

The effect of transport stress on parameters determined in rabbit meat

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Abstract

The quality of the rabbit meat transported to the slaughterhouse is influenced by a number of factors, such as transport duration, ambient temperature, noise, type of handling and the lairage holding period at the slaughterhouse. The individual factors are discussed in more detail and their impact on carcass yield, pH changes in the meat and other parameters assessed in this paper. Possible ways of decreasing stress levels during transport are also proposed and discussed with the aim of contributing to the improvement of meat quality.

Carcass yield, pH in meat, rabbits, transport

Introduction

Over the last twenty years, the population of rabbits reared in the Czech Republic has fluctuated from 8.3 to 16.8 million. There has been a gradual decline in the number of animals destined for fattening and breeding since 1999. Consumption of rabbit meat over the given period has dropped from 3.9 to 2.1 kg per person per year, which is several times less than consumption of pork, poultry or beef. In spite of that, the Czech Republic ranks among the largest consumers of rabbit meat in Europe (Roubalová 2002, 2004 and 2009). One of the reasons for the large quantity of rabbit meat consumed is certainly the high nutritional value of rabbit meat which contains less cholesterol and fat and more polyunsaturated fatty acids, selenium and iron than, e.g., chicken (Combes 2004; Barroeta 2007; Petracci and Cavani 2013). It is, unfortunately, not as readily available on the market as the meat of other kinds of animals. The decline in the number of reared animals is more evident in small-scale rearing than on farms, although rabbit rearing in the Czech Republic is concentrated largely in the hands of small breeders who devote great care to their animals as they want to consume a quality product at home (Roubalová 2009). More than half a million rabbits were slaughtered at slaughterhouses in the Czech Republic last year (Czech Statistical Office 2015).

To achieve the desired quality of the end product, greater emphasis must be placed both on rearing conditions and on the transportation of the animals to the slaughterhouse and all the associated operations such as the loading and unloading of the animals, their handling and the speed of slaughter at the slaughterhouse to ensure that meat quality is not negatively affected. The aim of this paper is to analyse the factors associated with the transportation of rabbits to the slaughterhouse and their impact on parameters determined in rabbit carcasses.

Stress factors during transport

Conditions for animal protection during transport are stipulated in the pertinent legal regulations, in particular Council Regulation (EC) No. 1/2005 on the protection of animals during transport and related operations and Act No. 246/1992 Coll. on the protection of animals against cruelty, as amended. Even if all the requirements stipulated by the

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legislation are assured, however, it is impossible to avoid stress entirely during the transport of animals. Nevertheless, it is desirable to try to reduce the action of stress factors to the minimum by means of the correct handling of animals and careful monitoring of conditions over and above stipulated by the legislation. The principal factors that may cause a stress response in animals include environmental factors such as temperature, humidity, ventilation in the vehicle and other microclimatic factors (Luzi et al. 1992; Buil et al. 2004; De la Fuente et al. 2004 and Liste et al. 2006), the duration of transport (Trocino et al. 2003; Lambertini et al. 2006 and Petracci et al. 2008), the restriction of food and water, the construction of transport crates and their positioning during transport (Jolley 1990), the lairage holding time before slaughter, and the unloading of animals in the vicinity of the slaughter line where they may come into contact with stress pheromones excreted during slaughter (Buil et al. 2004).

The effect of stress factors on parameters determined in rabbit meat

Rabbits generally prefer life in a group to individual rearing (Huls et al. 1991). The loading of animals previously reared separately into a single transport crate may, however, cause a problem, and dominant animals may display aggressiveness towards other individuals, which may result in injury. Animals stressed in this way have a slightly increased pH in the meat following slaughter (De la Fuente et al. 2007). The density of rabbits in crates has not appeared to be a stress factor in the studies conducted, and its effect on the quality of the product has been minimal (De la Fuente et al. 2004; Lambertini et al. 2006 and Buijs et al. 2011). Another factor associated with both the loading and unloading of animals is the standard of handling. If the animals are handled carefully, the animals suffer less injuries and show a reduced occurrence of haemorrhages, bruises, contusions and fractures and other states that might be difficult to detect on the animals during pre-slaughter inspections, but which are obvious following slaughter and reduce both the quality and usability of the carcasses (Cavani and Petracci 2004).

The most important factor in transport itself is the journey duration, with a higher incidence of bruises and contusions, affecting as many as 2.4% of animals, occurring during longer journeys. Losses on live weight of more than 4% occur on journeys lasting more than 5 hours, in contrast to losses of just 2.43% on journeys lasting around 3.5 hours (Petracci et al. 2008). A number of authors have confirmed that these losses in live weight before slaughter are the consequence of a loss of liquid and nutrients in the animal tissues and may have an impact on slaughter yield (Trocino et al. 2003 and Lambertini et al. 2006). This has been confirmed in studies showing that after long transport to the slaughterhouse the carcass yield falls from 58% after a 3.5 hour journey to 57% after a five-hour journey. The carcass yield is also affected by long lairage periods before slaughter which result in a fall from 57.8% to 57.2% if the difference in lairage time is 90 minutes or more. A higher carcass yield is observed in warmer seasons of the year, during which the increased occurrence of bruises and contusions, amounting to as many as 2.88% of individuals, and a lower pH of the meat after slaughter have also been recorded (Chiericato et al. 1993; De la Fuente et al. 2007 and Petracci et al. 2008). Lower weight losses during transport have been observed during the winter period (Petracci et al. 2008). Other changes observed in the meat of animals after transport lasting more than 4 hours include a higher ultimate pH, sensory changes in colour – the meat becoming purple-red and growing darker, lower cooking loss than in the meat of animals transported for a shorter period (up to 2 hours) and greater toughness (Lambertini et al. 2006 and Liste et al. 2006). Changes in the colour of the *m. longissimus dorsi* have also been described after long transport, with the muscle appearing redder (Trocino et al. 2003). Increased noise levels, which have an effect on the ultimate pH of the meat, also act on the animals during transport and associated operations, resulting in a higher ultimate pH value in the meat (De la Fuente et al. 2007).

Conclusions

As the number of rabbits reared in large-scale rearing facilities is gradually increasing in the Czech Republic, it is becoming necessary to consider a number of factors influencing meat quality that did not need to be considered in home slaughtering. The quality of the meat may be significantly affected by the transportation of the animals to the slaughterhouse and associated operations that change certain parameters studied in rabbit meat, such as ultimate pH, cooking loss, sensory properties such as colour and toughness, and perhaps carcass yield. How can the impact of stress situations, which cannot be entirely avoided in the commercial production of rabbit meat, be alleviated? It is appropriate to monitor carefully the microclimatic conditions during transport, particularly in months with extreme temperature fluctuations, to use vehicles with controlled ventilation for the purposes of transport, to handle the animals carefully and, from the long-term perspective, to try to shorten transport times by means of the appropriate placement of slaughterhouses in the vicinity of rearing facilities.

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