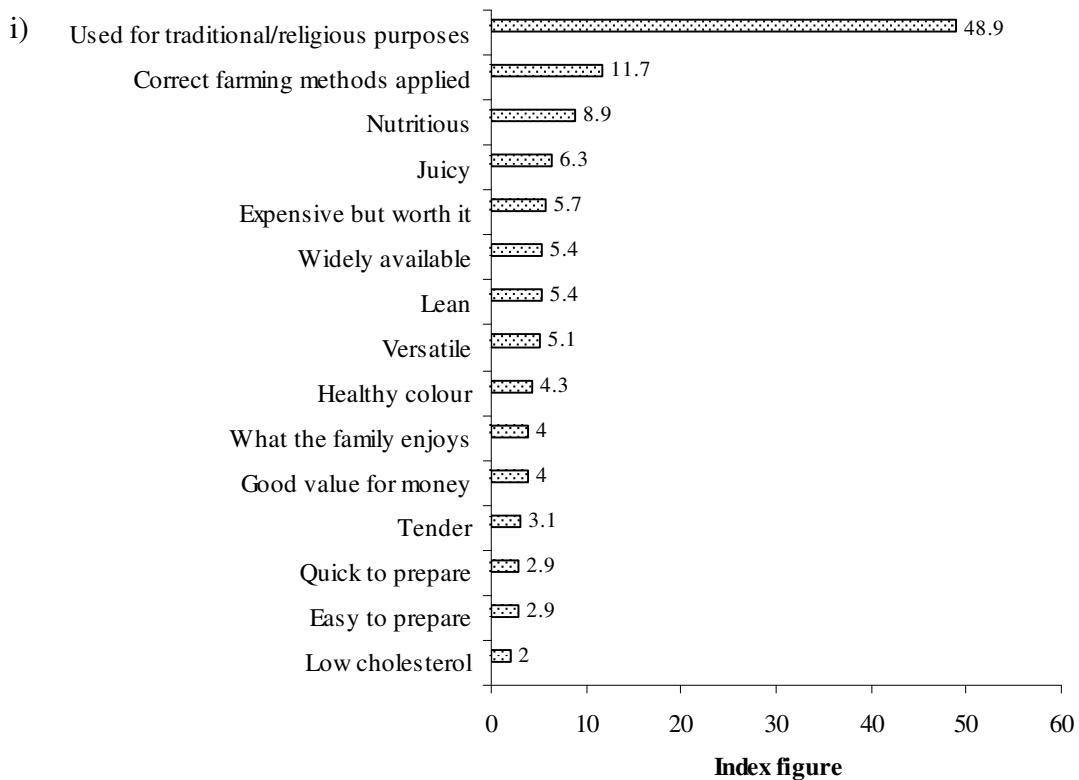


Figure 1.2 i) Positive and ii) negative perceptions of chevon by South African consumers (USAID/South Africa and ARC-ANAPI, 1998a)

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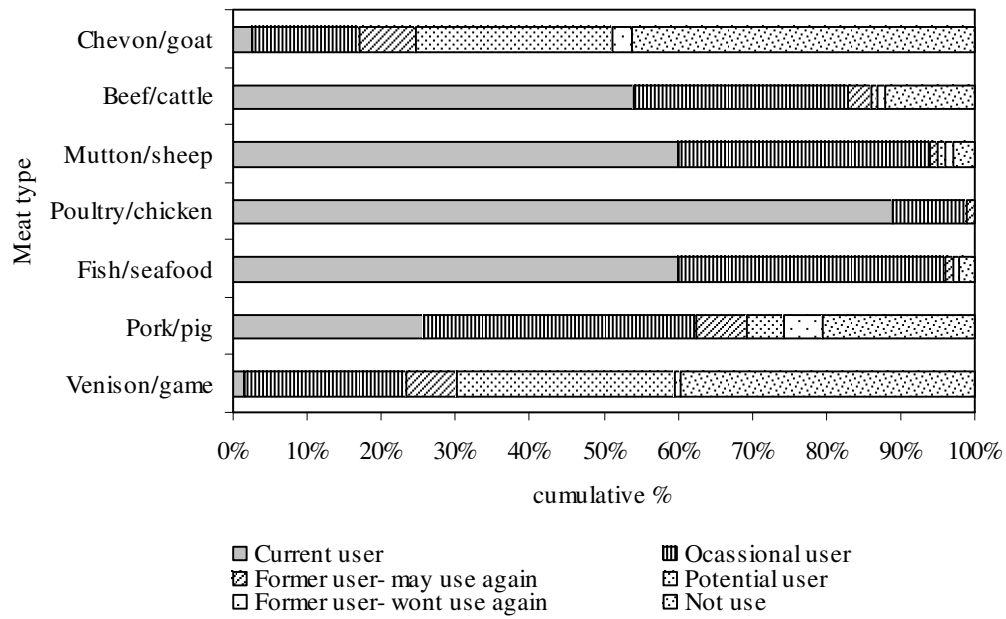


Figure 1.3 South African consumers' behaviour towards various types of meat (USAID/South Africa and ARC-ANAPI, 1998a)