12 June 2024

Parasites in fishery products Part 1: ToRs1–3

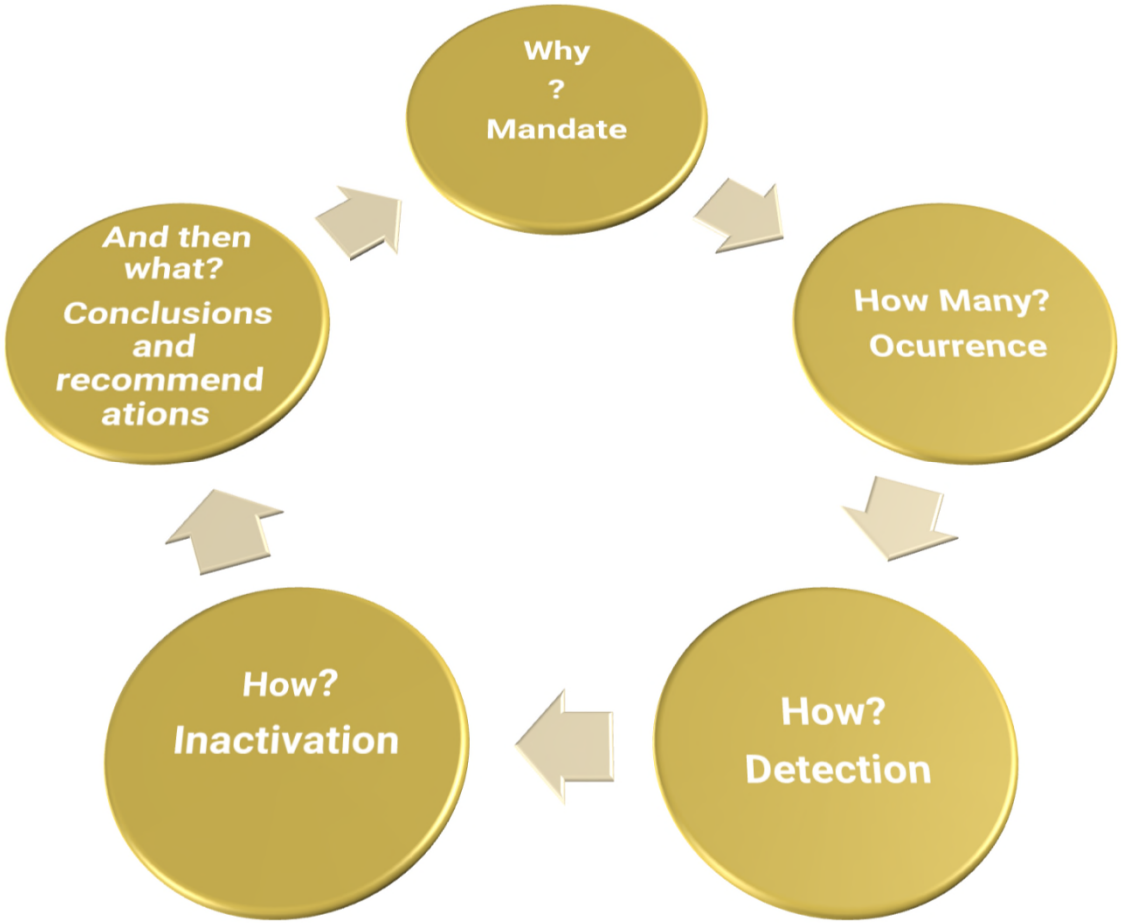
(EFSA-Q-2023-00090)

Beatriz Guerra

Aquaculture Advisory Council mtg

EUROPEAN FOOD SAFETY AUTHORITY

OUTLINE


Why
?
Mandate
How Many?
Ocurrence
How?
Detection
How?
Inactivation
And then
what?
Conclusions
and
recommend
ations

BACKGROUND

Adopted: 13 March 2024
DOI: 10.2903/j.efsa.2024.8719

SCIENTIFIC OPINION

efsa JOURNAL

Re-evaluation of certain aspects of the EFSA Scientific Opinion of April 2010 on risk assessment of parasites in fishery products, based on new scientific data. Part 1: ToRs1–3

2010

EC requested (2009) following to reporting by Spain of allergic reactions caused by Anisakidae
Three aspects:

1. **Assessment** of **food safety concerns** due to **possible allergenic reactions** from parasites in fishery products;
2. **Alternative treatment** for killing viable parasites and **comparison with freezing method;**
3. **Criteria** for when **fishing grounds** (wild-farmed) fishery products **do not present a health hazard** (Atlantic Salmon in particular)

EFSA conclusions were considered for modifying part D of Annex III, Section VIII, Chapter III to Regulation (EC) No 853/2004 (Commission Regulation (EU) N°1276/2011).

