Anisakis UV press method: training workshop attendance report

Maes o ddiddordeb ymchwil: Research projects
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Background

Anisakis is a genus of parasitic nematodes that can cause Anisakiasis, a gastrointestinal disease in humans who consume raw or undercooked seafood. In recent years, there has been a significant increase in reported cases of Anisakiasis worldwide (Audicana et al., 2008), highlighting the importance of understanding the biology, epidemiology, and clinical manifestation of this parasitic infection.

Measures to control zoonosis include inactivation through freezing or cooking and screening during processing, where individual worms can be removed, or heavily infected material rejected. Gutting and icing as soon as possible after capture can prevent post-mortem migration from viscera to flesh. Products containing viable or visible larvae are unlikely to be well received by consumers, further reinforcing controls applied by the seafood supply chain.

Legislative controls and detection methods

Legislative controls in the UK are specified in retained European Regulation (EC) No. 853/2004, as amended and subsequently copied in part into UK law through Statutory Instrument 2019 No. 1247. Fishery products intended for consumption raw (or not heated to 60°C or above for at least one minute) must be frozen at -20°C for at least 24 hours before being placed on the market. Other products intended for cooking must have been subject to visual examination and must not be marketed for human consumption if they are contaminated with parasites. This definition is somewhat ambiguous but has been further detailed in European Commission Regulation (EC) No 2074/2005. This defines the term "visual inspection" as a "non-destructive examination of fish or fishery products with or without optical means of magnifying and under good light conditions for human vision, including, if necessary, candling". Candling is defined as "in respect of flat fish or fish fillets, holding up fish to a light in a darkened room to detect parasites". This must be done continuously during manual evisceration and washing by qualified persons; in the case of machine processing, a representative number of samples should be inspected.

These controls are implemented by food business operators, under the supervision of Local Authorities in the UK. Methods employed by the seafood industry to ensure their products meet the hygiene requirements are either visual examination or candling. Visual examination is a simple inspection of the product in well-lit conditions. Candling usually involves examining fish fillets over a light box, whereby a diffuse white light is shone through the specimen from underneath. No official testing is undertaken in the UK in support of the legislative requirements.

There are two validated methods for which ISO standards have recently been developed:

- artificial digestion (BSI EN ISO 23036-2:2021 Microbiology of the food chain – Methods for the detection of Anisakidae L3 larvae in fish and fishery products – Part 2: Artificial digestion method)
- UV-press (BSI EN ISO 23036-1:2021 Microbiology of the food chain – Methods for the detection of Anisakidae L3 larvae in fish and fishery products – Part 1: UV- press method)

The artificial digestion method uses enzymatic degradation of the sample in a fluid composed of pepsin and hydrochloric acid followed by filtration and washing. Anisakis larvae are highly resistant to digestion and can be enumerated and assessed for viability. The UV press method involves pressing the material to about 2mm thickness, freezing it to kill the larvae, and then viewing the sample under UV light. Anisakis nematodes fluoresce after death under UV light and are counted by the analyst. It is possible to detect almost all larvae within a sample using either of these methods, although the viability of the larvae can only be assessed by the digestion method as the UV-press method kills them. The ISO standards indicate the accuracy, sensitivity, and specificity of the digestion method are 98%, 96% and 100%, and for the UV press method, they are all 100%. Both express results as a number of larvae per unit weight of the sample.

UV press method overview

The UK National Reference Laboratory (NRL) for Anisakis at Cefas was tasked by the Food Standards Agency to progress the accreditation of its UV-press method to ISO17025 standard to meet the statutory requirement for NRLs to only use accredited methods. Whilst the method has been in place at Cefas for many years, only very limited testing has been undertaken by the laboratory and accreditation had not been a requirement. The new requirement for accreditation meant that the method had to be formally characterised by Cefas and the various steps of the process defined and specified in such a way that it met all elements of a quality system. To Cefas knowledge, there are no official laboratories in Europe which are designated for Anisakis testing and accredited to ISO17025 standard for this testing by either the digestion or the UV press method. It has therefore not been possible for the NRL to seek advice from an accredited laboratory on the use of the method. Instead, the NRL contacted a Norwegian laboratory known for their extensive use of the method and their international expertise in this field to seek this advice.

The report

This report aims to provide a comprehensive overview of the UV press method as witnessed during a training workshop on the Anisakis UV press method organised by The Institute of Marine Research (IMR) in Bergen (Norway) in January 2023. The IMR hosts the National Institute of Nutrition and Seafood Research Centre with its Seafood Hazard group led by Senior Scientist Arne Levsen who organised the workshop. The workshop was delivered by Lucilla Giulietti (Post Doctoral Research) and Paolo Cipriani (Research) at the IMR in Nordnesboder 4, Bergen.

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