THE EFFECT OF DAY-TIME CROPPING ON WARTHOG (*PHACOCHOERUS AETHIOPICUS*) MEAT QUALITY

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Key words: Slaughter methodology, pig, stress, pH, drip loss, PSE

Background

Poor ante mortem handling of animals prior to slaughter can produce either pale, soft and exudative (PSE) meat or dark firm and dry meat (DFD). Both these phenomena result in a decline in the eating quality of the meat. PSE and DFD meat are two of the major quality problems facing both the domestic and game meat industries. PSE is a phenomenon that is frequently associated with domestic pigs and has been researched extensively. The names describe the characteristics of the muscle in comparison with normal meat (although there is no universally accepted definition of either condition – Warriss 2000). Often, the pH of the muscle is used as an indication of the state of the meat. PSE meat is commonly defined as having a pH at 45 min (or 1 hr) post mortem of <6. DFD meat is often defined as having an ultimate pH, measured after 12-48 hrs post mortem, of ≥6.

The warthog belongs to the Suidae family and has a natural distribution in Africa from Senegal and Guinea in West Africa, in the Sudan, and in part, in the Sahelian zones and Guinea savannas, to Ethiopia and south to the northern parts of the Republic of South Africa (Skinner and Smithers, 1990). For a wild game species the warthog has a high fecundity with a mean of four to five piglets per litter and a gestation period of 167-175 days. The mature males can attain a body weight of 100 kg and females up to 70 kg. A number of researchers have documented the growth of warthogs (Mason, 1985; Somers and Penzhorn, 1992) with Somers (1997) calculating a sustainable harvesting rate using simulation modeling. However, all the research conducted to date has concentrated on the biological and conservation status of this species, with no research being conducted on the meat quality attributes of this species. As noted by Somers (1997), in South Africa, as in other parts of Africa, poverty is widespread and use of wildlife as a source of income and food is important to local communities – one such wildlife species that is regularly hunted is the warthog.

Objectives

The major objective of the present investigation was to monitor the effect of cropping warthogs by means of a light caliber rifle on the rate of pH decline and water binding capacity of the *M. longissimus dorsi*.

Methods

In this investigation, a single sharp shooter fired all the shots using a .243 Winchester fitted with a telescopic sight and silencer. The shots invariably caused the remainder of the sounder to run, although not at an alarming rate. All the shots were fired in the daytime and utilized a flank, neck or head shot to kill the warthog. Directly after shooting, the animals were exsanguinated by sticking. Thereafter the pH and carcass temperatures were taken. These measurements were repeated during regular intervals over the next 24 hrs. An exponential function ($y = a + b\ e^{(ct)}$) was fitted to the rate of pH decline with time as depicted in Table 1. After cooling overnight, a sample of the *M. longissimus dorsi* was removed and the drip loss measured according to the method of Honikel (1998).

Results and discussion

The post mortem pH changes measured in the *M. longissimus dorsi* was converted to an exponential function and the pH changes with time of the individual animals are noted in Figure 1. As can be seen, three of the five warthog showed a rapid pH decline, a phenomenon associated with PSE type meat. In Table 1 a short description of the stress during the slaughter, the values of the constants calculated from the asymptotic equation and the percentage drip loss are shown. There was a positive correlation of 0.7725 between the rate of pH change (c-value in the exponential equation) and the percentage drip loss.

As can be noted from Table 1 and Figure 1 the warthogs that were stressed ante-mortem (No's 1, 4 and 5) had a rapid post mortem muscle pH decline that resulted in a high drip loss. This drip loss would have been caused by amongst others, protein denaturation which results in a decrease in the water binding capacity of the muscle. These animals also had the palest muscle colour. Warthog number 2 showed slight signs of DFD meat (slow pH decrease, low drip loss, dark colour, etc). This animal was sighted and ran off at a slow trot for a distance prior to being shot.

Conclusions

Although the physical meat quality of only five animals was monitored, the indications are that the muscle of warthogs show similar quality attributes as that of the domestic pig ie a tendency to become PSE when exposed to ante mortem stress.

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Table 1: The effect of ante mortem stress on the rate of pH change and drip loss of cropped warthogs

No	Description of ante mortem stress	Meat Class	Constants for the exponential function ($y = a + b\ e^{(ct)}$)			% Drip loss
			A	B	C	
1	Shot behind the shoulder, run 100m before dying	PSE	5.412	1.270	-0.312	3.4
2	Head shot, died immediately	Normal, slightly DFD	5.237	1.645	-0.062	2.4
3	Shoulder shot, dropped immediately	Normal	5.532	1.167	-0.144	2.2
4	Head shot, paralysed, frantic kicking movements	PSE	5.342	1.176	-0.649	6.8
5	Neck shot, dropped immediately, frantic kicking movements	PSE	5.466	0.842	-0.578	3.1

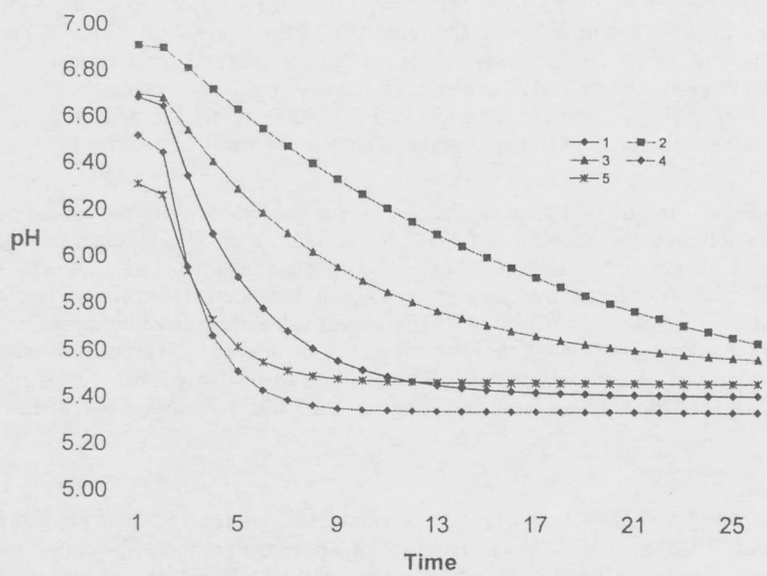

Figure 1: Post mortem pH change in the *M. longissimus dorsi* of Warthog