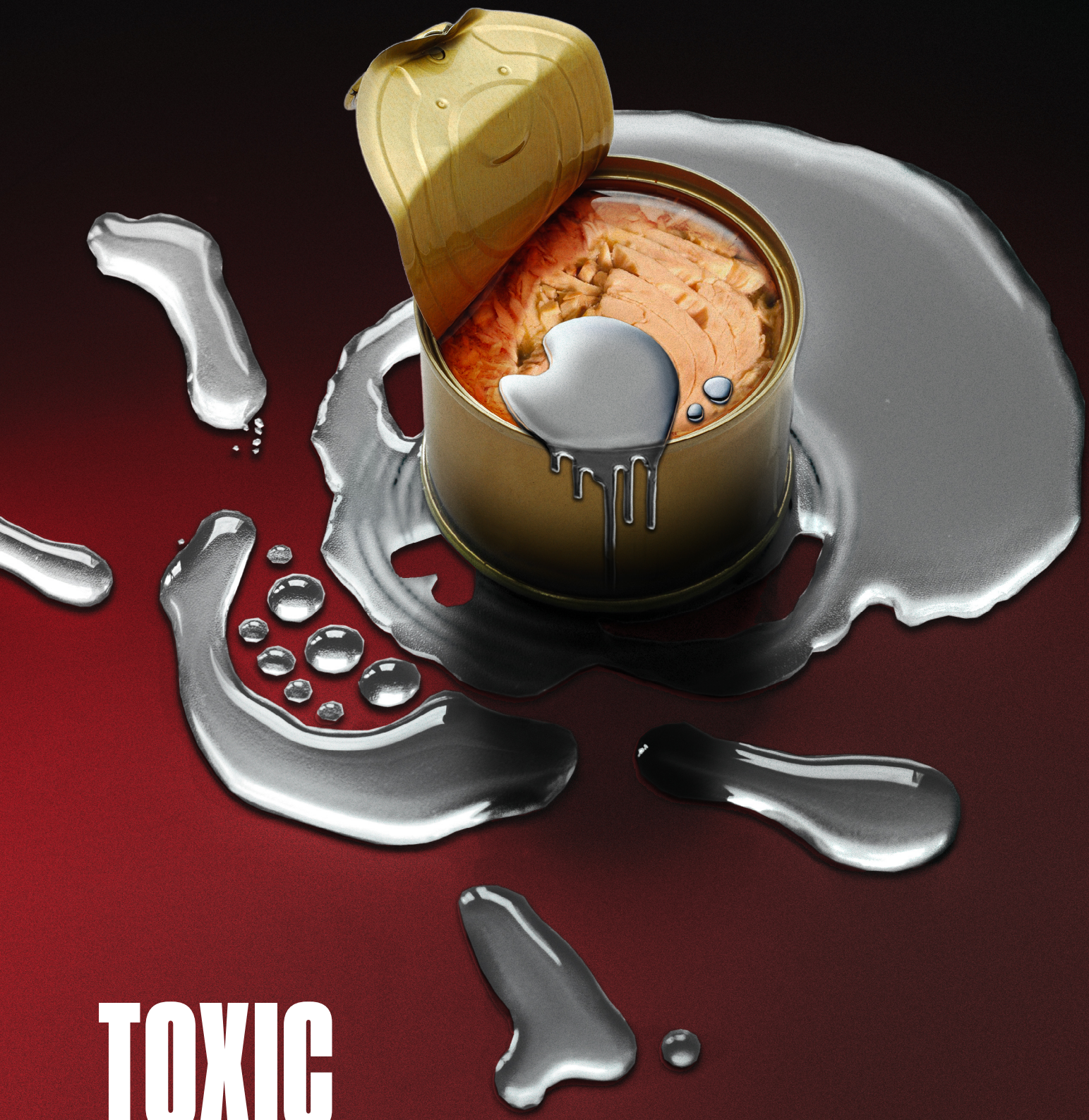

TOXIC TUNA

Chronicle
of a health scandal

BLOOM

Foreword

This report reveals a veritable public health scandal linked to the levels of mercury in tuna. Although almost all fished tuna are affected, BLOOM would like to recognise that mercury pollution in our environment isn't the sole cause of the risk to our health. The main reason that mercury in tuna has become a health concern is the industrialisation of tuna fishing and the resulting overconsumption of tuna.

The clear health risks described in this report and the disastrous environmental, social and economic impacts of industrial fishing described in our other "TunaGate" reports lead to one conclusion: tuna should no longer be seen as a staple food. Tuna should be recast as the noble animals they are. And if we do eat them at all, they should primarily be fished locally with rods or lines.



This report is accompanied by appendixes available in a supplementary document (clickable link).

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INTRODUCTION

Tuna fishing is the world's most lucrative fishing industry. With total sales of more than $40 billion a year, it plays a significant role in both economies and ecosystems.[1] The European Union is a world leader when it comes to tuna: European companies own 39 of the 50 largest tuna fishing vessels.[2] Globally, the European Union accounts for 20% of tuna catches.[3] Tuna is also the most consumed fish in the European Union.[4] With almost five kilos of tuna bought per person each year, it is also the favoured fish of the French, who mainly buy it canned.[5]

Since 2022, BLOOM has been uncovering the industry's darker side piece by piece through a series of studies and investigations. Our long-running TunaGate campaign has highlighted the tuna industry's capacity for the worst of human rights abuses: wage theft, denial of food and medical care, forced labour, debt bondage and more.[6] Tuna producers simply behave as if international standards don't exist. Fish that has been caught or processed by people whose human rights have been violated therefore ends up on the plates of consumers all over Europe.

This disastrous human cost has an ecological counterpart: large-scale use of fish aggregating devices (FADs), huge by-catches that lead to the pointless deaths of millions of sharks and other non-target species and, among other things, overfishing of tuna populations, including juvenile and immature fish.[7] The violations committed against marine life and ecosystems by the steel monsters of tuna fishing make for a long list.

Today, BLOOM is shedding light on yet another dark side of this industry: the widespread contamination of tuna with mercury, a powerful neurotoxin that is extremely dangerous to human health, and the creation of the health standards that knowingly allow the sale of contaminated products. All the while, the tuna industry lobbies are working to sweep this health scandal under the carpet.

EXECUTIVE SUMMARY

Mercury contamination: BLOOM exposes a health scandal on an unprecedented scale

Mercury, an extremely dangerous poison

First of all, we need to remember that mercury, whose global emissions have risen sharply over the last two centuries, is found in large quantities in the ocean. It accumulates in fish in its most toxic form, methylmercury, ending up on the shelves and then on the plates of millions of families. As a predator at the top of the food chain, tuna accumulate heavy metals from their prey, resulting in a great increase in mercury contamination compared with smaller species.

Tuna is the best-selling fish in Europe. In France, consumers eat an average of almost 5 kg per person per year. Yet regular ingestion of methylmercury - even in small quantities - represents a serious health hazard, particularly (but not exclusively) for the brain development of foetuses and young children.

100% of tins tested by BLOOM are contaminated with mercury

BLOOM randomly selected 148 tins from five European countries (England, Germany, Italy, France and Spain) and had them tested by an independent laboratory: 100% of the cans were contaminated with mercury. More than one in two tins tested (57%) exceeded the strictest maximum mercury limit defined for fish in the European Union (0.3 mg/kg). Of the 148 tins, a tin from the Petit Navire brand bought in a Paris Carrefour City store had a record level of 3.9 mg/kg, i.e. **13 times higher** than the level for species subject to the most restrictive limit of 0.3 mg/kg. **Because of the dangers posed by regular ingestion of mercury, even in small doses, all tins exceeding the 0.3 mg/kg limit should be banned from sale.** This is not the case.

Bogus health standards to maximise sales of contaminated products

BLOOM has analysed a hundred of official documents from the international bodies responsible for health standards (joint FAO-WHO committee, European Commission, European Food Safety Authority...) concerning mercury. Our investigation reveals that no method that takes into account the health consequences for adults and children is used to define maximum mercury levels in tuna. **On the contrary, the European public authorities have chosen an approach that is completely at odds with their duty to protect public health: they use the actual mercury contamination of the tuna to establish a threshold that ensures that 95% of them can be sold.** This is why tuna, one of the most contaminated species, has a maximum mercury tolerance three times higher than that of the least contaminated species (1 mg/kg compared with 0.3 mg/kg for cod, for example). There is no health reason for this discrepancy: mercury is no less toxic if ingested via tuna.

Mercury is a powerful neurotoxin that attaches itself to the brain and is very difficult to get rid of. Having acted upstream on regulatory thresholds, means that manufacturers and retailers can now sell contaminated products legally.

International bodies exposing the depth of the tuna industry's influence

BLOOM's investigation also examines decades of standard-setting by the FAO (Food and Agriculture Organization of the United Nations) and the WHO (World Health Organization), organizations that have strongly influenced European regulations over the years. By reviewing numerous documents, BLOOM was able to determine that several members of the FAO/WHO Joint Expert Committee on Food Additives (JECFA), which is supposed to ensure food safety, have clear conflicts of interest.

The Codex Alimentarius, launched in 1963 by the FAO and WHO to establish international food standards, is also under the influence of the tuna lobby. **The group responsible for monitoring food contaminants,** the Codex Committee on Food Additives and Contaminants (CCCF), **is led by the Netherlands, a major player in industrial fishing.** Moreover, **tuna giants are regularly represented directly among the national delegations** at CCCF meetings, unlike NGOs.

PAFF Committee: The European Commission's "technical" committee at the heart of the health scandal

A central actor in the health scandal exposed by BLOOM's report is an institution still largely unknown to the public: the PAFF Committee (Standing Committee on Plants, Animals, Food, and Feed). This committee is responsible, among other tasks, for setting maximum levels for contaminants in food products. Made up of representatives from EU member states, **the PAFF Committee operates with total opacity:** the European Commission refuses to reveal the identities of its members, voting results, or the detailed content of their discussions.

This lack of transparency also affects the working groups advising the PAFF Committee. Meeting minutes and reference documents are not disclosed, a policy actively maintained by **the Commission, which denies access even in response to formal transparency requests. The European Parliament, kept out of discussions and decisions related to food safety standards,** has been attempting for years, without success, to regain some oversight over the PAFF Committee's choices.

Rare and ineffective controls

Contrary to the vigilance that such a health issue should require, there are virtually no controls on the tuna production and marketing chain. In the Seychelles, the nerve centre of tuna fishing for the European market, the health authorities only have to carry out ten or so tests each year to guarantee the compliance of millions of kilos of tuna sent to Europe! French authorities are completely turning a blind eye to mercury contamination in tuna and placing unwarranted trust in the tuna industry and large retailers: since 2023, no inspections are planned for canned tuna, and fewer than fifty fresh tuna are tested.

Finally, as the few controls that do exist are based on a standard set to be unsurpassable, the number of tests with non-compliant levels of contamination is logically too low to arouse the slightest concern from the authorities. A further smokescreen to reinforce the misleading impression of safety.

> This BLOOM investigation is part of the "TunaGate" series, which has established the ecological criminality and numerous human rights violations attributable to the tuna industry.

OUR DEMANDS

In view of the pervasive presence of mercury in the most widely eaten fish in Europe, urgent steps must be taken to protect the health of European consumers and end the impunity of the tuna industry. BLOOM calls for the following measures to be taken throughout the European Union:

Immediately:

1. **Distributors must commit to only selling tuna that does not exceed the most protective mercury standard** (0.3 mg/kg) in order to reduce consumer exposure to this contamination. Considering the health risks posed by mercury contamination, even at low doses, manufacturers and distributors must also stop promoting tuna in any way and warn customers through all available communication channels of the risk to which are exposing themselves.

2. The French government should adopt European **safeguard measures** to ban the sale of tuna products containing more than 0.3 mg of mercury per kilo at French scale.

3. To protect the health of the most vulnerable populations, the French government and local authorities must ban all products containing tuna from school canteens, childcare facilities, retirement homes, maternity wards, hospitals, etc.

In the short term:

4. **The European Commission should adopt a precautionary measure for tuna in line with the strictest maximum mercury content that it has set for any fish: 0.3 mg/kg.** There is no logical reason for the current exception either for fresh or canned tuna. Tuna is the most widely consumed fish in Europe, including France, and should therefore be all the more strictly regulated. Products with a mercury content above this standard must not be sold and distributors must recall them.

5. **Checks on the entire tuna production chain need to be stepped up,** by the private actors involved, but also and especially by public authorities, so that these more protective public health standards are respected.

6. **National authorities must run large-scale information campaigns** to inform the public of the health risks of eating mercury, even at low doses, particularly for the most vulnerable groups (pregnant women, children, etc.). This information must, in particular, be provided through the labelling of predatory fish and products containing them.

In the medium term:

7. **European Regulation 915/2023 setting maximum mercury levels for foods must be updated,** to bring them down to 0.3 mg/kg, as with other seafood products.

8. Given the high toxicity of mercury, **the "tolerable weekly intake" (TWI) should be abolished, and consumption recommendations reevaluated.**

9. **European Commission committees such as the Standing Committee on Plant Animal Food and Feed (PAFF Committee),** which have the power to make decisions on major issues such as pesticide residues, genetically modified organisms (GMOs) and contaminants in foodstuffs, **must be held to a standard of complete transparency** and their decisions should have the possibility of following a democratic process.

ACRONYMS

ALARA
As low as reasonably achievable, the method used to minimise the impact of health standards on trade.

ATSDR
US Agency for Toxic Substances and Disease Registry

Anses
French Agency for Food, Environmental and Occupational Health and Safety

CCCF
Codex Committee on Contaminants in Foods ( ), formerly the CCFAC

CCFAC
Codex Committee on Food Additives and Contaminants, later the CCCF

IARC
International Agency for Research on Cancer

Codex Alimentarius Commission
The commission set up by the FAO and WHO to write the Codex Alimentarius (from the Latin for food code), a set of standards, guidelines and codes of practice relating to food

TWI
Tolerable weekly intake

ECHA
European Chemicals Agency

EFSA
European Food Safety Authority

FAO
Food and Agriculture Organization of the United Nations

IATTC
Inter-American Tropical Tuna Commission

JECFA
Joint FAO/WHO Expert Committee on Food Additives, relied on by the Codex Alimentarius Commission to draw up the Codex Alimentarius

OECD
Organisation for Co-operation and Development

MSC
Marine Stewardship Council

NOAEL
No-observed-adverse-effect level

WHO
World Health Organization

WTO
World Trade Organization

PAFF Committee
European Commission Standing Committee on Plants, Animals, Food and Feed. It is responsible for regulating contaminants.

