

## UNUSUAL SPOILAGE IN RABBIT CARCASSES CAUSED BY *JANTHINOBACTERIUM LIVIDUM*

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### ABSTRACT

A rare case of meat spoilage was identified in rabbit slaughterhouses in the regions of Veneto and Emilia Romagna (Italy). The first cases were detected in May and June 2005, but the problem was only brought to our attention in July 2005. As noted by the meat inspector, 2-3 days after slaughtering, the surfaces of some of the carcasses began to show pin-point violet colonies. Microbiological analyses established the origin of this spoilage, which was not due to fungi or *Pseudomonas* spp. A psychrophilic strain of *Janthinobacterium lividum* was isolated from all the carcasses as absolutely predominant microflora. This is probably the first report of this rare spoilage identified in meat in Italy.

**Key words:** *Janthinobacterium lividum*, Rabbit, Meat, Food microbiology.

### INTRODUCTION

About 20% of food produced in the world is wasted because of septic action by bacteria, and the health of many people has been affected negatively after ingestion of contaminated food. To supply healthy meat without biological contamination to consumers is one of the most important aims in the food industry (Nakamura *et al.*, 2002), although worldwide production of rabbit meat is over one million tons (Rodríguez-Calleja *et al.*, 2006) and rabbit breeding for meat is an important livestock activity in most Mediterranean countries (Badr, 2004). Several studies have been conducted on meat microbiology, but there is a certain lack of information on the microbiological quality of rabbit meat (Rodríguez-Calleja *et al.*, 2004; Badr, 2004). *Janthinobacterium lividum* is a Gram-negative, motile, strictly aerobic bacterium, commonly isolated from soil and water (Pantanella *et al.*, 2007). It is also involved in the spoilage of foods such as cream (Seitz *et al.*, 1961), pasteurised milk (Eneroth *et al.*, 2000), poultry meat (Cox, 1975) and vegetables (Koburger and May, 1982). In spite of its environmental habitat, *J. lividum* can occasionally cause opportunistic infections (Pantanella *et al.*, 2007), including fatal septicaemia (Patijanasoontorn *et al.*, 1992).

The aim of this study was to determine the cause of a case of violet discoloration in rabbit meat in Italy.

### MATERIALS AND METHODS

Twenty five spoiled carcasses of regularly slaughtered rabbits were examined. At the moment when the refrigerated carcasses were found to be contaminated, 20 g of rabbit meat were removed aseptically from each carcass to prepare the initial 1/10 dilution, which was then used to prepare other serial dilutions in peptone water. Colony-forming units for total aerobic mesophilic were determined by plating on plate count agar (Oxoid Ltd, Basingstoke, United Kingdom) and incubation at 30°C for 3 days. *Pseudomonas* spp. were searched by plating the 1/10 dilution on *Pseudomonas* Isolation agar (Oxoid Ltd, Basingstoke, United Kingdom) and incubation at 30°C for 3 days, whereas moulds were

cultured by plating on Oxytetracycline Glucose Yeast agar (Merck KGaA, Darmstadt, Germany) and incubation for 3 days at 25°C. *J. lividum* was detected by Triptone-soya agar containing 10 IU of penicillin sodium (Biolife, Milan, Italy). Cultures were examined for typical colonies and confirmed by biochemical testing according to Novara *et al.* (2004).

## RESULTS AND DISCUSSION

Between May and June 2005, the surface of some batches of rabbit carcasses showed the evident growth of small, violet-coloured, pin-point colonies (Figure 1).



**Figure 1:** Spoilage in rabbit carcass caused by *Janthinobacterium lividum*

The case was brought to our attention only in July 2005. The spoilage increased gradually over time, even at refrigeration temperature. The dressed carcasses were examined (Figure 2) and microbiological analyses established the true cause of the spoilage. The unusual defect consisted of violet discoloration, which spread into the meat. Microbiological tests revealed that the spoilage was not caused by fungi such *Aspergillus fumigatus*, nor by specific spoilage organisms such as *Pseudomonas* spp., because the only dominant flora detected was that of *Janthinobacterium lividum*.



**Figure 2:** Dressed carcass

## CONCLUSIONS

Food is exposed to many different pollutants all along the production line until it reaches the consumer, and the rabbit meat market is no exception. Safe production of rabbit meat is therefore necessary, and should be considered not as a quality factor, but as an obligation on the part of producers and a requirement on that of consumers.

In the cases examined here, microbiological analyses established the nature and origin of the defect, and showed that the spoilage in rabbit carcasses was caused by *Janthinobacterium lividum*. Rabbit meat quality must be judged not only by its appearance, but an official method must be developed.

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