EuroReference
journal of Reference
anses
French agency for food, environmental and occupational health & safety

Journal No. 12
Summer 2014

Methods

Video illustrating the artificial digestion method for Trichinella larvae detection in meat

Pauline Macé[1] (pauline.mace@ANSES.fr) ; Bruno Allouche[2] ; Aurélie Chevillot-Grasset[1] ; Aurélie Heckmann[1] ; Bruno Polack[1] ; Sandrine Lacour[1]; Pascal Boireau[1] ; Isabelle Vallée[1].

1. UMR BIPAR ANSES – Enva – Upec ; ANSES, Maisons-Alfort Laboratory for Animal Health, France, laboratoire national de référence « Parasites transmis par les aliments »,Maisons-Alfort, France

2. Ecole nationale vétérinaire d'Alfort, France

Keywords: ***Trichinella*,**

Introduction

It is estimated that approximately 60% of emergent or re-emergent human diseases are zoonoses[1] (diseases which animals can transmit to humans and vice versa). Due to the widespread distribution of affected animal species[2,3], effective prevention methods, reliable controls and heightened surveillance of zoonotic diseases are essential. One zoonotic disease, trichinellosis, constitutes a major public health issue worldwide since there is no curative treatment for it. The availability of an effective system for detecting trichinellosis-positive carcasses prior to consumption is therefore crucial.

Trichinellosis

Trichinellosis is a globally distributed zoonosis caused by consumption of raw or undercooked meat infected with *Trichinella* spp. muscle larvae. This pathogen is a nematode (roundworm) parasite with an infectious stage located in the striated muscle cells of its host (Figure 1). *Trichinella* is able to infect all monogastric mammals (in particular pigs, wild boars and horses) and some raptors or detritivore birds and reptiles.

Figure 1 : *Trichinella spiralis* muscle larvae

http://vimeo.com/user16014309/methodetrichinella
« Illustration d'une méthode de détection de *Trichinella* dans les viandes»
«Implementation and critical points of a *Trichinella* detection method in meat : artificial digestion and microscopic examination (reference method according to the UE regulation n° 2075/2005).»

Worldwide, the number of people contaminated by *Trichinella* is estimated at 11 million[4] and each year approximately 10 000 new infections occur[5].
Trichinellosis is an asymptomatic disease in animals, but in humans it is characterised by a painful presentation (diarrhoea, fever, facial oedema, muscle pain and nervous signs) for which there is no effective curative treatment. Contamination by *Trichinella* larvae can lead to sometimes irreversible sequelae and in very rare cases to death. Thus, inspection of carcasses for *Trichinella* at the slaughterhouse is a key regulatory measure for collective control. In France, these analyses are performed on carcasses of species susceptible to *Trichinella* infection (pigs, wild boars, horses) by official laboratories approved by the Ministry of Agriculture.

1. Cutler SJ, Fooks AR, van der Poel WH. 2010, Public health threat of new, reemerging, and neglected zoonoses in the industrialized world. Emerg Infect Dis, 16,1-7
2. Merianos, A., 2007, Surveillance and response to disease emergence. Curr Top Microbiol Immunol 315, 477-509.
3. Murphy, F.A., 2008, Emerging zoonoses: the challenge for public health and biodefense. Prev Vet Med 86, 216-223.
4. Dupouy-Camet, J., 2000, Trichinellosis: a worldwide zoonosis. Vet Parasitol 93, 191–200.
5. Dorny P, Praet N, Deckers N, Gabriel S. 2009, Emerging food-borne parasites. Vet Parasitol, 163, 196-206.
6. Soulé, C., Dupouy-Camet, J., 1991, Conséquences physiopathologiques et immunologiques de l'infestation par Trichinella. In: « La trichinellose: une zoonose en évolution » (ed) Office International des Epizooties, 18.
7. Pozio, E., 2001, New patterns of Trichinella infection. Vet Parasitol 98, 133-148

Methods

The detection method in meat

The reference method on the date of online publication of this video (June 2014) is the artificial digestion of blended muscle samples. This method is described in Commission Regulation (EC) No 2075/2005 of 5 December 2005 (Annex I, Chapter I), amended by Regulation (EC) No 1245/2007 dated 24 October 2007. It consists in artificial digestion of muscle samples in order to release and then detect by microscopy any *Trichinella* larvae present. Although the test's principle is simple, its implementation is fully manual and cannot be automated. The performance of the method therefore mainly relies on the technical expertise of the analyst. Furthermore, there is no possibility of including any internal positive or negative controls during the test. Maintaining a high level of technical expertise, especially by training analysts to master the critical points of the method, is therefore essential to ensure the quality of results.

A new tool to supplement the training of Trichinellosis screening analysts

To this end, the French National Reference Laboratory for Foodborne Parasites (ANSES, Maisons-Alfort Laboratory for Animal Health, France) has created a video to present a technical operating procedure for the artificial digestion method, highlighting critical points. This video can specifically be used as one of the tools for primary and continuous technical training of analysts performing the artificial digestion method.

1. This video is intended only as an illustration of an operating procedure for detecting Trichinella muscle larvae by artificial digestion in accordance with the reference method described in Commission Regulation (EC) No 2075/2005 of 5 December 2005 (Annex I, Chapter I), amended by Regulation (EC) No 1245/2007 dated 24 October 2007. This video has no legislative or regulatory value; laboratories must refer to current regulations to obtain the text for the method to be applied. ANSES shall in no way be held liable for damages of any kind for a laboratory resulting from analyses performed as per the method described in this video, particularly if, in doing so, the laboratory deviated from rules applicable on the date of the analysis.

2. This video is the property of ANSES. It is protected by international conventions on industrial, literary and artistic property rights currently in force, and by legislative and regulatory provisions in effect in France. Reusing this video is subject to compliance with the rules stipulated in the "Legal Information" section of the ANSES website