STC
Société de toxicologie clinique (French Society for Clinical Toxicology)

UNECE
United Nations Economic Commission for Europe

US EPA
United States Environmental Protection Agency

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CONTEXT

Mercury is a serious threat to our health

- According to the WHO, **mercury is one of the top ten substances of major public health concern.**[8]
- Mercury is emitted as a gas by various natural phenomena – mainly volcanic eruptions and forest fires – and by human activities, mainly burning coal, but also certain gold mining activities. Since the industrial revolution, human-induced emissions have far exceeded natural emissions.[9-10]
- Once in the atmosphere, mercury spreads across the planet, with **some making its way into the ocean. Bacteria** then convert it into **methylmercury, its most toxic form.**[9-10]
- Fish are **bioaccumulators.** Once they ingest the heavy metals present in the marine environment (such as methylmercury), their bodies store them indefinitely. All the toxic substances stored in prey fish then accumulate in the fish at the top of the food chain, i.e. tuna and other predatory fish (swordfish, sharks, etc.). This leads to mercury levels in these fish that are ten times the levels found in species at the bottom of the food chain.
- Once ingested, methylmercury is difficult to remove from the body and **regular consumption of** this toxin, even **in low doses, can have devastating long-term effects on human health.** Several studies have documented the damage caused by **methylmercury not only to the neurological, cognitive and motor systems of fetuses, but also to the neuromotor, cardiovascular, immune, renal and reproductive systems of children and adults exposed to low levels.**[11-29]
- The International Agency for Research on Cancer (IARC) classified methylmercury as a **"possible carcinogen"** (category 2B) in 1993.[30] Over the last two decades, the number of studies demonstrating the potentially carcinogenic effects of mercury has continued to rise.[31-33]
- Methylmercury is rarely found in food in isolation. Combined with other contaminants such as lead or cadmium, it could have serious negative effects on health that are hard to measure: this is known as the **"cocktail effect"**.[69]

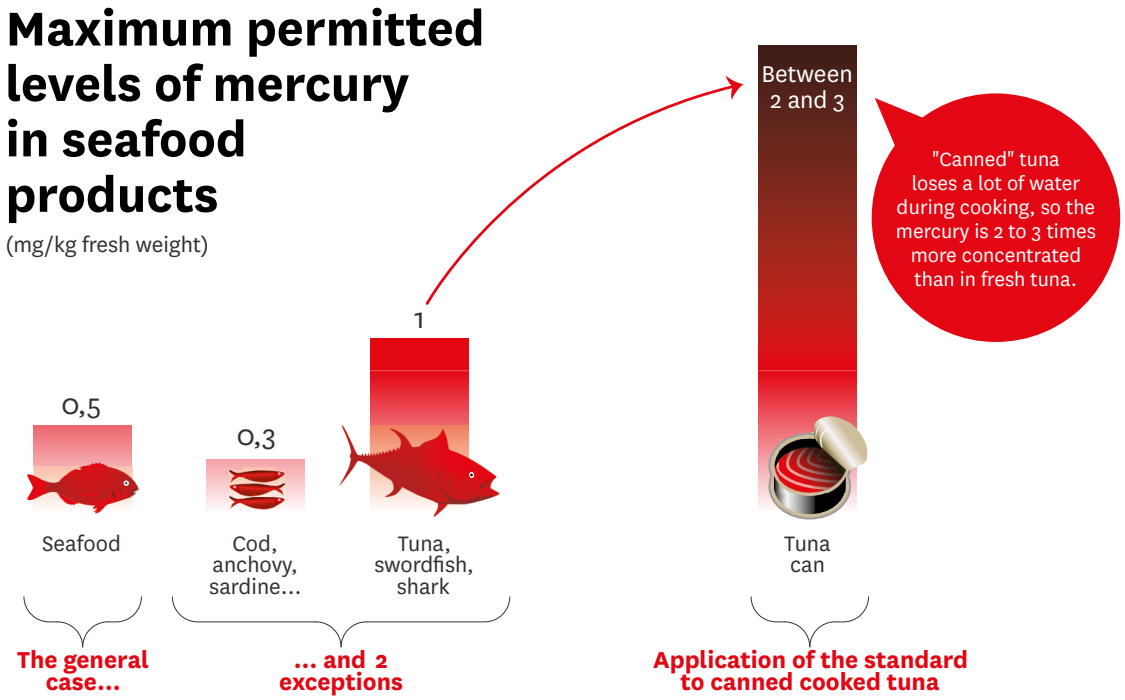
KEY RESULTS OF THE INVESTIGATION

Standards are set to protect demand for tuna with no regard for public health

- **The maximum levels are set so as to allow the commercialization of as many contaminated fish as possible: this is what is called the ALARA method ("as low as reasonably achievable").**[40,113] With this method, the maximum level for cod is set based on the contamination of cod, and the maximum level for tuna is set based on the contamination of tuna. For each species, the standards are custom-made to avoid reducing the volumes allowed for sale.
- None of the methods used to determine how much mercury should be allowed in fish **take into account all its harmful effects on adult and child health.**
- For this reason, **the maximum permitted mercury concentration in tuna and other predatory fish is set three times higher** than for other fish (anchovies, sardines, cod, etc.): 1 mg/kg versus 0.3 mg/kg.[41] There is no health reason for this discrepancy: **mercury is no less toxic if ingested via tuna, only the mercury concentration in the food matters.**

- **Canned tuna benefits from a legal loophole and we estimate that they can reach mercury levels nine times higher** than the maximum set for other species, because the current standard applies to fresh tuna, not the finished product. However, canned tuna contains much less water than fresh tuna, so mercury is two to three times more concentrated in a can than in a fillet of fresh fish[1]. But it makes no sense to allow higher levels, because canned tuna is eaten as it is, not rehydrated.
- **Pets are better protected from mercury than babies:** the maximum mercury concentrations allowed in wet pet food are lower than those allowed in human food.[42]

Figure 1



1 We asked the French Directorate-General for Food what level was applied to canned tuna. They replied that they did not have this information (see Figure 21). Therefore, we used the available data to calculate the mercury concentration in canned tuna compared to fresh tuna. Average moisture content of fresh tuna: Médieu et al. 2023 https://doi.org/10.1007/s10646-023-02679-y, Supplementary Table 1). Average moisture content of canned tuna: 20%, based on our analysis of 148 cans.

BLOOM tested almost 150 cans of tuna: all were contaminated with mercury

- BLOOM **randomly** collected 148 cans of tuna from five countries (Germany, England, Spain, France, and Italy) and had them analysed by an **independent laboratory: Every can was contaminated with mercury.**
- **Over half of the cans tested (57%) exceeded the lowest maximum mercury concentration permitted for seafood products** (0.3 mg/kg). If this limit applied to the mercury concentration in tuna, **more than half of all canned tuna would be banned from sale.**
- **One can in ten exceeds the limit set for fresh tuna,** i.e. 1 mg/kg.
- Among the 148 cans tested, one can of Petit Navire (bought in a Carrefour City store in Paris) had a record level of 3.9 mg/kg. This is almost four times the maximum concentration allowed in fresh tuna and thirteen times that allowed in species subject to the lowest limit of 0.3 mg/kg.

For the elimination of the "tolerable weekly intake" (TWI) and a reevaluation of consumption recommendations.

- The European Food Safety Authority (EFSA) has estimated that the human body can tolerate 1.3 micrograms of methylmercury per kilo of body weight per week: this is known as the Tolerable Weekly Intake or TWI.[34]
- In the case of lead, another highly neurotoxic heavy metal, WHO and EFSA experts did set a TWI before reversing their decision and refusing to set any "tolerable" level for lead because they "*did not identify a clear limit below which it could be certain that no adverse effects would occur*".[43-44]
- **BLOOM objects to the very existence of a TWI for mercury,** given that regular consumption of methylmercury, even in low doses, can have devastating long-term health effects. Moreover, **the methods used to calculate the TWI are not sufficiently reliable nor rigorous,** given that the TWI varies by as much as a factor of two between authorities.[11,12]
- The **French Agency for Food, Environmental and Occupational Health and Safety (Anses) recommendations** for pregnant people and young children are obsolete and not strong enough when it comes to tuna. Considering the levels of mercury contamination found in our tests, the **recommendations are far too lax to effectively protect people's health.**[45]

The tuna industry lobbies influence health standards

- Several international bodies are involved in setting standards for mercury content in seafood, including:
  - The Joint FAO/WHO Expert Committee on Food Additives (JECFA). Several representatives on the committee have serious conflicts of interest (the vast majority are from the FAO rather than the WHO).
  - The Codex Alimentarius Commission, launched in 1963 by the FAO and the WHO (the Codex Alimentarius is a set of standards and guidelines designed to protect consumer health while safeguarding the commercial interests of the countries involved). The Codex Committee on Food Additives and Contaminants was the working group responsible for the issue of food contaminants under the Codex (CCFAC, now CCCF). Led by the Netherlands, a major industrial fishing nation, **the CCCF also acted under the influence of industrial agriculture and the tuna giants, whose representatives sit among national delegations, in contrast to that of NGOs.**
  - The European Commission's highly opaque Standing Committee on Plants, Animals, Food and Feed (PAFF Committee) is in responsible for these areas. **The European Parliament is excluded from discussions and decision-making on the maximum permitted levels of contaminants in human food. The European Commission refuses to make the composition of this committee public and will not publish the minutes of the working group that advises it** or the documents on which its decisions are based.[46]

- Alongside directly lobbying these bodies, the tuna industry is **manufacturing doubt at full speed: funding public laboratories, recruiting an FAO expert to the tuna industry, running communication and marketing campaigns on the benefits of omega-3s** to divert attention from the dangers of mercury, and pushing a **narrative of consumer responsibility rather than market regulation** and the measures to go with it. And this manufactured doubt is working, sowing confusion across decision-making bodies.

Checks are rare and undermined by sky high mercury limits

- The few checks that are carried out are based on **mercury limits that are intentionally set at a level that is almost impossible to exceed.** It's an effective strategy. When products are tested, they rarely fail to meet the standard. They are therefore considered satisfactory, giving consumers a **false sense of security.**
- **Very few checks are carried out along international production chains** to determine whether or not the tuna is contaminated with mercury. But our tests show that high mercury content is **far from an isolated occurrence.**
- In the Seychelles, the nerve centre of tuna fishing for the European market, the health authorities can only carry out **a dozen tests to "certify" the conformity of millions of kilos of tuna sent to Europe.**[47]
- **Once the tuna reach French soil, the authorities select fewer than 50 fresh fish for testing each year. No canned tuna are tested.**[48]

OTHER RESULTS FROM THE REPORT

Tuna is a poor source of omega-3s and a major source of methylmercury

- Eating predatory fish is the **main way people are exposed to methylmercury** in Europe[2].[34-35]
- **People in France are among the most exposed to methylmercury in Europe.** This is due to their consumption of seafood, particularly tuna, which is the most popular fish in both France and wider Europe.[4,35-36]
- Between 2014 and 2016, scientists tested hair samples from more than 500 children and over 700 adults as part of the French Esteban study: **The samples from every child and 99.6% of the adults were contaminated with mercury.**[35] Fish has been identified as the main source of dietary exposure to mercury. According to the different risk thresholds currently used, between 2% and 27% of French adults have a hair mercury concentration above the no-observed-adverse-effects level.
- Despite the fishing industry's insistence to the contrary, **tuna contains way less Omega-3 fatty acids than other smaller fishes such as sardine, herring or mackerel.**[37-38] There is therefore no health justification for maintaining such high levels of tuna consumption.

2 Other means of exposure are much less common (such as from certain dental amalgams or living in a mercury-polluted environment, for example near gold-mining sites).[9]

1. FROM THE SEAS TO OUR STOMACHS: A BRIEF GLOBAL HISTORY OF MERCURY CONTAMINATION

Mercury is present throughout our environment, but its true destructive power is unleashed when it reaches the ocean. There, bacteria convert it into methylmercury, its most toxic form and the form in which it accumulates along the marine food chain, in particular in apex predators such as tuna.

Where does it come from?

Mercury is a heavy metal **released by natural events,** such as volcanic eruptions, soil erosion and forest fires. It is also emitted by **human activities,** mainly by **burning solid fuels such as coal,** by **artisanal or small-scale gold mining,** by certain **industrial processes,** such as paper pulp processing and cement and polyvinyl chloride (PVC) production, and by waste incineration.[10,49] Highly volatile, it quickly evaporates at room temperature, dispersing into the atmosphere and **spreading easily around the globe.**

Some of this mercury is then deposited in the ocean. Bacteria then **transform it into methylmercury, its most toxic form.** This methylmercury is then absorbed by phytoplankton, which in turn is eaten by zooplankton, which are eaten by fish and other edible sea life. Because **most marine animals cannot eliminate this highly toxic substance, it accumulates in their bodies throughout their lives.** If they are then eaten by larger predatory fish, the mercury accumulates in these fish in even greater quantities. In this way, methylmercury is **"biomagnified" along the food chain** and predatory fish contain concentrations around a thousand times higher than zooplankton.[50]

Mercury emissions have been rising since the pre-industrial era

With its otherworldly sheen and liquid state, mercury is well-deserving of its nickname "quicksilver" and has piqued humans' curiosity since the Palaeolithic era. Its use has become increasingly widespread and peaked during the gold rush and again in the 1970s, mainly because it is used in a range of industrial processes.[51-52] Human-induced mercury emissions have therefore added to natural emissions and have far exceeded them since the industrial revolution.[53]

The first health disasters

Mad Hatters

The dangers of mercury began to be studied following the serious poisoning of hat makers in the 1880s. At that time, hat felt was washed in a solution containing mercury (metallic mercury, a different form from methylmercury), large quantities of which was inhaled by workers. These workers began to lose their hair and teeth, to shake and to have serious psychological problems. They became known as the "mad hatters".[54]

From the 20th century on, more and more cases of mass poisoning came to light and the industry soon became disenamoured of the much-lauded properties of quicksilver. At that time, mercury was still used in many industrial processes, beauty products and everyday objects, but our relationship with it has now changed radically. One of the most infamous cases of mass poisoning, **Minamata disease, claimed thousands of lives, causing death, paralysis, and deformities and cognitive disabilities in children in Japan between 1930 and 1970.**

Minamata disease, a Japanese scandal

In the 1930s, the Chisso Corporation (a chemical company notably producing acetaldehyd) discharged large volumes of mercury into Minamata Bay, Japan. **Twenty years later, thousands of people who ate fish from the bay began to show symptoms.**

Those who had been poisoned experienced convulsions, loss of coordination, blindness, deafness and serious mental health conditions. Many children born after the initial epidemic also had difficulty speaking and walking and had convulsions. **Some will never be able to speak, walk, or be autonomous.** Chisso Corporation managed to conceal the causes of these symptoms. Unable to identify their source, people excluded sufferers from society for fear of catching the disease. The animals in the area also began to behave strangely. Crews could not fly anymore, cats had convulsions, behaved erratically and even threw themselves into the sea and drowned. It was known as "dancing cat fever". Local scientists were then able to find a link between these harbour cats and the people most affected by the disease: fishing families. **With the help of the health authorities, Chisso Corporation silenced their accusations, downplayed the seriousness of the situation and continued to discharge its waste for thirty years,** until 1966. Between 1930 and 1966, around 400 tonnes of mercury was discharged into the bay. Nine hundred people died of poisoning and more than 10,000 suffered severe symptoms.[55-56]

Millions of tonnes of mercury were emitted over the two centuries to 2013, **when 128 countries adopted the Minamata Convention, committing to reduce global mercury emissions.** However, despite the adoption of this convention, **mercury emissions have yet to fall.[49] The battle is still raging to ban mercury-containing products, including dental fillings, or mercury-containing skin lightening creams.**[57,95]

A mouthful of mercury

Dental amalgams or "silver fillings" are another major source of mercury exposure (in its metallic form, which is different from the methylmercury found in seafood). Contrary to what their name suggests, amalgams are half mercury and half other metals such as silver. They gradually release mercury vapour into the patient's mouth, which then passes into the bloodstream and can turn into a powerful poison in the body.[58-59] Some NGOs, such as the *European Network for Environmental Medicine*, have been campaigning for years for the European Union to revise its regulations on mercury and ban these materials.[60] The European Council, Parliament and Commission have recently adopted a regulation to that effect (entered into force on 30 July 2024).[61] It provides for a ban on mercury in dental amalgams from 1 January 2025. The regulation includes other measures to reduce the remaining sources of mercury uses, including a ban on certain types of lamps and new rules for crematoriums.