2023

Update on 2010 Scientific opinion based on any new scientific evidence that may have become available since then

EC MANDATE

In particular, EFSA is requested to review and assess:

Part 1 (published March 2024)

1. The **occurrence of parasites** of public health importance in **fishery products** derived from the most relevant **farmed fish species in the EU** (**in particular**, but **not limited to**, Atlantic **salmon, seabass, farmed seabream and turbot**).

2. Diagnostic **methods for the detection** of parasites of public health importance in fishery products from such farmed fish species.

3. **Technical developments** and **new scientific data** available in relation to **killing viable parasites** of public health importance in fishery products, **in particular** treatments **other than freezing**.

Part 2 (on-going, deadline December 2024)

1. **ToR 4**: Whether any **particular species** of **wild caught fish** originating from **specific fishing grounds** could be regarded as **not representing a health hazard** with regards to the presence of parasites of public health importance.

CONCLUSIONS TOR 1: OCCURRENCE

ToR 1: The **occurrence of parasites** of public health importance in **fishery products** derived from the most relevant **farmed fish species in the EU** (**in particular**, but **not limited to**, Atlantic **salmon, seabass, farmed seabream and turbot**).

- List of relevant **zoonotic parasites** and the list of relevant **finfish species** (consumption/production data)
- The experts consider it to be 99%-100% certain (**almost certain**) that fish produced in **recirculating aquaculture systems (RAS)**, or **indoor** or **roofed facilities** with **filtered and/or treated water intake are not exposed to parasites** provided the fish is exclusively **fed heat-treated feed**.
- Fish farmed in open **marine offshore cages** or open **flow-through freshwater ponds** or **tanks** can be exposed to zoonotic parasites.

https://www.flaticon.com/free-icons/fish-farming

FISH VS PARASITES SPECIES

Table 1: Relevant fish species

	Common name
Marine water	Atlantic salmon
	Rainbow trout
	Gilthead Seabream
	European Seabass
	Turbot
	Atlantic bluefin tuna
	Meagre
	Atlantic halibut
	Atlantic cod
	Greater amberjack
Fresh water	Rainbow trout and Brown trout
	Common carp
	European eel
	European catfish and African catfish
	Tench
	Pikeperch

Table 2: Relevant parasites

- *Anisakis simplex* (s. s.)
- *Anisakis pegreffii*
- *Phocanema decipiens* (s. l.)
- *Contracaecum osculatum* (s. l.)
- *Cryptocotyle lingua*

- *Opisthorchis felineus*
- *Metorchis* spp.
- *Pseudamphistomum truncatum*
- *Paracoenogonimus ovatus*
- *Dibothriocephalus* spp

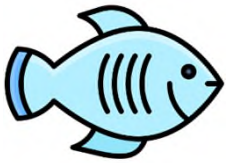
CONCLUSIONS TOR 1: OCCURRENCE

Positive studies:

- **European seabass**: **2/10** studies : larvae of ***A. pegreffii*** and ***A. simplex*** (s. s.)
- **Atlantic bluefin tuna**: **2/2** (Adriatic Sea, Croatia); ***A. pegreffii*** and ***A. simplex*** (s. s.) with prevalence values from 17.1% to 32.8%.
- **Atlantic cod**: **1/1** (Norway): ***C. lingua*** and ***A. simplex*** (s. l.)
- **Tench**: **1/1** (Germany) metacercariae of ***Pseudamphistomum truncatum*** (Opistorchiidae) and ***Paracoenogonimus ovatus*** (Cyathocotylidae) detected.

