National Reference Laboratory annual literature review on anisakis 2022-23

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Methods

In order to maintain awareness of any new developments in this field, an annual review of the peer-reviewed literature is undertaken by the UK National Reference Laboratory for Anisakis each year. This short report covers the review undertaken for 2022-3.

The search term ‘anisakis OR pseudoterranova’ was entered into Open Athens search engine along with Research Gate, PubMed and Google Scholar. All results were extracted (including title and abstract) into a spreadsheet. The retrieved references were then reviewed and where relevant were divided into the following categories:

- Presence of Anisakis in European fish stocks and fishery products (Epidemiology).
- European reports of illness due to Anisakis.
- Detection methods (for parasites within fishery products).

Papers which were tagged as falling under one of these headings were reviewed in more detail, retrieving the full text as necessary and where possible. A synthesis of the findings of these various studies were made. These papers are listed in separate tables in the results section.

Results

Table 1: Presence of Anisakis spp. in European fish stocks and fishery products

Species	Area	Description	Reference
European hake (Merluccius merluccius)	North East Atlantic (Portugal)	High infection levels of Anisakis spp. larvae in hake, with 96% prevalence and more than 0.05 worms per gram of muscle.	Santos et al, 2022
Frigate tuna (Auxis thazard) European hake (Merluccius merluccius) Mackerel (Scomber scombrus)	Canary Coast, zone FAO 34 (Spain)	The presence of Anisakis spp. larvae was detected in 25% of the fish analysed, 4 out of the 11 species being positive. • Auxis thazard 21.34%, 3/14 • Merluccius merluccius 85.18%, 23/27 • Scomber scombrus 62.5%, 10/16	Martin- Carrillo et al., 2022

Species	Area	Description	Reference
Horse mackerel (Trachurus trachurus)	Ligurian Sea (Italy)	A total of 481 horse mackerel sampled with a prevalence of 60.9% of Anisakis spp.	Menconi et al., 2022
Anchovies (Engraulis encrasicolus)	Different fishing ground: Mediterranean Sea, Balearic Sea, Atlantic Sea (Spain)	A total of 161 anchovies from different areas of the Iberian Peninsula coast were analysed. Prevalence of Anisakis in muscle was 7.45%.	Domingo- Hernandez et al., 2023
Atlantic cod (Gadus morhua)	Norwegian Sea (Norway)	A total of 106 cod were caught in 2 FAO zones of the Norwegian Sea. A total of 353 Anisakis and 265 Pseudoterranova were recorded in the muscle tissue.	Nadolna- A?tyn et al., 2023

These reports show the level of infestation in different fish species caught in different fishing ground areas around Europe. The different distribution of Anisakis species depends on many variable factors such as the presence of definitive and intermediate host, sizes of the fish sampled, and samples conducted at different time (year and season) for instances.

Furthermore, by analysing the EU Rapid Alert System for Food and Safety (RASFF) database, this shows in the period of March 2022 and March 2023, a total of 25 notifications of Anisakis. Italy and Spain are the most frequent reporter, and Spain products were the most affected. One unexpected notification from Italy on the 28th of April 2022 notifying “presence of Anisakis species in fish stick made in Germany”.

A specific paper made reference to illness due to Anisakis (see Table 2). This was an unusual finding for Anisakis, as usually the infections are localised in the gastrointestinal tract. This paper reported not finding the parasite through endoscopy or in the pleural effusion. Only “a focal eosinophilia in the ileum mucosa that could represent an indirect sign of Anisakis spp infection” followed by reactive antibodies against Anisakis spp. antigen. The patient admitted to frequently eat raw sushi at restaurants.

Table 2: Reports of illness in Europe

Country	Description	Reference
Italy	First case of eosinophilic pleural effusion due to Anisakis spp. infection in a 39-years-old European subject.	Bongiovanni et al., 2023

One paper focussed on methodological improvements relating to the inactivation of Anisakis Larvae within fish fillets (see Table 3). However, this technique was applied only to mackerel fillets, therefore more research needs to be done to evaluate the effects in other fish species fillets.

Table 3: Methodological developments

Summary	Reference
This research paper introduces an innovative way to inactivate the Anisakis larvae inside the fish fillet by applying repetitive electric current to the fish meat by using a pulsed power technology. This technique will allow the treatment of fish fillets without impact on the quality of the meat for a sashimi product.	Onitsuka et al., 2022

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