Other cases of mass poisoning around the world

In the 1960s, the Grassy Narrows First Nation (*Asubpeeschoseewagong***) in Canada was severely affected by mercury contamination.** Over ten years, a paper pulp mill dumped waste containing mercury into the Wabigoon River. The effects were devastating for the community and continue to this day.[62]

In the **1970s,** cereals treated with a methylmercury-based fungicide were sent to **Iraq** from the United States and Mexico, leading to mass mercury poisoning. The cereals were not intended for direct consumption. However, the warnings were written in English or Spanish, rather than local languages, and these toxic cereals were consumed by some Iraqi people during a famine. **This tragedy led to widespread poisoning, affecting thousands of people, and caused many deaths.**[62]

In French Guiana, Brazil and other **places where there are artisanal and illegal gold mines,** large volumes of mercury are used to extract gold. It is then released into rivers and soils as an endless source of mercury pollution. **Local indigenous communities that depend on fishing to survive are then exposed to this mercury contamination.**[63]

2. A SEA OF POISON: HOW MERCURY AFFECTS OUR HEALTH

The World Health Organization (WHO) classifies mercury as one of the ten substances of major public health concern and the US Agency for Toxic Substances and Disease Registry (ATSDR) ranks it third on its list of priority substances, just after arsenic and lead.[8,64] Seafood mainly contains mercury in its most toxic form: methylmercury. Most of the methylmercury ingested by eating contaminated foods passes into the bloodstream before being carried to the organs, particularly the brain. In young children and fetuses, mercury has been found to impair the development of neurons. In adults, the accumulation of mercury over time can lead to a range of problems affecting the nervous, cardiovascular and immune systems. It is also classified as a possible carcinogen by the International Agency for Research on Cancer (IARC).[30]

Methylmercury, a possible carcinogen

In 1993, the International Agency for Research on Cancer (IARC) classified methylmercury as "possibly carcinogenic to humans" (category 2B).[30] Over the last twenty years, more research has been done on the links between methylmercury and cancer, providing an increasingly large body of evidence showing the mutagenic and potentially carcinogenic effects of mercury.[31-33] **In 2017, the European Chemicals Agency (ECHA) classified methylmercury chloride as a category 2 carcinogen ("Suspected of Causing Cancer").[65]**

It takes our body over two months to halve the mercury content in our blood. However, studies suggest it can take **years or even decades to eliminate mercury from our brains.[66] In other words, for somebody regularly eating fish contaminated with methylmercury, that mercury stays in their body and can end up harming their health for years to come.**

Harmful effects on children's brains

Methylmercury poses myriad risks to human health. During pregnancy, it can cross the placenta, enter the fetus and make its way to the baby's developing brain. Many studies have demonstrated the link between prenatal exposure to methylmercury and lifelong neuromotor disorders in children. According to a 2015 study on 250 children in Quebec, **those children with the highest exposure to mercury in the womb were four times more likely to have an IQ below 80,** i.e. only ten points above the threshold for diagnosing an intellectual disability.[13] In addition to reduced cognitive performance, children exposed to mercury in the womb may also develop behavioural, mental, motor, coordination and attention disorders, and an increased risk of heart disease and immune disorders.[11,13-17,29] Some studies also found a link between exposure to methylmercury and premature birth or miscarriage.[23-27,67]

Myriad harmful effects on adults too

In adults, methylmercury causes a wide range of problems depending on the severity of the poisoning. It can cause **numbness in the limbs, visual disturbances, loss of motor skills and coordination, decreased concentration ability, memory disorders and anxiety, overall intellectual deterioration, and can even lead to blindness and deafness at high doses of mercury.133 Chronic exposure to low doses,** which is more common among European consumers, is not without risk. It can have **irreversible effects on the neuromotor system,** increase the risk of **neurodegenerative diseases, early onset dementia** and **cardiovascular disease** and have **harmful effects on the immune, reproductive and renal** systems.[13,18-20,22,28,63,68]

A cocktail with explosive effects

Mercury is not the only neurotoxic element we ingest. Cadmium, lead, arsenic, PCBs (polychlorinated biphenyls), dioxins and other POPs (persistent organic pollutants) are also present in the marine environment. However, the health standards for all these pollutants are set in such a way that each contaminant is considered on its own. Every day we are exposed to myriad contaminants. Considering their effects separately in no way reflects the multiple ways they interact inside us. In a system as complex as the human body, the rules of arithmetic do not necessarily apply, and **the effects of two pollutants may not just add up, but multiply. This is known as the "cocktail effect".**

Studies on the combined effects of mercury and other pollutants are very rare, despite their importance. For example, in 1978, a team of researchers found that a set dose of mercury and lead had no apparent effect when **administered separately, but that these same doses administered at the same time killed all the rats in the study.**[69]

As well as threatening our health, industrial tuna fishing destroys the workers' lives and kills other living organisms.

Since 2022, BLOOM's TunaGate series has revealed the many wrongdoings of the tuna industry in the Indian and Pacific Oceans.[2,6-7,70,76] **The fishing methods used to put the vast majority of tuna on our plates are hugely destructive.**

They kill millions of rays, sharks, turtles and other endangered species because they do not select the species fished.[77] Nor does the gear used only catch mature fish. In some Indian Ocean fisheries, more than 97% of the yellowfin tuna caught are still juveniles. These practices jeopardise the survival of tuna species and the entire marine and human ecosystem that depends on them.[7]

In May 2023, our report "Canned Brutality" highlighted **the many human rights abuses that go into producing a can of tuna,** reported by NGOs, including GreenPeace and the Environmental Justice Foundation.[6] Most of the tuna we eat is fished far from the coasts of mainland Europe and working conditions at sea can be hellish for the fishers (most of whom are men). They end up abused and beaten, trapped aboard ships, not allow to set foot on land for months or even years at a time, and forced to work 20 hours straight, without enough food or water. Hidden from view, these practices continue with impunity, while those who try to hold them to account, risk their lives. In December 2023, Samuel Abayateye, a Ghanaian observer on board a tuna fishing vessel, was murdered and his dismembered body was thrown overboard.[78]

Conditions are no better on land, in the factories where the tuna are canned and cut up for sashimi. **The factory workers pay the price for our cheap tuna: forced labour, days without breaks, sexual assaults and deprivation of liberty.**[6]





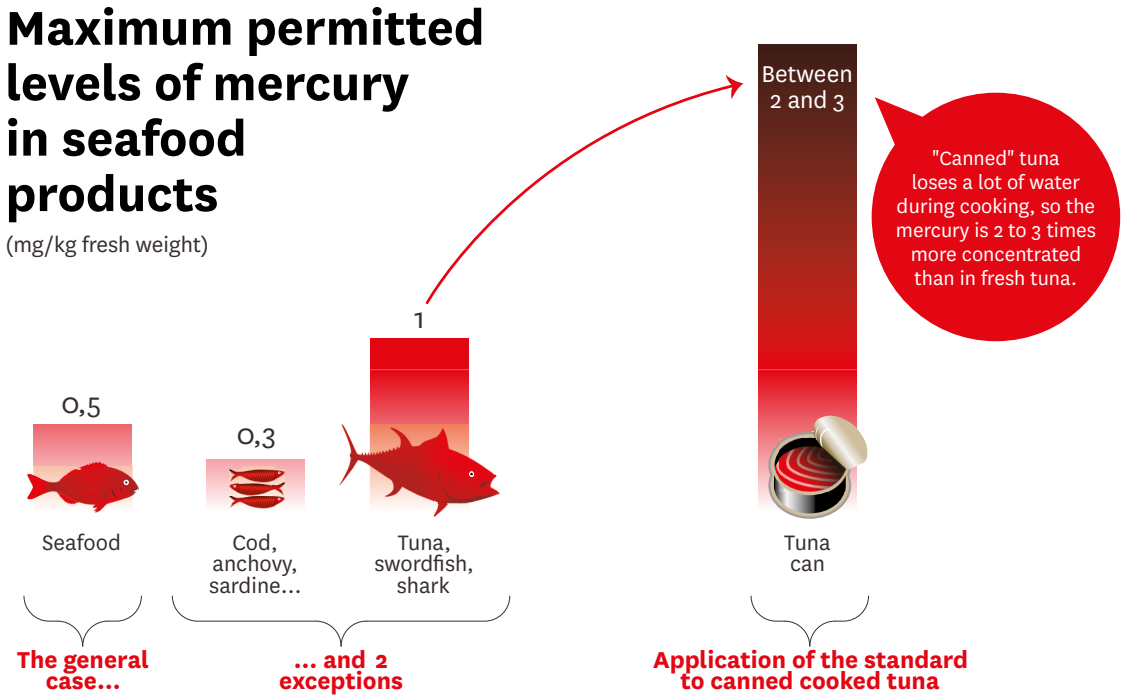
3. HEALTH STANDARDS THAT PRIORITISE TUNA PROFITS OVER HEALTH

The maximum mercury levels allowed by health standards do not take sufficient account of the health risks of mercury

While health standards do set limits on mercury levels in food, these limits are not based on what level would reduce the risk to human health. Instead, they are based on the mercury content actually found in the fish. The maximum level for cod is set according to the contamination of cod, while the maximum level for tuna is set according to the contamination of tuna. This logic is completely reversed from what one might expect as citizens.

In other words, because the mercury levels *measured* are generally less than 0.5 mg/kg, the standard is set at 0.5 mg/kg.

For some species with very low mercury content a lower limit has been set (0.3 mg/kg) without any more fish actually exceeding the standard. Yet for species in which mercury is usually present at higher concentrations, such as tuna, swordfish and sharks (i.e. apex predators), mercury levels very often exceed the 0.5 mg/kg limit. For these species, the limit was set to 1 mg/kg, i.e. double the previous limit. **The species with the highest mercury content might therefore contain three times more poison than other species,** with a 0.3 mg/kg limit, **and still be authorised for sale. Yet the mercury in tuna is no less toxic than the mercury in sardines or cod. This is completely illogical, especially considering that tuna is the most popular fish in Europe.** As we will see in Chapter 5, this decision was taken with the aim of excluding as few fish from the market as possible.



Mercury or methylmercury?

Methylmercury is the form of mercury that is particularly toxic to the body. However, measuring methylmercury levels is difficult and expensive. For this reason, maximum levels in Europe are defined in milligrams of total mercury (including methylmercury) per kilogram of fish.

The "fresh weight" scam: cans of tuna even more contaminated, are sold completely legally

European Regulation 915/2023, which sets maximum permitted mercury levels, **specifies that these limits apply to the "fresh weight" and not to the finished product.** If a product has been concentrated, as in the case of canning where the tuna is dehydrated compared to fresh tuna, it is the mercury content of the fresh fish – which is lower than that of the finished product – that is used to determine whether the product exceeds the limit.

Using the fresh weight would make sense for a product like tomato paste, which is eaten diluted. The concentrate might contain higher levels but only a tiny quantity is eaten. For canned tuna, which is usually eaten as is, this measure makes no sense. Between fresh and canned tuna, the concentration of mercury can theoretically jump from 1 mg/kg to 2.7 mg/kg[3]. **The standard applied to canned tuna could therefore lead to mercury levels up to nine times higher than allowed in fresh sardines.**

The exceeding of the tolerable weekly intake occurs very quickly

To avoid excessive mercury contamination, the European health authorities set a "tolerable weekly intake" (TWI) of mercury. As we will see below, suggesting that there is a tolerable intake of a heavy metal as harmful as mercury raises many issues. But even if we accept the premise that there is a tolerable weekly intake, **the volumes of tuna eaten in France mean that people risk regularly exceeding it.** To understand when tolerable weekly intakes are likely to be exceeded, we can look at the different content levels allowed by the standards and how much tuna would need to be eaten to exceed the TWI for four persons: two children weighing 15 and 35 kilograms (respectively 3-4 years and 10-11 years old), and two adults weighing 67 and 79 kilograms (the median weights of French women and men).[79] Specifically, we compare the following levels of mercury content in tuna:

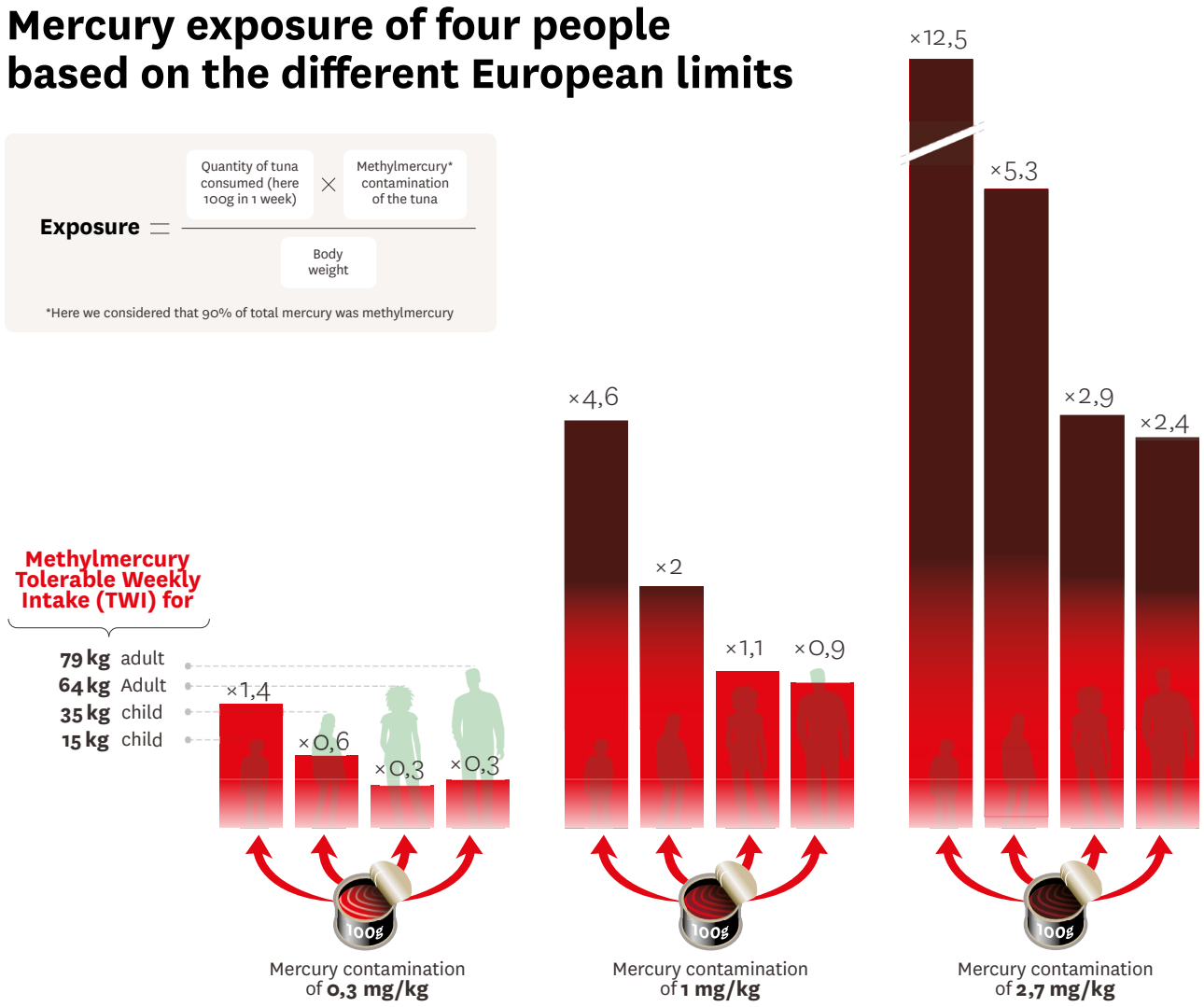
- 0.3 mg/kg, the maximum mercury content allowed in most fish species, which is slightly lower than the median content found in our tests: 0.36 mg/kg (see Chapter 4);
- 1 mg/kg, the limit for fresh tuna,41 which one in ten cans exceeded in our tests;
- 2.7 mg/kg, the level that a 1 mg/kg fresh tuna can theoretically reach after being canned.

The TWI for methylmercury is set at 1.3 µg/kg of body weight. With this TWI, both the children and the adults would exceed the TWI by eating only one 100g can of tuna contaminated with 1 mg/kg.

3 The average water content of fresh tuna is 70% (Médieu et al. 2023 https://doi.org/10.1007/s10646-023-02679-y, Supplementary Table 1). According to the results of our tests on 148 cans of tuna, the fresh fish loses half of its water content during the canning process (the water content falls to 20%) and the mercury is therefore concentrated in the can: 1 mg/kg * (1-0.2)/(1-0.7) = 2.7 mg/kg of mercury in a can of tuna made from fresh tuna measured at 1 mg/kg.