Negative studies:

- **Atlantic salmon**: **4/4** studies (Norway)
- **Marine rainbow trout**: **5/5** (Denmark, Norway and UK)
- **Gilthead seabream**: **9/9** (Mediterranean Sea)
- **Turbot: 3/3** (Atlantic coast of Spain)
- **Meagre**: **1/1** (Spain)
- **Atlantic halibut**: **1/1** (Scotland)
- **Freshwater rainbow trout**: **1/1** (Denmark)
- **Common carp**: **1/1** (Hungary)



No studies available: Greater amberjack, Brown trout, European and African catfish, European eel, Pikeperch

- Due to the **lack of representative data**, it is **not possible** to make informative **estimates** of the **prevalence** or the abundance of those parasites, that are considered to be of public health importance, for all fish species, farming systems and production area in the EU/EFTA.

https://www.flaticon.com/free-icons/fish-farming

CONCLUSIONS TOR 2: DETECTION

ToR 2: Diagnostic **methods for the detection** of parasites of public health importance in fishery products from such farmed fish species.

- Some methods described in 2010 are still in use: **visual inspection** (candling), **artificial digestion** (now ISO 23036-1:2021) and the **UV-press method** (now ISO 23036-2:2021).

New developments :

- New **UV-scanning devices**, **Novel optical** (hyperspectral) sensing methodologies (still require further development)

- Molecular identification: **PCR-amplification** and **sequencing** targeting both **nuclear/mitochondrial** sequences. Genetic/molecular approaches + microscopic identification are the most reliable identification methods.

- **OMICs** (genomics, metagenomics, transcriptomics, and proteomics) **data** are useful resource for **selection** of molecular/genetic **markers** for the identification/characterization of zoonotic parasites.

- **Artificial intelligence** and **machine learning algorithms** in **image and video processing** are being tested for **high throughput** detection/identification of parasites in fish.

CONCLUSIONS TOR 3: INACTIVATION

ToR 3: Technical developments and **new scientific data** available in relation to **killing viable parasites** of public health importance in fishery products, **in particular** treatments **other than freezing**.

- **High pressure processing (HPP), pulsed electric field (PEF), natural products**, have been successful in killing the parasites under defined **laboratory conditions**, but need to be verify under **commercial conditions.**

- **Ultrasound treatment** has neither been successful

RECOMMENDATIONS

- **Information on the fish origin** (farmed or wild) should be included in the RASFF notifications.
- A **baseline survey** to address the **data gaps on the occurrence** of zoonotic parasites in **fish species** produced in **open systems**.
- More regular **epidemiological studies** for fish species exempt from freezing.
- ISO methods: **UV- press** and **artificial digestion** should be used for the detection of parasites **in official control programs.**
- **Methods to visualise and isolate parasites** must be complemented whenever possible by **molecular methods** for parasite **identification**

RECOMMENDATIONS

Further research and development should focus on:

For detection methods:

- **Improvement of real time** non-destructive (eg. optical sensing methods) or destructive (UV-press) **automatic parasite detection systems** with **higher samples throughput**;
- Validation of **molecular detection methods** using **multiple markers** for the **accurate identification** of the parasite **at species level**;
- Generation of **more OMICs-based data** focusing on **all zoonotic parasites**.

Treatments to kill cestodes and trematodes:

- Further **development of high throughput phenotypic screening** methods to **assess parasites infectivity**;
- Optimization of **inactivation treatments for individual fishery preparations**.

Thanks for your attention!

And thanks to:
Sonagnon Martin Goudjihounde,
EFSA WG Parasites,
BIOHAZ Panel

Beatriz Guerra, PhD
Lead Expert Molecular Epidemiology.
BIOHAW Unit
ASSESS Department
e-mail: beatriz.guerra@efsa.europa.eu

STAY CONNECTED

SUBSCRIBE TO
efsa.europa.eu/en/news/newsletters
efsa.europa.eu/en/rss
Careers.efsa.europa.eu – job alerts

LISTEN TO OUR PODCAST
Science on the Menu –Spotify, Apple Podcast and YouTube

FOLLOW US ON TWITTER
@efsa_eu
@plants_efsa
@methods_efsa
@animals_efsa

FOLLOW US ON LINKEDIN
Linkedin.com/company/efsa

FOLLOW US ON INSTAGRAM
@one_healthenv_eu

CONTACT US
efsa.europa.eu/en/contact/askefsa

efsa
EUROPEAN FOOD SAFETY AUTHORITY