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Short communication

# Influence of age and method of carcass suspension on meat quality attributes of pure bred Ankole bulls

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ABSTRACT

This study investigated the effect of age at slaughter, pre-rigour carcass suspension and their interaction on meat quality of longissimus dorsi from Ankole bulls. Ankole bulls (45) were evenly distributed into three age groups (2, 3 or 5 years). Immediately after slaughter, carcasses were weighed, halved and sides were either suspended in the Achilles tendon or pelvic bone until 48 h postmortem. Carcass weights, grades and fat scores increased ($P<0.001$) with increasing age. Pelvic suspended sides had lower ($P<0.001$) chilling and cooking loss than Achilles-suspended sides across all age groups. Collagen solubility decreased ($P<0.001$), while shear force increased ($P<0.001$) with increasing age. Pelvic suspension decreased shear force across all age groups and the decrease was more pronounced in 5 year old bulls. The present study indicates that pelvic suspension is beneficial in eliminating the age-induced increase in toughness in longissimus thoracis from Ankole bulls.



## 1. Introduction

In Uganda farmers tend to bring their animals for slaughter solely when they are in need of money. Consequently a large number of animals are delivered for slaughter without any prior finishing which results in large variations in animal body condition and carcass weights. Furthermore, due to random bringing of cattle, animals of different ages and sex which collectively results in variations in meat quality especially tenderness. A number of post-mortem interventions have been developed for beef producers and processors to improve beef quality of cattle from less intensive production systems for example electrical stimulation (Ferguson et al., 2001), ageing (Monsón et al., 2004) and altered carcass suspension (Ahnström et al., 2009; 2011; 2012). However, in Uganda interventions such as electrical stimulation or postmortem storage are not widely utilized due to inconsistent power supply, high electricity tariffs and lack of enough cold room space. Therefore, beef producers and processors may improve beef tenderness by altered carcass suspension using the pelvic method.

Sørheim et al. (2001) working with Norwegian Red bulls and their Hereford crosses reported that pelvic carcass

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suspension was efficient for improving beef tenderness even without electrical stimulation. Ahnström et al. (2006) and Wolcott et al. (2009) working with Swedish bulls and Brahman steers, respectively, also reported that pelvic suspension resulted in less tough meat. However, most of the studies that have investigated the influence of pelvic suspension on tenderness and other meat quality attributes (Hostetler et al., 1970) did not include variations in animal age and the influence of carcass suspension on connective tissue characteristics. A study where variation in animal age was included, investigations were only carried out on heifers and this study only covered a short age range (18 to 22 months). Furthermore, connective tissue characteristics were not included (Ahnström et al., 2012). It is therefore not understood whether there would be interactive effects between animal age and pelvic suspension on the connective tissue component and hence tenderness of muscles.

The main objective of the study was to examine effects of animal age, pelvic suspension and the interaction between these on meat quality attributes (toughness, $pH_{24}$, carcass weights, chilling loss, cooking loss and collagen characteristics) of *longissimus thoracis* from grazed Ankole bulls.

## 2. Materials and methods

### 2.1. Slaughter and sample extraction

Forty-five grazed pure Ankole bulls aged 2, 3 and 5 years (15 in each group) were slaughtered at the Uganda Meat Industries abattoir, Kampala. Carcasses were weighed to get hot carcass weight (HCW) and split into right and left sides, left side was suspended by the abturator foramen of the pelvic bone while the right side was suspended by the Achilles tendon in the chilling room at +4 °C as shown in Fig. 1). At 24 h post-mortem, carcasses were graded, scored for fat and weighed to get cold carcass weights (CCW) and per cent chilling loss was calculated as (HCW − CCW/HCW × 100%). pH at 24 h was determined with a handheld digital meat pH metre fitted with a spear type electrode (Knick, Elektronische MessgerÃte, GmbH & Co.) at the second last lumbar vertebrae. The *longissimus thoracis* muscle between the 7th and 12th rib was excised from both carcass sides at 48 h post-mortem. Samples were cut from the *longissimus thoracis* for drip loss, Warner Bratzler shear force and collagen


**Fig. 1.** Carcass suspension: (A) pelvic suspension and (B) Achilles tendon suspension.