Figure 2 **Mercury exposure of four people based on the different European limits**

The weights of these four people are based on two children aged 3–4 years (15 kg) and 10–11 years (35 kg) and the median man and woman in France. The height of the bar is proportional to the number of times the individual exceeds their TWI (i.e. they exceed it if the bar reaches the top of their head).



In one of the 148 cans we tested, we measured a record mercury level of 3.9 mg/kg (including 3.4 mg/kg of methylmercury). If **they were to eat from this can, a child weighing 40 kg (~12 years old) would only need to eat 15 g to exceed their "tolerable" weekly intake and an adult would only need to eat 30 g.**

Definitions

The **mercury content** of a product or living being refers to the **concentration of mercury already present** and measurable in it (for example 1 mg/kg in tuna or 1 µg/g in human hair). **Exposure** refers to **the quantity of mercury to which a person is exposed** in their environment or by their daily activities over a given period. In the case of methylmercury, which comes almost exclusively from food, assessing a person's exposure makes it possible to estimate their mercury content at a lower cost, as food questionnaires are easier to carry out than biological tests.

Millions of Europeans overexposed to mercury

In 2012, the European Food Safety Authority (EFSA) published the results of a Europe-wide survey to estimate the overall exposure of the population to mercury. It has only published the median exposure and that of the 5% most exposed, but the findings are indisputable: **at least 5% of the European population exceeds the tolerable weekly intake.**[34] That is 22 million people, equivalent to a third of the population of France, with children and adolescents particularly at risk. **Eating predatory fish is the main source of methylmercury in our bodies.**[11]

In 2021, the French Esteban study conducted by Santé Publique France tested the mercury levels in the hair of 570 French children and 760 adults. It concluded that **the mercury concentrations found in the French population were well above the European average** (an average of 0.31 µg/g of mercury in the hair of French children compared with 0.15 µg/g in Europe, and 0.59 µg/g for French adults compared with 0.29 µg/g in Europe)[4].[35] To determine whether these values present a danger to health, they must be compared against reference limits. However, these limits differ from one health authority to the next and setting a risk-free intake level is a thorny issue for scientists. The Joint FAO-WHO Expert Committee on Food Additives (JECFA) and the Société de toxicologie clinique (French Society for Clinical Toxicology – STC) have set a limit of 5 µg/g of hair for adults in general and 2.5 µg/g of hair for pregnant women. Based on these limits, 0.8% of adults and 2.1% of pregnant women are at risk. This means that **almost 15,000 infants are at risk each year** (2.1% of the 700,000 births each year). Furthermore, **if we use the limit set by the US EPA,** which is more conservative at 1 µg/g of hair, **then more than a quarter (27.4%) of the French adults tested by the Esteban study are at risk** (and therefore of corresponding proportion of unborn children).

Cooking up the "tolerable" weekly intake

Can we really tolerate mercury?

Setting a tolerable weekly intake (TWI) is based on the principle that a certain intake of mercury IS tolerable, and that there is a limit above which it has an effect. Nothing could be less certain.
In the case of lead, another heavy metal and powerful neurotoxin, the WHO and the EFSA have withdrawn the tolerable weekly intake that they had previously set.
"*The group was unable to set a new recommended level because it did not identify a clear limit below which it could be confident that no adverse effects [from lead] would occur.*" (EFSA 2010)[44] "*It is not possible to establish a new TWI that would be considered protective of health.*" (WHO 2013).[43]

4 Measuring the mercury content of hair mainly measures how much methylmercury, linked to eating seafood, a person has been exposed to in recent months.

A dubious scientific approach

The **concept of** a "tolerable weekly intake" has for decades been held up as an irrefutable scientific standard. However, the TWI of a particular substance is based on standards and rules that could not be more vague, even though they are widely accepted within the toxicology community. The TWI is identified by looking for the "no-observed-adverse-effect level" (NOAEL) in cohorts of animal or human individuals, depending on the data available. The parameters to be observed are chosen – neurological capacity in the case of mercury – and **the intake at which the poison has a harmful effect on the parameters under observation is measured.** However, it is impossible to measure all its effects to estimate the tolerable intake, and **the use of a tolerable intake should not preclude the application of the precautionary principle to potential or possible adverse effects.**

This intake with no observable toxic effect is converted into an ingestible quantity per week that in theory has no effect on health. For methylmercury, the Joint FAO/WHO Expert Committee (JECFA) reassessed this intake in 2003, based on two studies carried out on children from the Seychelles and the Faroe Islands. To make the studies more inclusive and to try to take account of the differences between individuals, an uncertainty factor is usually applied. In 2003, the uncertainty factor for mercury was set at 3.2. This factor is intended to take account of differences in the genetic and epigenetic characteristics, eating habits and morphology, among other aspects, between a child in the Seychelles, an old man in Finland and a pregnant woman in Peru. Why 3.2? A factor of 10 is usually used to account for differences between individuals of the same species[5], but since the focus here is on children, i.e. a sub-population of the human species, the square root of 10 (3.2) has been used to reduce uncertainty. **There is no real justification for this baseline factor of 10.** It appeared at the same time as the first TWI and has been around ever since. However, if we consider, for example, difference between a child's blood volume or weight and those of an adult, we quickly exceed a factor of 3.2. Yet it **was adult parameters that were used to calculate** the weekly intake (blood volume of 5 l, weight of 65 kg, etc.), which were in turn used to study the exposure of these groups of children.

For methylmercury, another arbitrary choice was made, with important consequences. More than one NOAELs was available, **and instead of taking the lowest (and therefore the most protective) value of the two, an average was calculated.** This simple statistical sleight of hand increased the tolerable weekly intake of methylmercury by 12%. In this case, the average NOAEL set was higher than the NOAEL identified in children in the Seychelles. This TWI does not therefore protect these children.[80]

French nutrition recommendations put pregnant people and fetuses at risk

The French Agency for Food, Environmental and Occupational Health and Safety (Anses) recommends that pregnant people limit their consumption of fish "l*ikely to have a high [mercury] content*" to 150 g per week; however, **tuna only appear at the end of the list provided** in a footnote (Figure 3).[45]

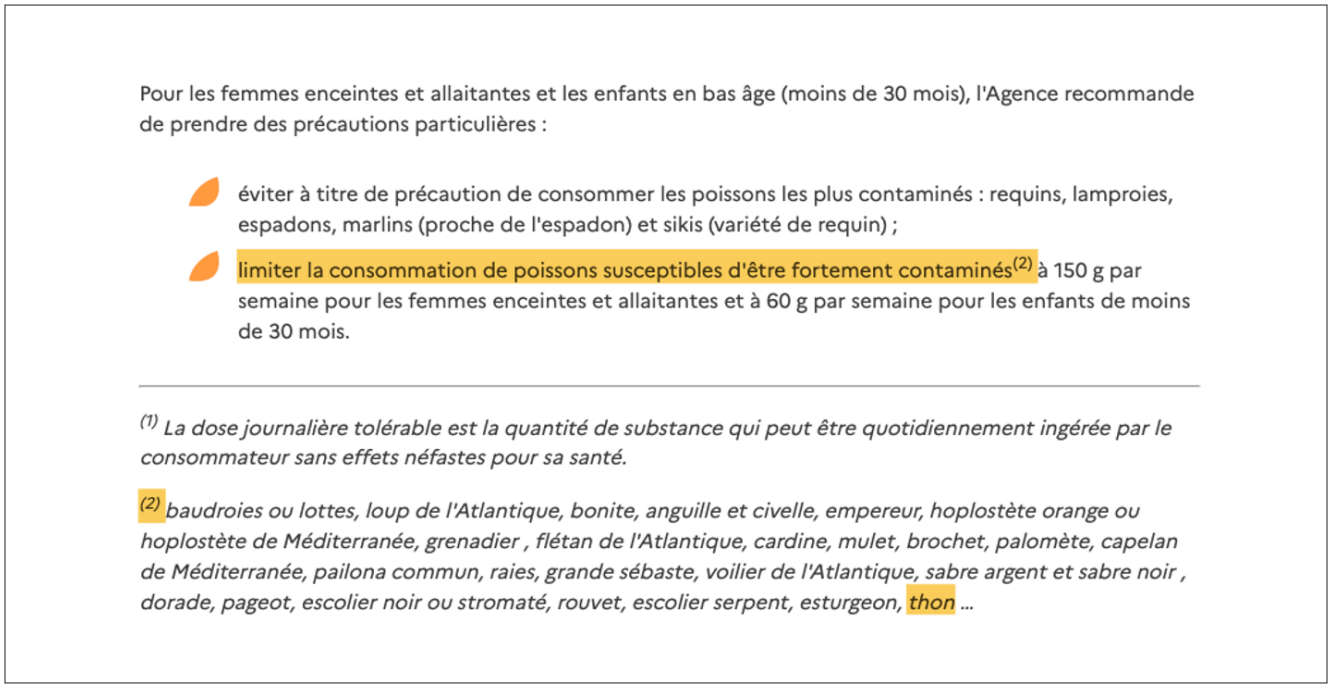
The consumption limits recommended by Anses are taken from an opinion published over twenty years ago (in 2003), based on an obsolete tolerable weekly intake (revised by EFSA in 2012). According to our calculations[6], **one in six women of child-bearing age could exceed the tolerable weekly intake** by consuming 150g of tuna in a week. And that's without taking into account their consumption of other seafood.

A 15 kg child would exceed their TWI by eating just 60 g (the recommendation made on the Anses website) from one tin of tuna with a methylmercury content of 0.33 mg/kg (more than one in two cans according to our tests).

5 To transpose animal results to humans, a factor of 100 is used, with no further justification.

6 We randomly selected 10,000 women from four European studies and assigned each of them two tuna-based products with **randomly selected levels of contamination** from the EFSA data on mercury content. Assuming that they ate 150g – the intake indicated by Anses – 15% women exceeded the TWI. See methodology in annex for more detail.

Figure 3 **Recommandations de l'ANSES.** https://www.anses.fr/fr/content/consommation-de-poissons-et-exposition-au-méthylmercure



Pour les femmes enceintes et allaitantes et les enfants en bas âge (moins de 30 mois), l'Agence recommande de prendre des précautions particulières :

- éviter à titre de précaution de consommer les poissons les plus contaminés : requins, lamproies, espadons, marlins (proche de l'espadon) et sikis (variété de requin) ;
- limiter la consommation de poissons susceptibles d'être fortement contaminés(2) à 150 g par semaine pour les femmes enceintes et allaitantes et à 60 g par semaine pour les enfants de moins de 30 mois.

(1) La dose journalière tolérable est la quantité de substance qui peut être quotidiennement ingérée par le consommateur sans effets néfastes pour sa santé.

(2) baudroies ou lottes, loup de l'Atlantique, bonite, anguille et civelle, empereur, hoplostète orange ou hoplostète de Méditerranée, grenadier , flétan de l'Atlantique, cardine, mulet, brochet, palomète, capelan de Méditerranée, pailona commun, raies, grande sébaste, voilier de l'Atlantique, sabre argent et sabre noir , dorade, pageot, escolier noir ou stromaté, rouvet, escolier serpent, esturgeon, thon ...

We protect our dogs better than our babies

Mercury standards are stricter for dog food than for baby food (0.3 mg/kg for wet pet food versus 1 mg/kg for predatory fishes used for human food, including babies) meaning animals are better protected against the dangers of methylmercury than babies.[42].

4. BLOOM TESTS NEARLY 150 CANS FROM ACROSS EUROPE

BLOOM randomly sampled 148 cans of tuna from 15 towns and cities in the United Kingdom, Germany, Spain, France and Italy. In each location, a supermarket was selected at random and ten cans were randomly selected from each supermarket (see methodology in annex). An independent laboratory specialising in mercury tested the concentration of mercury and methylmercury in these cans.

Every can contained mercury, some at very high levels

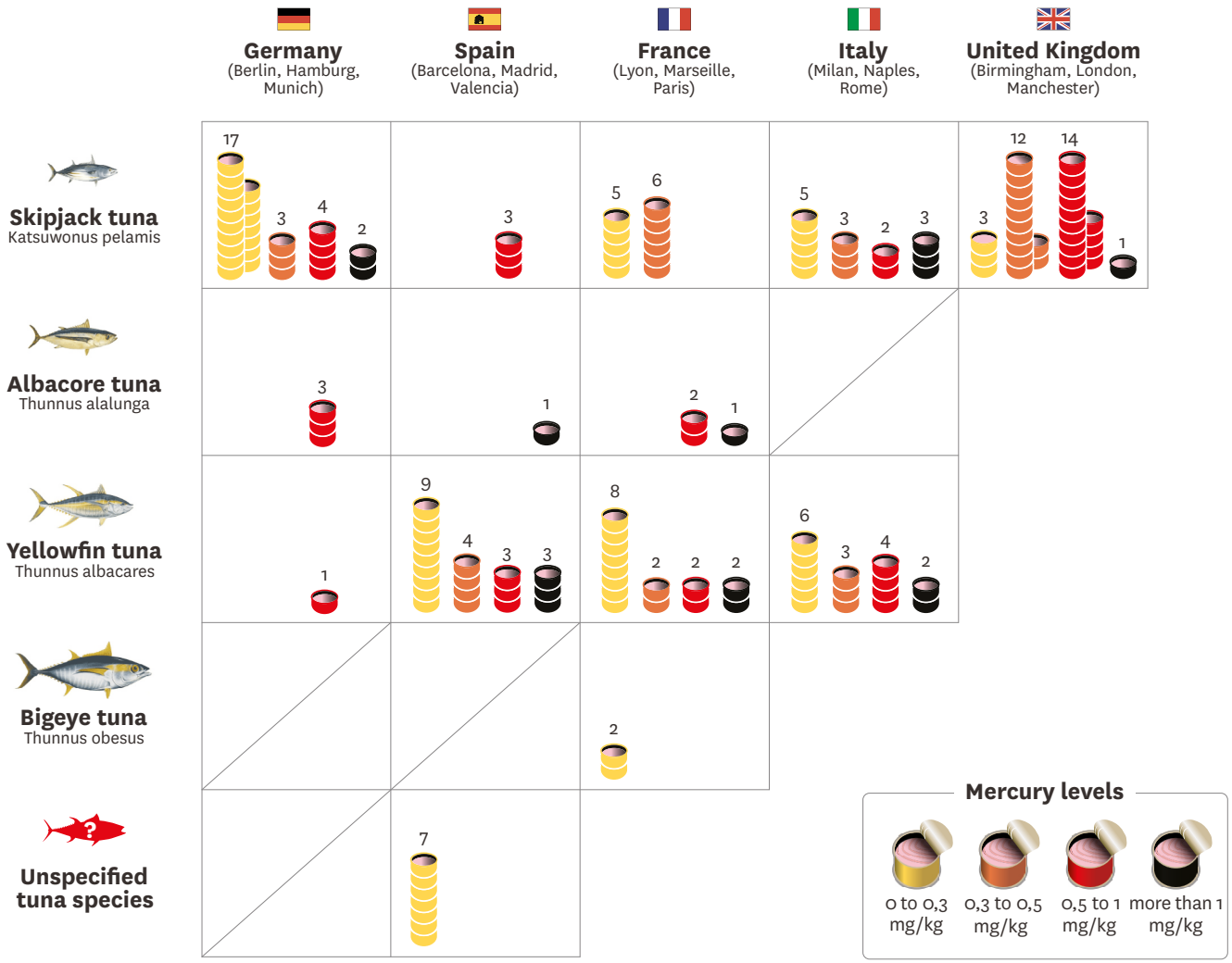
The results are eye-opening:

- If the rules on mercury content did not make an exception for tuna and the permitted content was limited to 0.5 mg/kg, **one in three cans would not be allowed to be sold on the European market due to exceeding this limit.**
- **Over half of the cans tested (57%) exceeded the lowest maximum mercury concentration permitted for seafood products (0.3 mg/kg).** If this limit applied to the mercury content in tuna, more than half of all canned tuna would be banned from sale.
- **One can in ten exceeds the limit set for fresh tuna,** i.e. 1 mg/kg.
- Among the 148 cans tested, **one can of Petit Navire (bought in a Carrefour City store in Paris) had a record level of 3.9 mg/kg.** This is almost four times the maximum concentration allowed in fresh tuna and thirteen times that allowed in species subject to the lowest limit of 0.3 mg/kg.

