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ScienceDirect
Meat Science 80 (2008) 304–314
MEAT SCIENCE
www.elsevier.com/locate/meatsci

Eating quality of pork from pure breeds and DLY studied by focus group research and meat quality analyses

Lene Meinert [a,b], Sara C. Christiansen [a], Lars Kristensen [a], Charlotte Bjergegaard [c], Margit D. Aaslyng [a,*]

[a] *Danish Meat Research Institute, DMRI, Maglegårdsvej 2, DK-4000 Roskilde, Denmark*
[b] *The University of Copenhagen, Faculty of Life Sciences, Department of Food Sciences, Sensory Science, Rolighedsvej 30, DK-1958 Frederiksberg C, Denmark*
[c] *The University of Copenhagen, Faculty of Life Sciences, Department of Natural Sciences, Biochemistry and Natural Product Chemistry, Thorvaldsensvej 40, DK-1971 Frederiksberg C, Denmark*

Received 7 May 2007; received in revised form 11 December 2007; accepted 13 December 2007

Abstract

The eating quality of pan-fried pork chops from the pure breeds of Duroc, Hampshire, Black spotted and Wild pigs, and of the cross-breed of Duroc, Landrace and Yorkshire (DLY) was investigated by focus group research in combination with analyses of raw meat quality. The three focus groups, all consisting of young consumers, generally agreed in their description of the eating quality of the five breeds. The focus group methodology was found to be an informative method for the sensory evaluation of pork chops. Chemical and physical analyses of raw meat quality were performed in parallel with the focus group research, and this combination proved useful. The chemical and physical analyses generally supported the focus group evaluation, and differences between the breeds could be explained. Duroc was the breed with the overall best eating quality, while Hampshire had the lowest overall eating quality. DLY, Black spotted, and Wild pigs were intermediate, though not similar.
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Keywords: Pork; Eating quality; Focus group; Meat quality; Black spotted; Wild pigs; Duroc; Hampshire; DLY

1. Introduction

The eating quality of pork is a combination of several impressions obtained when pork is eaten. In other words, it is "what the consumer perceives when eating cooked pork". Many factors have an impact on eating quality, but those considered the most important with regard to pork are tenderness, juiciness, flavour and colour (Aaslyng et al., 2007; Wood et al., 2004). It is well known that eating quality can be affected by several factors including primary production, pre- and post-slaughter handling and the cooking process.

Consumers demand meat with a low fat content (Toldrá, Reig, Hernández, & Nazarro, 1996). Over the last decades, the improvement of pork quality has thus been focused on reducing the fat content. Recently, chefs from Danish restaurants have demanded pork with a different and, above all, high eating quality. This demand has prompted an investigation of the eating quality of pork with different meat qualities including meat from breeds not normally included in the commercial production of pork. Such an investigation will provide useful information in the search for pork that meets the required eating quality.

Consumer preference and choice are believed to depend on the interaction between the consumer's expectations and the objective quality of the product in question (Ngapo, Martin, & Dransfield, 2004). Focus group research is a

* Corresponding author. Tel.: +45 46303194; fax: +45 46303132.
E-mail address: mas@danishmeat.dk (M.D. Aaslyng).

0309-1740/$ - see front matter © 2008 Published by Elsevier Ltd.
doi:10.1016/j.meatsci.2007.12.021

qualitative study, in which insight into the consumers' attitudes can be gained, thereby enabling researchers to better understand how the consumer selects products (Chambers & Smith, 1991). Galvez and Resurreccion (1992) successfully used five focus groups to describe the quality parameters of mungbean noodles. It was concluded that the focus group research technique was a valuable and reliable method for determining consumer criteria for the quality of mungbean noodles. However, only few reports on focus group research of foods have been published. A clear advantage of focus group interviews is the exploratory nature of the method compared with methods based on "test and confirm" (Marlow, 1987). The dynamic of the discussion may stimulate consumers to come forward with observations, thoughts and opinions, which they otherwise would not have shared (Ngapo et al., 2004).