BLOOM tested the total mercury and methylmercury content of a can to **find out just how much poison we are ingesting** when we eat a can of tuna. The results for the total mercury content are presented below for comparison against the European legislation. In the 148 cans tested, in average **90% of the mercury was in fact methylmercury, the most toxic form of mercury.**

Figure 4

Mercury levels of the 148 cans analysed



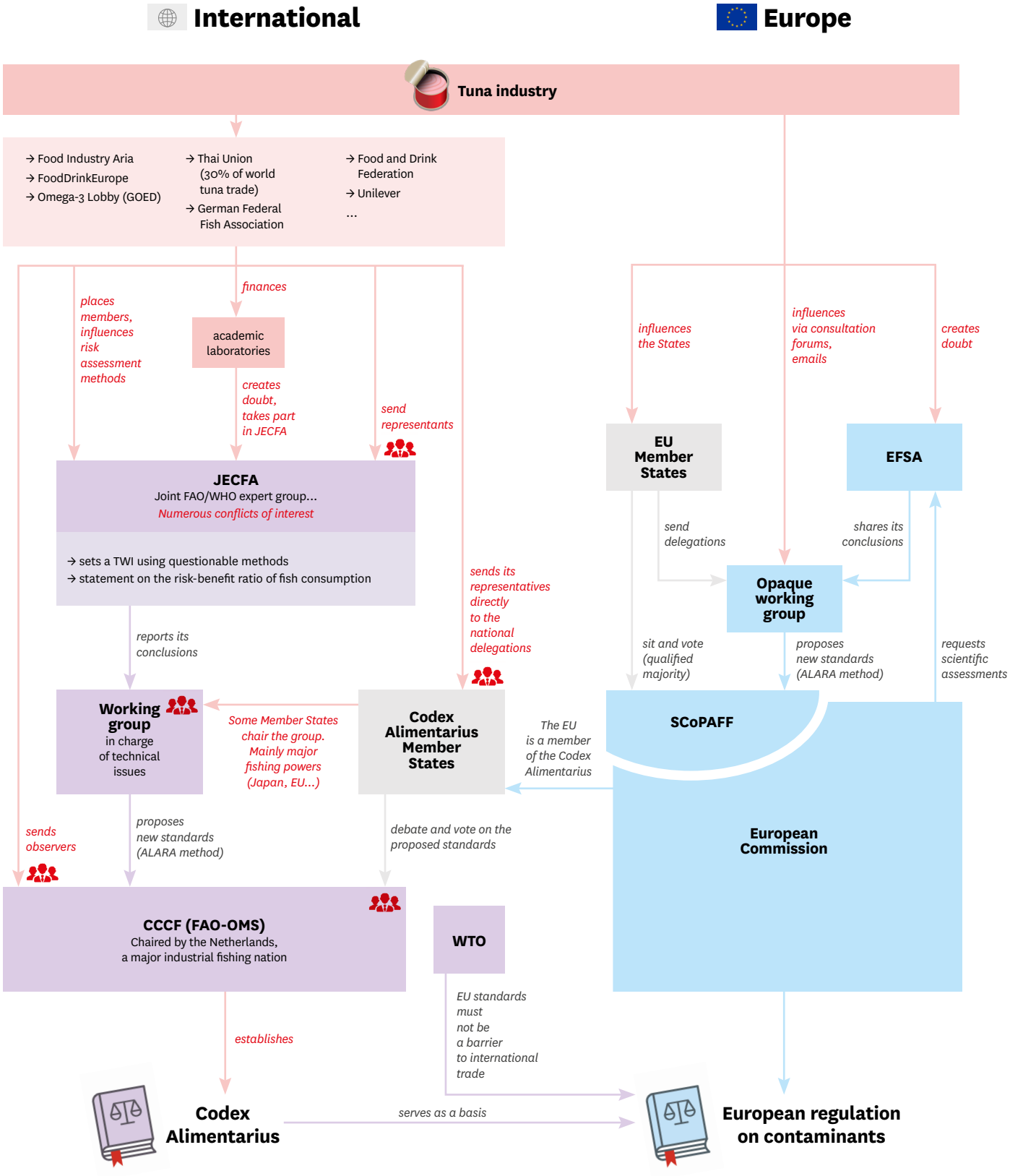
Our test results found **methylmercury in significant quantities in every can in the random sample, regardless of the species of tuna, the ocean in which it was caught and the shop where it was bought.**

5. FOOD STANDARDS FOR MERCURY: AN OPAQUE MAZE THAT SERVES COMMERCIAL INTERESTS SINCE THE 1960S

The current mercury standards are the product of a long history of bowing to vested interests to keep fish sales as high as possible. Commercial interests are heavily represented throughout the standard-setting process, from toxicological evaluations to legislative discussions, sometimes completely crowding out efforts to protect public health.

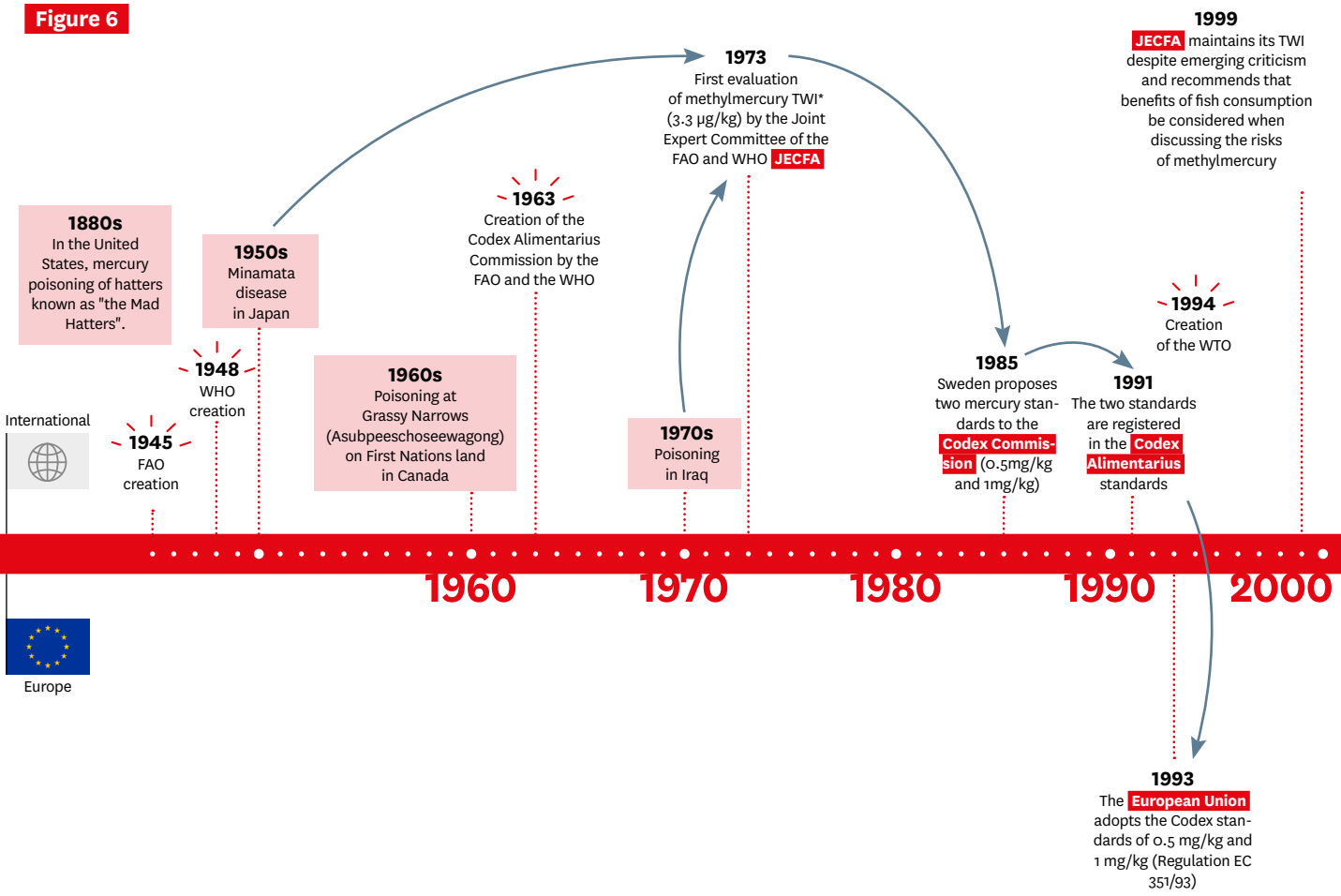
THE TUNA INDUSTRY'S INFLUENCE ON CONTAMINANT STANDARDS

Figure 5



MERCURY THROUGH THE YEARS BEFORE 2000...

Figure 6



Glossary

Anses Agence nationale française de sécurité sanitaire de l'alimentation, de l'environnement et du travail

Codex Alimentarius Commission Commission created by the FAO and the WHO to define the Codex Alimentarius, a set of standards, guidelines and codes of practice concerning food.

EFSA European Food Safety Authority

FAO Food and Agriculture Organization of the United Nations

JECFA Joint FAO/WHO Expert Committee on Food Additives

PAFF Committee European Commission's Standing Committee on Plants, Animals, Food and Feed. In charge of the regulating contaminants in food

US-EPA United States Environmental Protection Agency

WTO World Trade Organization

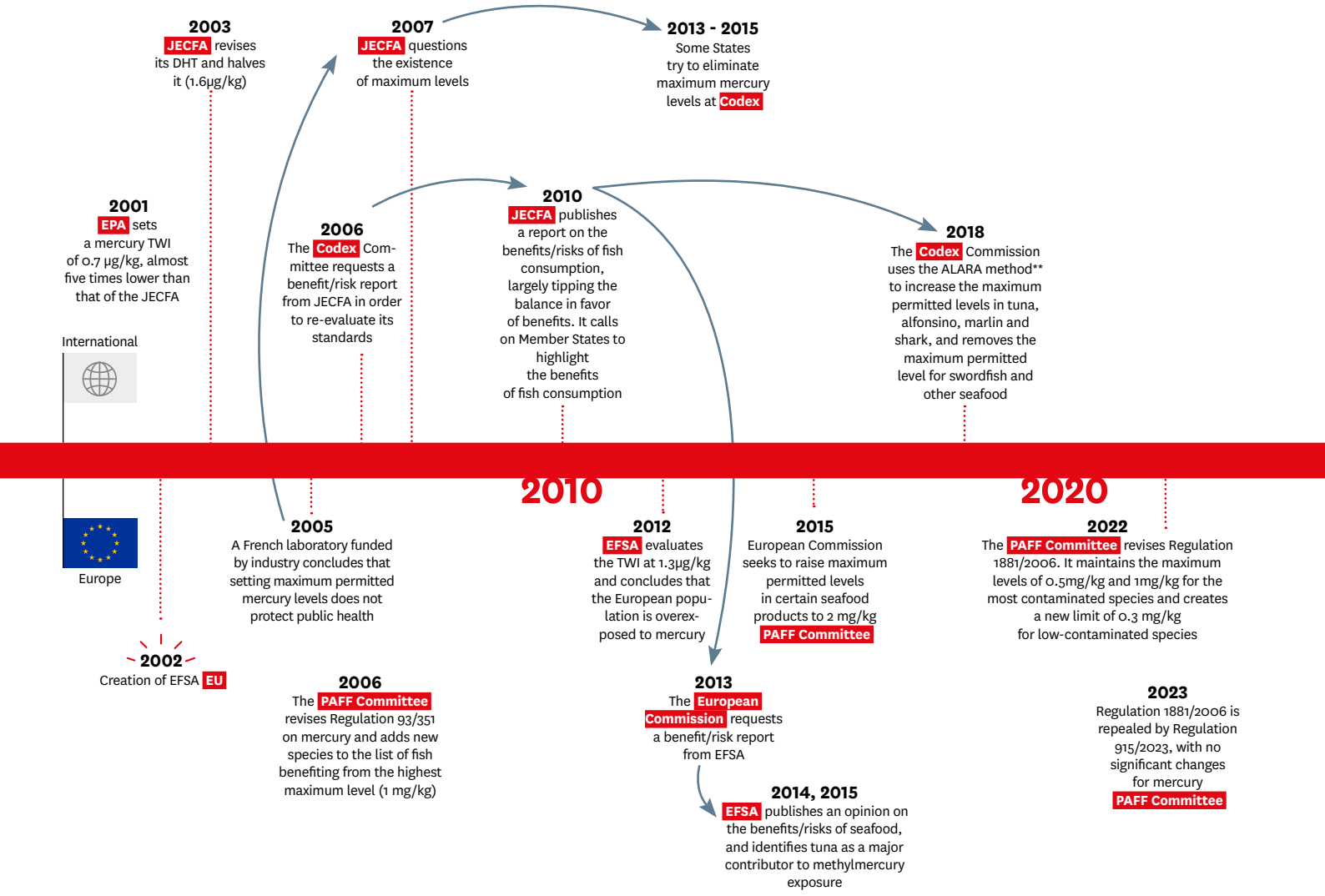
WHO World Health Organization

Other definitions

***TWI:** Tolerable Weekly Intake

****ALARA:** As Low As Reasonably Achievable, used to minimize the impact of health standards on trade.

... AFTER 2000


2003
JECFA revises its DHT and halves it (1.6µg/kg)
2007
JECFA questions the existence of maximum levels
2013 - 2015
Some States try to eliminate maximum mercury levels at Codex
2001
EPA sets a mercury TWI of 0.7 µg/kg, almost five times lower than that of the JECFA
2006
The Codex Committee requests a benefit/risk report from JECFA in order to re-evaluate its standards
2010
JECFA publishes a report on the benefits/risks of fish consumption, largely tipping the balance in favor of benefits. It calls on Member States to highlight the benefits of fish consumption
2018
The Codex Commission uses the ALARA method** to increase the maximum permitted levels in tuna, alfonsino, marlin and shark, and removes the maximum permitted level for swordfish and other seafood
International
Europe
2010
2020
2005
A French laboratory funded by industry concludes that setting maximum permitted mercury levels does not protect public health
2012
EFSA evaluates the TWI at 1.3µg/kg and concludes that the European population is overexposed to mercury
2015
European Commission seeks to raise maximum permitted levels in certain seafood products to 2 mg/kg
PAFF Committee
2022
The PAFF Committee revises Regulation 1881/2006. It maintains the maximum levels of 0.5mg/kg and 1mg/kg for the most contaminated species and creates a new limit of 0.3 mg/kg for low-contaminated species
2002
Creation of EFSA EU
2006
The PAFF Committee revises Regulation 93/351 on mercury and adds new species to the list of fish benefiting from the highest maximum level (1 mg/kg)
2013
The European Commission requests a benefit/risk report from EFSA
2014, 2015
EFSA publishes an opinion on the benefits/risks of seafood, and identifies tuna as a major contributor to methylmercury exposure
2023
Regulation 1881/2006 is repealed by Regulation 915/2023, with no significant changes for mercury
PAFF Committee

1963
The United Nations and the Organisation for Economic Co-operation and Development (OECD) create the Codex Alimentarius, a comprehensive guide designed to protect health and commercial interests.

Faced with the rampant use of chemicals in the food industry after the Second World War, in the early 1960s some countries began to introduce national regulations to protect the health of their populations. But these national regulations began to disrupt cross-border trade.[81] The FAO, WHO, OECD and United Nations Economic Commission for Europe (UNECE) met to find a means of ***"protecting the consumer's health, of ensuring quality and of reducing trade barriers"*** (Figure 7[82]). **This led to the creation of the Codex Alimentarius, which aimed to establish internationally recognised standards and guidelines** (Figure 8).

Meetings of the Codex Committee on Food Additives and Contaminants are based on reports by the Joint FAO-WHO Expert Committee on Food Additives.

Figure 7 **FAO (1960) Conference for Europe**

7. Questions diverses

i) Normes alimentaires

Sur la proposition d'un certain nombre de délégations, la Conférence a examiné le problème de coordination posé par le nombre croissant de programmes de normes alimentaires entrepris par plusieurs organisations. On a jugé souhaitable de parvenir à un accord international sur les normes alimentaires minima et les questions connexes (étiquetage, méthodes d'analyse, etc.) en tant que moyen important pour protéger la santé du consommateur, assurer la qualité des produits et réduire les obstacles au commerce, en particulier sur le marché européen en voie de rapide intégration.

Figure 8 **Official website of the Codex Alimentarius/about. https://www.fao.org/fao-who-codexalimentarius/about-codex/ consulted on 24 July 2023**

Purpose of the Codex Alimentarius

The Codex Alimentarius is a collection of internationally adopted food standards and related texts presented in a uniform manner. These food standards and related texts aim at protecting consumers' health and ensuring fair practices in the food trade. The publication of the Codex Alimentarius is intended to guide and promote the elaboration and establishment of definitions and requirements for foods to assist in their harmonization and in doing so to facilitate international trade.

The Codex Committee on Food Additives and Contaminants, a veritable bastion of the fishing industry

The leadership of the Codex Committee on Food Additives and Contaminants (CCFAC, later the CCCF), the Codex committee responsible for discussing heavy metal contamination, **was entrusted to the Netherlands** in 1963, granting the country the power to guide all decisions concerning the regulation of contaminants in foods.[83] Seventy years later, the Netherland still chairs the committee. However, **as numerous BLOOM campaigns have shown, the choice of the Netherlands is far from inconsequential. A major industrial fishing nation** (electrofishing, demersal seining, etc.), the Netherlands has significant power over much of the world's industrial fishing, including in France. In 2016, for example, Dutch giant Parlevliet & van der Plas bought France's largest tuna fishing company, Compagnie française du thon océanique, and the Pêche Et Froid Océan Indien processing plant.

Each year, the CCCF meets to set or approve (indicative) maximum permitted levels for various substances present on our plates and in animal feed. **Each member country of the Codex Alimentarius sends a delegation to each meeting, a delegation that often includes industry representatives,** and more rarely academics. To illustrate: **the French delegations at** CCCF meetings **include representatives from Danone, Nestlé, Eurosucre and Pernod-Ricard, while the Thai delegations include people affiliated with "The Federation of Thai Industries" – including the global tuna giant Thai Union** (which owns the Petit Navire brand).[84] See Annex I – Figure 1 and 2 for more details.

In addition to the pervasive presence of industry representatives in the national delegations, other intergovernmental or non-governmental organisations may attend the meetings as observers. In some cases, they have the right to speak during discussions, except those on the final decision. **These organisations are often just another front for** those defending industrial interests. Most are producer organisations, such as FoodDrinkEurope, which defends the interests of the largest European agri-food groups, Food Industry Asia, which defends the interests of Asian groups, and the Global Organization for EPA and DHA Omega-3s, which defends the interests of fisheries, particularly those certified by the Marine Stewardship Council (MSC) label,[84] which it counts among its members (see Annex I – Figure 3).

Europe prepares its position ahead of the CCCF meetings. As part of this process, each Member State establishes its position and defends it to the European Commission. Once the European position has been adopted, the Member States all line up behind it and speak with one voice at the CCCF, with few exceptions.

1973
The Joint FAO-WHO Expert Committee on Food Additives establishes an initial assessment of the tolerable weekly intake for mercury, but it does not sufficiently protect children

In 1973, the Joint FAO-WHO Expert Committee on Food Additives (JECFA) turned its attention to mercury and carried out an **initial assessment of the tolerable weekly intake (TWI)** of methylmercury. This TWI was based on the premise that according to the clinical data available, people exposed to high levels of mercury over a short time are the worst affected. Based on patients from Niigata, a Japanese coastal town with a similar story to Minamata, the experts chose the lowest blood mercury concentration found in a patient presenting neurological symptoms as their reference. They converted this to the amount of mercury that could be ingested per week using a simplistic mathematical model based on weak evidence[7], and obtained a TWI in micrograms per kilogram of body weight by dividing the amount obtained by the weight of an average adult. The resulting TWI of 3.3 µg of methylmercury ingested per week per kilogram of body weight (µg/kg bw) was the law for the next thirty years. However, basing the TWI on one reference adult with neurological symptoms was already problematic. As a result of the Minamata disaster, it was already known at the time that **children born to mothers with no symptoms could develop health conditions due to their mother's exposure to mercury.**

Children were therefore not protected by the 1973 TWI.

1985
The Codex Committee on Food Additives and Contaminants sets guideline mercury limits to avoid hindering international trade in tuna

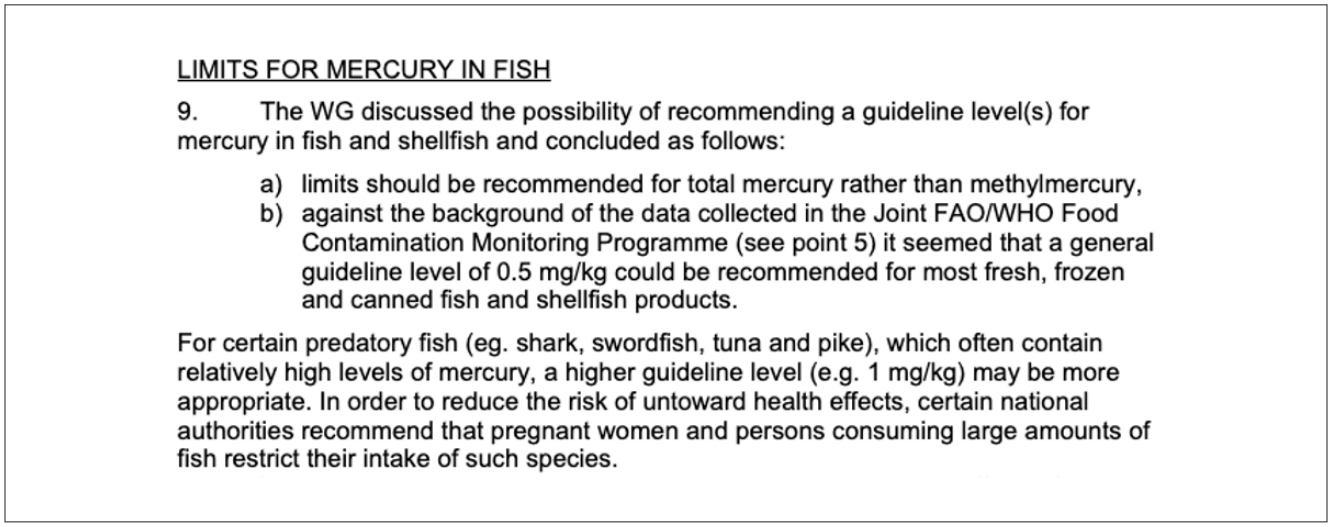
Aware of the dangers of ingesting methylmercury, some countries began to independently regulate the maximum levels allowed in fish products. The CCCF saw this as a barrier to international trade and in 1985 proposed that guideline limits be adopted at the international level to facilitate trade. The task of setting this limit was entrusted to a CCCF working group led by Sweden. **Based on seafood contamination data** from across Europe, they concluded that a maximum level of 0.5 mg of mercury per kilogram of product would be a good recommendation for most fresh, frozen and canned seafood. Nevertheless, "*For certain predatory fish (e.g. sharks, swordfish, tuna and pike), which regularly contain relatively high levels of mercury,* ***a higher guideline (e.g. 1 mg/kg) may be more appropriate***" (Figure 8).[86]

There is **no trace of any health-based argument** in the conclusions of the working group. **The only justification for these standards was the actual mercury content of the fish.** For fish species with a generally low mercury content, the standard was set at 0.5 mg/kg. This was deemed "appropriate" because it excluded little to no fish from the market. **If a species usually contains higher levels, the standard was doubled. Nearly one in three members of this working group was there to defend the industry's interests** (employees of the Food and Drink Federation, Unilever, Nestlé, etc. (see Annex I – Figure 4)).

In 1991, this proposed double standard was approved at the meetings of the Committee on Food Additives and Contaminants. It was then passed on to the Codex Alimentarius Commission and ultimately ratified in 1991 in Codex STAN 193, the veritable bible of food standards.

7 This is a highly simplified first-order linear regression that converts a blood or capillary mercury level into an ingestible quantity of mercury per week. This calculation is based on two articles: the first is not very robust because it is based on only 32 subjects. The second is based on 735 individuals. This second article does not, however, give the correlation coefficient (r2) and the article is not available online; it is cited as "submitted to WHO".[85]

Figure 9 **CCFAC (1985) Report of the eighteenth session of the Codex Committee on Food Additives available here: https://www.fao.org/fao-who-codexalimentarius/sh-proxy/en/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FMeetings%252FCX_711-18%252Fal87_12e.pdf**



LIMITS FOR MERCURY IN FISH

9. The WG discussed the possibility of recommending a guideline level(s) for mercury in fish and shellfish and concluded as follows:

a) limits should be recommended for total mercury rather than methylmercury,
b) against the background of the data collected in the Joint FAO/WHO Food Contamination Monitoring Programme (see point 5) it seemed that a general guideline level of 0.5 mg/kg could be recommended for most fresh, frozen and canned fish and shellfish products.

For certain predatory fish (eg. shark, swordfish, tuna and pike), which often contain relatively high levels of mercury, a higher guideline level (e.g. 1 mg/kg) may be more appropriate. In order to reduce the risk of untoward health effects, certain national authorities recommend that pregnant women and persons consuming large amounts of fish restrict their intake of such species.

1993
The European Union transposes these standards into its regulations

In 1993, the European Union followed the international recommendations and adopted the same standards in Regulation EC 351/93. **This double standard, which has no health-related justification whatsoever, thus entered our laws. There was no reason to set the limit for mercury in fish to 0.5 mg/kg, and no reason to grant some fish an exception or allow a fish with double the mercury content to be sold, but now these arbitrary rules were set in stone.**

The power to set maximum permitted mercury levels is not in the hands of elected representatives in the Parliament but in those of the Standing Committee on Plants, Animals, Food and Feed (PAFF Committee), the Member States' Trojan horse within the European Commission.

In Europe, laws are not always amended and voted on by Members of the European Parliament. Texts deemed to be purely technical and without major political implications can be drawn up and adopted directly by the European Commission, without having to go through the elected Parliament. This is the case for the Commission regulation setting the maximum mercury content permitted in foods (Regulation 915/2023, the successor to Regulation 351 of 1993).

Since 2002, the Commission has delegated power over the entire food production chain, from field to fork, to the Standing Committee on Plants, Animals, Food and Feed (PAFF Committee), on which the Member States sit. Unlike the European Parliament, where members, amendments and votes are public, only a very brief agenda of PAFF Committee meetings is published. The rest is not easily accessible to the general public – even though the public is directly affected by the decisions taken – in theory to avoid the PAFF Committee being subjected to external pressure. Following an official transparency request to the European Commission, BLOOM was only given access to the ministerial affiliations of participants in the PAFF Committee sub-working groups.[46] Unlike the "expert groups", the "working groups" are subject to few, if any, transparency requirements. When it comes to contaminants, the PAFF Committee relies on a working group rather than an expert group, making its decisions even more difficult to understand.

In theory, these working groups use the EFSA's work as a basis for drafting proposed standards, which are then submitted to the PAFF Committee and then to the Commission. In practice, the PAFF Committee groups are in constant discussion with the industries affected by their decisions (and much less so with civil society), and are heavily biased in their favour, often to the detriment of public health and biodiversity.[87]

But the stakes are high: **setting maximum mercury levels or authorising pesticides are not purely technical issues.** They are political issues with far-reaching consequences for the lives of Europeans. **The denial of democracy is twofold.** Firstly, the PAFF Committee comprises members of the Member States' governments. These same Member States sit on the Council of the European Union. They are therefore behind many of the decisions taken by the European Commission, which increases their influence over the European institutions even further, all in complete secrecy. Secondly, because the elected members of the European Parliament are not given any opportunity to amend PAFF Committee decisions, **these decisions of the utmost importance are taken without any democratic checks and amendments.**

1994
Following the creation of the World Trade Organization, the standards in the Codex become the reference standard

The Codex standards were initially established as recommendations, with no legal value. But when the WTO was established in 1994, WTO member states agreed that the **standards in the Codex would become their reference standards.** From that point on, if national governments wanted to impose stricter standards, they would have to demonstrate an "*appropriate level of protection*" **that takes into account "*as relevant economic factors: the potential damage in terms of loss of production*"** (Annex I – Figure 5).[88] This was a disastrous blow to efforts to protect human health. Because the European Union is a member of the WTO, it now has to consider potential barriers to trade and cannot freely set the maximum levels it deems appropriate to protect public health. Granted, in 1993 the European Union adopted the Codex standards voluntarily, but as of 1994, it could no longer reverse that decision. In other words, if a WTO member finds that Codex standards do not sufficiently protect its population, it must arm itself with an entire arsenal of **health and economic justifications** to be allowed to apply stricter limits to the level of contaminants in the food it imports.

2003
The joint FAO-WHO committee halves its TWI, but the Codex blocks any change in the maximum mercury content of fish

Since its creation in the 1970s, the **tolerable weekly intake** (TWI) set by the Joint FAO-WHO Expert Committee on Food Additives (JECFA) **has faced criticism** because it is based on adult patients. However, children and fetuses are more sensitive to mercury and the "tolerable" intake fails to protect them from its dangers. The JECFA did not change its TWI for another ten years, finally revising it in 2003.[80] Following a new analysis (taking into account new studies published in the interim), it halved its TWI, i.e. **it determined that half as much methylmercury could be ingested per week as the level it had been stubbornly defending since 1973.**[8]

In light of this new assessment of the risks of mercury, the following year the Codex Commission asked the Codex Committee on Food Additives and Contaminants (CCFAC) to consider whether the limits for mercury in fish (0.5 mg/kg and 1 mg/kg) should be revised or "or if any other risk management options, including the formulation of specific dietary advice, would be appropriate" (Annex I – Figure 6).89 At the Codex, a working group led by the European Union and attended by Australia, Canada, France, India, Italy, Japan, Kenya, South Africa and the United States (all fishing nations) was tasked with answering this question.89 They concluded that revising the guidelines would indeed require a more in-depth examination of the issues to consider all the factors associated with fish consumption, in particular the risks and benefits. The recommendations for maximum levels could therefore not be revised until a full report on the benefits and risks of eating fish contaminated with methylmercury had been published.90

> **For the next seven years, all decisions or discussions on maximum methylmercury levels were postponed, and fish sales continued to soar.**

Any excuse would do, if meant not lowering mercury limits.

The rise of arguments centred around benefits and risks, consumer-centred approaches or the benefits of omega-3s, to name a few, is the **product of the powerful "factory of doubt"** that the fishing industry has been operating for years. While the industry's disinformation campaign is hard to pin down and prove in its entirety, a few elements help to highlight it.

8 The new tolerable weekly intake for mercury according to the JECFA was 1.6 µg/kg bodyweight, compared with 3.3 µg/kg bodyweight previously. Ten years later the European Food Safety Authority set its TWI at 1.3 µg/kg.

6. THE TUNA LOBBY'S FACTORY OF DOUBT

It is the early 2000s: The joint FAO-WHO committee has revised the TWI, but any attempt to lower the maximum mercury content allowed in fish is postponed by the Codex Alimentarius Commission. The tuna lobbies' factory of doubt is firing up: a consumer-centred approach, highlighting the benefits of eating fish to distract from the risks, advertising and marketing... Everything is in place to protect tuna sales from regulation in response to the dangers of mercury.