Several meat quality parameters have been linked and correlated to eating quality attributes. For example, pH and the content of intramuscular fat have been correlated to "juiciness" (Bejerholm & Aaslyng, 2003). The meat quality parameters can provide useful information when observations made by consumers are interpreted. The link between meat quality measurements and consumers' criteria for good eating quality is especially valuable for the meat industry in order to meet consumer preferences and demands.

An independent market survey on pork consumption in Denmark revealed that young Danish consumers have a relatively low consumption of pork (GfK Consumerscan, 2006). To understand why these young people only consume small amounts of pork, it is important to study their preferences: what are their attitudes towards pork of various eating qualities, and what do they prefer? In this study, a unique setup with focus group research in combination with raw meat quality measurements was chosen. The overall aim was to investigate whether this combination of methods was useful and informative when studying pork with varying raw meat qualities resulting in different eating qualities. This study sought to answer the following three questions: (i) Was focus group research applicable for the investigation of pork with different eating qualities? (ii) Was it possible to explain the observed differences in eating quality from measurements of raw meat quality? and (iii) Could the combination of focus group research and raw meat quality analyses describe the differences between the five breeds used?

2. Materials and methods

2.1. Meat

2.1.1. Breed and slaughter

Four animals from five breeds were slaughtered at the age normal for the individual breed. The genders varied with breed and within breed. Four DLY (Duroc (sire line), and Landrace × Yorkshire (dam line)) gilts were reared indoors and slaughtered at the age of 5–6 months. Castrates of Black spotted (BS) were reared outdoors for the first eight weeks and were then fattened indoors until 7–8 months old. Wild pigs (WP) (two females and two boars) were reared outdoors in fenced fields and slaughtered at 1½–2½ years. Hampshire (H) and Duroc (D) gilts were reared indoors and slaughtered at 5–6 months. H were free of the RN^- allele.

DLY, BS, H and D were slaughtered at commercial slaughterhouses using group CO_2 stunning (Støier, Aaslyng, Olsen, & Henckel, 2001) or individual CO_2 stunning (DLY) followed by cooling in a chilling tunnel (air: approx. −18 °C at approx. 3 m/s). All pigs were fasted a minimum of 5 h prior to slaughter in accordance with the normal code of practice. WP were shot and stuck in the field and were then transported to a local slaughterhouse, where the carcasses were dehided and then chilled at 4 °C. The cooling rate was not measured.

2.1.2. Meat samples

The day after slaughter, *m. longissimus dorsi* (LD) were excised from both sides of each pig and transferred to the Danish Meat Research Institute, where they were further divided, vacuum-packed, and aged at 2 °C for various times (Fig. 1). This distribution was used for all animals in order to standardise comparisons between animals, while taking any differences in raw meat quality along the LD into account. It was chosen not to randomise between the two sides in order to reduce the overall random error and thereby ensure a better standard of comparison between the breeds.

After ageing, the meat was frozen at −20 °C until further analyses with the exception of the cut from the right LD denoted "mincing" (Fig. 1). This meat was trimmed of visible fat, minced twice through a 2 mm hole plate (Bizerba-Werke, Type FN 70, Balingen, Germany), mixed thoroughly and then stored in small plastic cups at −20 °C until further analysis.

2.2. Chemical and physical analyses

2.2.1. pH

The pH was measured twice between the fourth and fifth lumbar vertebrae in the right LD 24 h after slaughter using a pH-meter (Knicks pH-meter, Model 913, Berlin, Germany) with an Ingold LOT glass electrode type 3120 (Mettler Toledo, Urdorf, Switzerland).

2.2.2. Drip loss

Drip loss was measured in a 2-cm thick chop after one day of ageing (eight replicates per breed) using the EZ drip loss method described by Christensen (2003).

2.2.3. Colour

Colour was measured 24 h after slaughter on a 2-cm thick chop (32 replicates per breed) using Minolta Chroma Meter CR-400 (Osaka, Japan) with CIE lab colour system: a^* (red–green), b^* (yellow–blue) and L^* (lightness).

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