The tuna industry funds a public laboratory to push its version of truth: regulating maximum mercury levels is not an effective way to protect consumer's health

In France, **around 2004, a public laboratory was commissioned by the fishing industry to assess the effectiveness of various measures to prevent the risks associated with eating fish contaminated with methylmercury** (see Annex I – Figure 7). This conflict of interest was declared only once, in 2007, when **one of the members of the laboratory took part in the meeting of the committee of experts that informs the Codex meetings** (JECFA).[91] Despite a large number of publications on methylmercury and the many occasions on which members of this laboratory participated in official bodies such as the JECFA, the Codex and the EFSA, this conflict of interest is not mentioned anywhere else. In an article published by researchers from this laboratory in the journal *Regulatory Toxicology and Pharmacology* (which is itself widely criticised for its many conflicts of interest),[92] they conclude that setting **maximum permitted mercury levels for fish is not an effective way to protect consumers' health.**[93] According to the JECFA report, the expert who noted their conflict of interest was excluded from discussions about mercury. However, a source told us that this was not the case[9]. This meeting was based on "*a French analysis*" and concluded that "*setting of [maximum] guideline levels for methylmercury in fish may not be an effective way of reducing exposure for the general population*."[91] This statement then snowballed through the decision-making bodies. **After it was referenced by the JECFA, the biased "delegations" immediately seized on it to question the very existence of maximum permitted levels.**

Omega-3, at the heart of the tuna lobby's ploy to divert attention away from the dangers of mercury

Omega-3s came onto the scene in the early 2000s. The members of the international bodies working to defend fish consumption and, more generally, the interests of the fishing industry, made Omega-3s the hallmark of their manufactured doubt. Media debates, advertising and food marketing all highlighted the benefits of omega-3s. Within international bodies like the Joint FAO-WHO Expert Group (JEFCA), **the focus turned to the question of nutrition (the risk-benefit ratio of mercury and omega-3s) and away from the toxicology problem at the heart of the debate:** how to effectively protect consumers from the health risks of eating predatory fish full of mercury.

There are three main problems with this approach:

- The supposed benefits of omega-3s for brain health **do not cancel out the neurological damage caused by mercury.**

9 Interview of 12 September 2023 with a participant in the 2006 JECFA evaluation.

- The **consequences** of ingesting mercury **go far beyond neurological damage** (affecting the immune and reproductive system, causing long-term genetic damage, etc.). Eating omega-3s has no "benefit" when it comes to these consequences and they are therefore not taken into account in these risk-benefit assessments.

- **The fish that provide omega-3s are not the same as those that expose us to methylmercury:** predatory fish are much less rich in omega-3s than, for example, sardines, anchovies or mackerel.[37-38] Avoiding fish contaminated with methylmercury does not therefore mean risking an omega-3 deficiency,[37-38] but limiting how much tuna we eat would enable us to drastically and rapidly reduce our exposure to mercury.[125]

Understanding omega-3s

The term "omega-3" covers three distinct molecules:

ALA (alpha-linolenic acid), found in **various plant sources** such as **flaxseed** (also called linseed) and flaxseed oil, **chia seeds, rapeseed oil and walnuts;**

EPA (eicosapentaenoic acid) and **DHA** (docosahexaenoic acid), **found mainly in oily fish (cod liver oil, herring, mackerel, salmon, sardines...)** and in certain microalgae.

The human body is capable of transforming ALA into EPA and DHA, at a low conversion rate. Recent studies seem to show that this conversion rate could increase in people who eat little to no fish (and therefore have a zero EPA and DHA intake).[96,100]
› See Annex III for more details on omega-3s.

At a global level, most omega-3 rich food supplements are the product of industrial fishing, which targets certain species of oily fish such as anchovies, horse mackerel and mackerel to produce fishmeal and fish oil. In 2018, **three quarters of fish oil-based supplements were destined for fish farms, compared with 13% for human consumption.** In practice, farmed fish would have little nutritional value if it were not itself supplemented with EPA and DHA from wild fish.[94]



› To learn more
see our report
"The dark side of aquaculture"
published in 2017

Corruption and conflicts of interest within the bodies responsible for assessing the risk-benefit ratio of seafood consumption

The risk-benefit assessment called for by the Codex in the early 2000s was drawn up by the Joint FAO-WHO Expert Committee (JECFA). The secretariat of this "joint" group is heavily skewed in favour of the Food and Agriculture Organization (FAO): of the seven members, six work for the FAO, which is responsible for agricultural issues, and **only one works for the World Health Organization.**[101]

The background of the experts chosen to conduct the assessment is illuminating. Two of the authors have already been criticised by the Norwegian newspaper Morgenbladet for **conflicts of interest** in their assessment of the health effects of eating salmon. Their assessment concluded that there was no longer any need for pregnant people to restrict how much farmed salmon they eat, much to the delight of the Norwegian aquaculture industry.[102-103] The first expert, Anne-Katrine Lundeby-Haldorsen, at the time Director of the National Institute for Nutrition and Seafood Research, is also accused by Morgenbladet of having been paid by a salmon producer to convince the health agencies that the quantities of ethoxyquin (a toxic synthetic antioxidant) present in Norwegian salmon does not pose a risk to health. A few years earlier, she allegedly received payments from the same producer to whitewash BHA (butylated hydroxyanisole), an additive used in fish feed.[102] The second expert, and "resource person" for the JECFA assessment, Edel Oddny Elvevoll, is the **co-founder of a company producing omega-3 capsules made from seal oil**[104] (seals are a predator that can accumulate high levels of methylmercury).[105]

Meanwhile one of the FAO representatives, Jean-François Pulvenis de Séligny, is heavily involved in regulating world fisheries. The year after the JECFA report was published, **he became a senior policy adviser to the Inter-American Tropical Tuna Commission (IATTC),** whose interests are contrary to a reduction in the consumption of predatory fish.[106]

The logical consequence is that the risk-benefit assessment of seafood consumption published in 2010 is overflowing with praise for the benefits of omega-3s,[101] but makes few recommendations about how to reduce the risk of methylmercury (Figure 10). **Nevertheless, seafood is not the only source of omega-3s available to us** (see Annex III). **But it is virtually the only way we are exposed to methylmercury.**

Figure 10 **Recommendations from the 2010 FAO/WHO expert consultation on the risks and benefits of fish consumption.**

Recommendations

To minimize risks in target populations, the Expert Consultation recommended a series of steps that Member States should take to better assess and manage the risks and benefits of fish consumption and more effectively communicate with their citizens:

- Acknowledge fish as an important food source of energy, protein and a range of essential nutrients and fish consumption as part of the cultural traditions of many peoples.
- Emphasize the benefits of fish consumption on reducing mortality from coronary heart disease (and the risks of mortality from coronary heart disease associated with not eating fish) for the general adult population.
- Emphasize the net neurodevelopmental benefits to offspring of women of childbearing age who consume fish, particularly pregnant women and nursing mothers, and the neurodevelopmental risks to offspring of women of childbearing age who do not consume fish.
- Develop, maintain and improve existing databases on specific nutrients and contaminants, particularly methylmercury and dioxins, in fish consumed in their region.
- Develop and evaluate risk management and communication strategies that both minimize risks and maximize benefits from fish consumption.

The factory of doubt does its job

Following the publication of the risk-benefit assessment in 2010, combined with the JECFA report published in 2007, which reiterated the idea that setting maximum levels is not an effective way to protect people's health,[91] discussions within the Codex Committee took a turn for the bizarre: **some countries went so far as to call for the limits on mercury content to be abolished.**

The JECFA argument about the ineffectiveness of standards for protecting public health became a battle cry. The debate had shifted from how to make the standards more stringent to whether it makes sense to impose limits on the mercury content of seafood at all.[107]
The debate was then entrusted to a working group chaired by Norway and co-chaired by Japan.

Once again, two major fishing nations found themselves presiding over discussions to mediate between economic interests and public health measures. It did not take them long to reach a conclusion. The Japanese delegation insisted on "*the effectiveness of consumer advice*", by which they meant that forcing companies to comply with limits on mercury content was pointless and that simply providing consumers with information would make the mercury problem disappear (Figure 11). Other countries added that limits could "*give the impression that there is a problem with fish*", and "*result in reduced consumption of fish, and should therefore be repealed*" (Figure 11). For five years, the same arguments bounced back and forth, and nothing changed. The end result was a travesty: the international institutions would not make any recommendations on consumption **and the limits would be revised, but they would be revised upwards to exclude even fewer fish from the market.**

Figure 11 **Extracts from the reports on the 2013 and 2014 annual meetings of the Codex Committee on Contaminants in Foods (CCCF)**[39,108]

COMMISSION DU CODEX ALIMENTARIUS

Organisation des Nations Unies pour l'alimentation et l'agriculture

Organisation mondiale de la Santé

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REP13/CF

RAPPORT DE LA SEPTIÈME SESSION DU
COMITÉ DU CODEX SUR LES CONTAMINANTS DANS LES ALIMENTS

114. La délégation du Japon, co-présidente du groupe de travail électronique, a indiqué que les discussions au sein du groupe de travail avaient signalé l'efficacité des conseils aux consommateurs en tant que mesure utile pour maximiser les bénéfices de la consommation de poisson et minimiser les risques liés au méthylmercure dans le poisson et a par conséquent proposé que le Comité examine aussi le besoin de formuler des conseils aux consommateurs.

117. Plusieurs délégations étaient d'avis que les limites indicatives n'étaient pas appropriées pour la gestion des risques et pourraient résulter en une consommation restreinte de poisson et qu'elles doivent par conséquent être révoquées. Ces délégations avaient exprimé l'avis que les conseils aux consommateurs seraient plus efficaces. À cet égard, les tableaux du rapport mixte FAO/OMS pourraient servir de modèles à ces conseils. Certains pays ont compilé des données pour chaque espèce de poisson qui pourraient être utilisées à cette fin. D'autre part, d'autres délégations ont exprimé l'avis que les limites indicatives et les limites maximales associées aux conseils aux consommateurs étaient appropriées. Un observateur a soutenu la proposition pour les limites maximales et a attiré l'attention du Comité sur CRD 10.

RAPPORT DE LA HUITIÈME SESSION DU
COMITÉ DU CODEX SUR LES CONTAMINANTS DANS LES ALIMENTS

110. Les délégations opposées à l'établissement de limites ont été d'avis que les avis aux consommateurs étaient davantage appropriés et que les bénéfices du poisson devraient être pris en compte, conformément aux résultats de la *Consultation d'experts mixte FAO/OMS* sur les risques et les bénéfices de la consommation de poisson, que l'établissement d'une limite donnerait l'impression qu'il y a un problème avec le poisson, et que très peu de poissons contiennent des concentrations excessives de mercure, ceci concerne principalement les poissons ichtyophages (ou prédateurs) de très grande taille.

In 2014, the Codex Committee on Contaminants in Food (CCCF) abolished the 0.5 mg/kg mercury content limit for non-predatory fish and revised the 1 mg/kg limit for predatory fish. Once again, the Japanese delegation headed the working group, this time assisted by New Zealand. They concluded that tuna should be the primary target when setting standards. Other countries proposed including other highly bio-accumulative species such as shark, marlin and swordfish.[109] The working groups that followed (again headed by fishing nations) examined which species should be included, what limit would be most appropriate for each species and which commercial products should be covered. **They collected data on contamination levels for each species from several countries, tested different limits and calculated what percentage of fish would be eliminated from the market at each limit** (Figure 12).[110] The name of the method used to set these limits speaks for itself: **ALARA, which stands for "As Low As Reasonably Achievable".** In other words, **as low as commercial interests allow.**[111,112]

In 2018, the CCCF decided it was acceptable to exclude at most 5% of fish from the market, and therefore chose a limit that would make it possible to achieve this goal .

For shark (which is very popular in Spain), the arbitrary limit was set at 1.6 mg/kg, a **60% increase** on a standard that should have been lowered. **For swordfish, the members of the committee were unable agree on the limit to set and therefore chose… not to set one.** For tuna, the arbitrary limit was set at 1.2 mg/kg. **Based on a distorted calculation, the CCCF concluded that there was no need to set standards for canned tuna,** and decided to remove "*internationally-traded fishery products*" from the note specifying what the limit applies to, so as to avoid including canned products under the standard.[113]

Figure 12 **Extracts from the report on the 2018 annual meeting of the Codex Committee on Contaminants in Foods (CCCF) and the proposal from the working group preparing this meeting.**

CODEX ALIMENTARIUS COMMISSION

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Food and Agriculture Organization of the United Nations

World Health Organization

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Agenda Item 7 **CX/CF 18/12/7**

JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX COMMITTEE ON CONTAMINANTS IN FOODS

12th Session
Utrecht, The Netherlands, 12 - 16 March 2018

PROPOSED DRAFT MAXIMUM LEVELS FOR METHYLMERCURY IN FISH INCLUDING ASSOCIATED SAMPLING PLANS

(Prepared by the Electronic Working Group led by the Netherlands, Canada and New Zealand)

Table 5: Number and percentage of tuna samples meeting hypothetical MLs (compliance rate) based on total mercury data. Statistical analysis excluding data without LOD/LOQ.

Table 5a: all tuna; Table 5b: Bigeye and Bluefin tuna; Table 5c: Other tuna than Bigeye and Bluefin.

Total mercury All tuna Excluding data without LOD/LOQ		
	Samples =< ML	
Hypothetical MLs	Number	%
0.9	2883	94
1.0	2941	95
1.1	2967	96
1.2	2988	97
1.3	3013	97
1.4	3027	98
1.5	3028	99
1.6	3033	99
1.7	3036	99
1.8	3039	99
1.9	3042	99
2.0	3046	99

Total mercury Bigeye and bluefin tuna Excluding data without LOD/LOQ		
	Samples =< ML	
Hypothetical MLs	Number	%
1.1	768	89
1.2	785	91
1.3	807	93
1.4	815	96
1.5	816	97
1.6	821	97
1.7	824	98
1.8	826	98
1.9	828	98
2.0	832	98
2.1	832	99
2.2	832	99

Total mercury Tuna other than bigeye and bluefin Excluding data without LOD/LOQ		
	Samples =< ML	
Hypothetical MLs	Number	%
0.4	1823	81
0.5	1973	88
0.6	2049	92
0.7	2100	94
0.8	2151	96
0.9	2173	97
1.0	2193	98
1.1	2199	98
1.2	2203	99
1.3	2206	99
1.4	2212	99

RAPPORT DE LA DOUZIÈME SESSION DU COMITÉ DU CODEX SUR LES CONTAMINANTS DANS LES ALIMENTS

Utrecht, Pays-Bas
12 - 16 mars 2018

LM pour le thon

74. Le CCCF a d'abord examiné la LM basée sur le P95 (1,1 mg/kg) et a fait remarquer que, même si cette LM bénéficie d'un certain soutien parce qu'elle protège davantage la santé, de nombreuses délégations ont estimé que le taux de rejet de 5 pour cent était trop élevé et que la LM d'1,2 mg/kg ou d'autres LM plus élevées, par exemple à 1,7 mg/kg, doivent être examinées, ce qui entraînerait des taux de rejet plus faibles. Il a également été signalé que la LM pour le thon devait être définie sur la base des espèces de thon présentant une teneur en mercure élevée, par exemple le thon obèse ou le thon rouge. La LM d'1,2 mg/kg a été proposée à titre de compromis, étant donné que celle-ci se base sur les données de toutes les espèces de thon mais avec le taux de rejet suivant inférieur à 5 pour cent.

Conclusion

75. Le CCCF a convenu d'une LM d'1,2 mg/kg.

Figure 13 **Maximum limits as defined in the Codex Alimentarius in 2019**

CXS 193-1995 66

METHYLMERCURY

Reference to JECFA: 22 (1978), 33 (1988), 53 (1999), 61 (2003), 67 (2006)
Toxicological guidance value: PTWI 0.0016 mg/kg bw (2003, confirmed in 2006)
Contaminant definition: Methylmercury
Related code of practice: *Code of Practice Concerning Source Directed Measures to Reduce Contamination of Foods with Chemicals* (CXC 49-2001)

Commodity/ Product name	Maximum level (ML) (mg/kg)	Portion of the commodity/ Product to which the ML applies	Notes/Remarks
Alfonsino	1.5	Whole commodity fresh or frozen (in general after removing the digestive tract)	Countries or importers may decide to use their own screening when applying the ML for methylmercury in fish by analysing total mercury in fish. If the total mercury concentration is below or equal to the ML for methylmercury, no further testing is required, and the sample is determined to be compliant with the ML. If the total mercury concentration is above the ML for methylmercury, follow-up testing shall be conducted to determine if the methylmercury concentration is above the ML. The ML also applies to fresh or frozen fish intended for further processing. Countries should consider developing nationally relevant consumer advice for women of childbearing age and young children to supplement the ML.
Marlin	1.7		
Orange roughy	0.8		
Pink cusk-eel	1.0		
Shark	1.6		
Tuna	1.2		

Today: manufactured doubt targets pregnant people through promotional campaigns

The negative health effects of mercury no longer need to be proven: neurotoxic, immunotoxic, reprotoxic, potentially carcinogenic, etc. Studies on the subject have been accumulating for almost a century. **Yet the tuna industry continues to proclaim that the toxicity of mercury is a myth, going so far as to recommend that pregnant people eat tuna** (Figure 14).

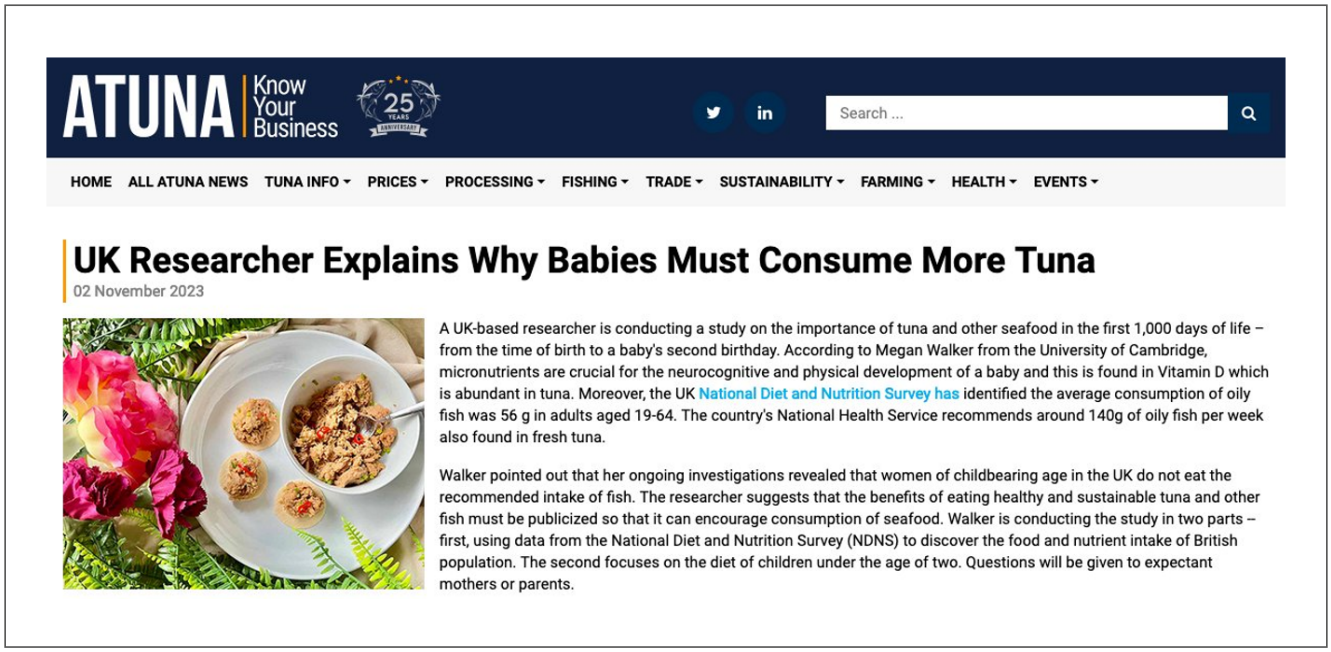
Figure 14 **Images from aboutseafood.com, a website run by the National Fisheries Institute, the North American fishing lobby. Available at https://aboutseafood.com/can-pregnant-women-eat-tuna-yes-and-they-should/**



In November 2023, the tuna lobby went so far as to twist the words of a researcher, making it appear that she recommended that babies should be given more tuna (Figure 15).[114]

When contacted by BLOOM, the researcher said that her words had been misused (Figure 16).

Figure 15 **Article published by Atuna media**



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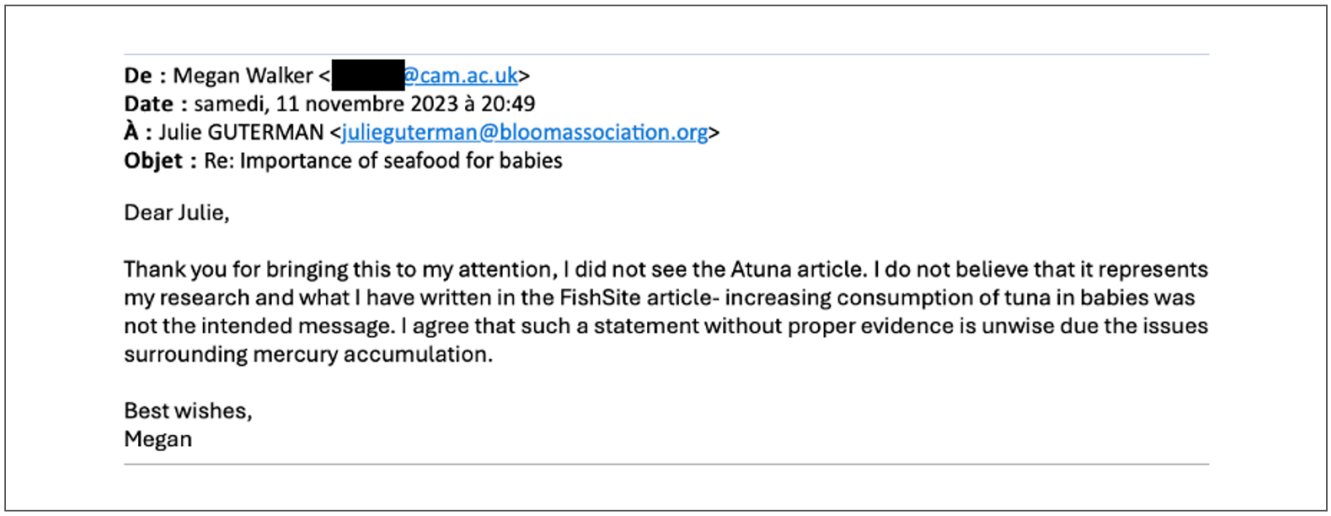
UK Researcher Explains Why Babies Must Consume More Tuna

02 November 2023

A UK-based researcher is conducting a study on the importance of tuna and other seafood in the first 1,000 days of life – from the time of birth to a baby's second birthday. According to Megan Walker from the University of Cambridge, micronutrients are crucial for the neurocognitive and physical development of a baby and this is found in Vitamin D which is abundant in tuna. Moreover, the UK National Diet and Nutrition Survey has identified the average consumption of oily fish was 56 g in adults aged 19-64. The country's National Health Service recommends around 140g of oily fish per week also found in fresh tuna.

Walker pointed out that her ongoing investigations revealed that women of childbearing age in the UK do not eat the recommended intake of fish. The researcher suggests that the benefits of eating healthy and sustainable tuna and other fish must be publicized so that it can encourage consumption of seafood. Walker is conducting the study in two parts – first, using data from the National Diet and Nutrition Survey (NDNS) to discover the food and nutrient intake of British population. The second focuses on the diet of children under the age of two. Questions will be given to expectant mothers or parents.

Figure 16 **Response from the researcher quoted by Atuna after being contacted by BLOOM**



De : Megan Walker <[redacted]@cam.ac.uk>
Date : samedi, 11 novembre 2023 à 20:49
À : Julie GUTERMAN <julieguterman@bloomassociation.org>
Objet : Re: Importance of seafood for babies

Dear Julie,

Thank you for bringing this to my attention, I did not see the Atuna article. I do not believe that it represents my research and what I have written in the FishSite article- increasing consumption of tuna in babies was not the intended message. I agree that such a statement without proper evidence is unwise due the issues surrounding mercury accumulation.

Best wishes,
Megan

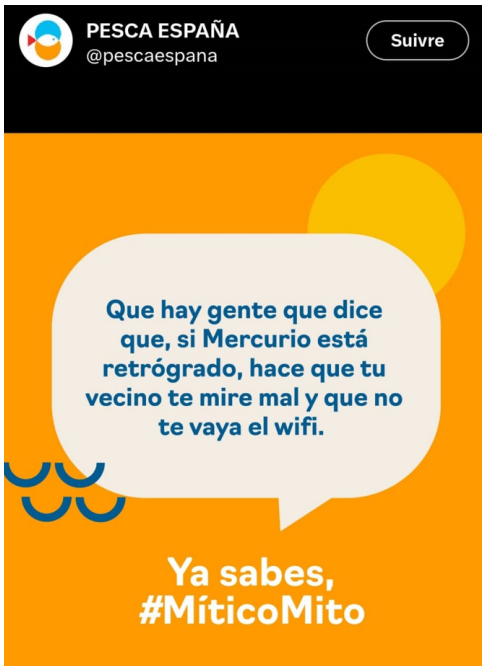
Selenium: The new focus of the industrial fishing lobbies

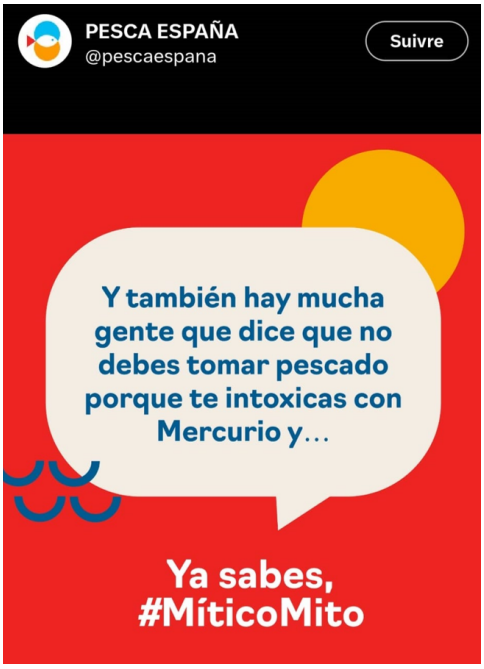
In recent months, Spanish producers – the most powerful in European tuna fishing – have launched a campaign to "*debunk the myths about mercury*".[115]

Figure 17 **Extracts from a Twitter feed by Pesca España, the Spanish fishing lobby, available here: https://x.com/pescaespana/status/1742834377371811935**

Photo 1: "Some people say that if [the planet] Mercury goes retrograde, your neighbour will look at you sideways and you won't be able to get wifi. You know, #MythicalMyth"

Photo 2: "And there are a lot of people who say you shouldn't eat fish because you'll get Mercury poisoning and... you know #MythicalMyth"





According to Pesca España, the association of Spanish fisheries organisations, the harmful effects of mercury consumption from seafood products are just a "myth".

In fact, they claim that selenium – present in most seafood products – acts like a "magnet", removing mercury from our bodies even before it reaches our organs.[116]

Pesca España, a powerful lobby for industrial fishing

Pesca España is headed by Javier Garat, who is also president of the most powerful lobby for European industrial fishing, Europêche (see below)117. Javier Garat is also a shareholder and member of the Board of Directors of Albacora, Europe's largest tuna fishing company. Albacora owns the four largest tuna fishing boats in the world, including the Albatun dos (116 m) and the Albatun tres (115 m).

In a report published in October 2022 by the think tank InfluenceMap, **Europêche was identified as one of Brussels' most destructive lobbies when it comes to the climate and the environment.**[118] Europêche was singled out for its damaging influence on public decisions. It almost universally opposed measures to protect biodiversity and blocked policies aimed at reducing the staggering loss of wild species at a time when an ever-increasing number of species is going extinct. InfluenceMap analysed around 750 public statements from 12 industry lobbies. On a scale from A (the best rating) to F (the worst), Europêche received an overall grade of E-, i.e. half a mark away from the worst possible rating, held by the oil and mining lobbies.



> For more information: see: "The Wild West of Tuna Fisheries in Africa" available here: https://www.bloo-massociation.org/en/wp-content/uploads/2022/11/The-wild-west-of-tuna-fi-sheries-in-Africa-BLOOM-November-2022.pdf

There are many holes in this theory:

1. **Poisoning due to mercury in predatory fish has been widely documented, for example in the case of Minamata,** and when people who eat seafood are tested, mercury is found in their test results. It has not simply disappeared thanks to the concurrent presence of selenium.[11,29,35]

2. **Scientific studies on selenium's ability to extract mercury from the body are far from conclusive.** Animal experiments have shown varying results: in the presence of selenium, the measured effects of methylmercury can be delayed, mitigated, even cancelled out or... remain unchanged.119,120 Multiple studies have shown that in the presence of selenium, mercury has a greater tendency to accumulate in the brains of rodents.[121]

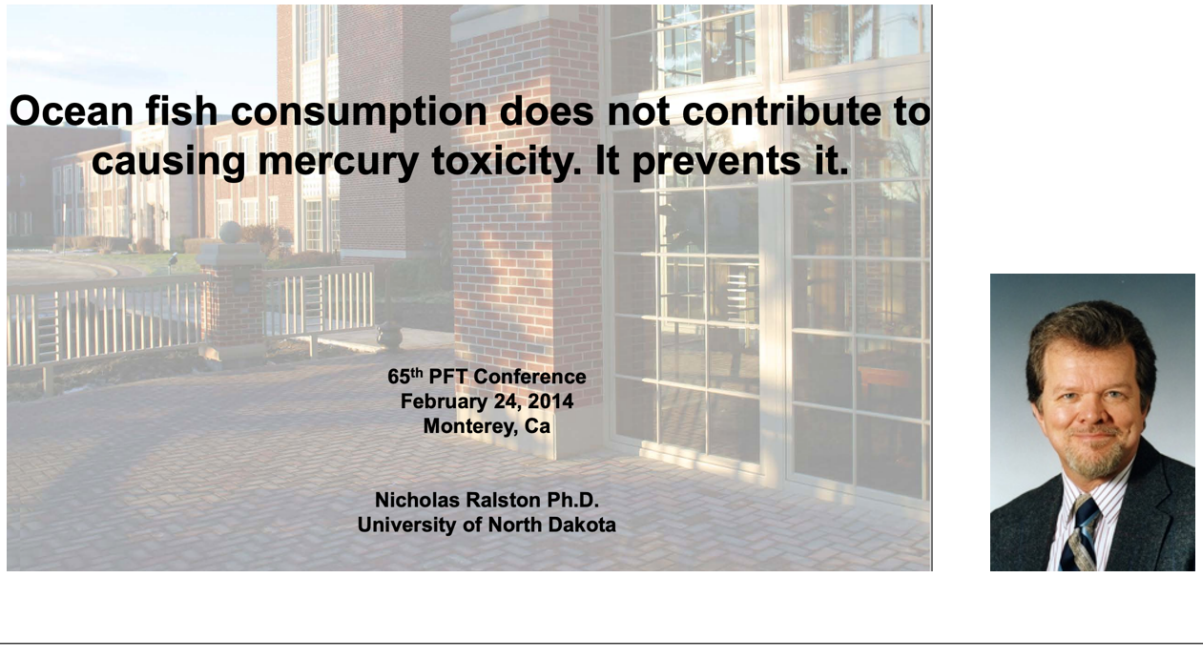
3. Given the many targets and effects of mercury, **to think that one compound could solve all its problems at once seems completely irrational** (and is scientifically unfounded).

4. **Ingesting a poison at the same time as its supposed antidote is a risky gamble, especially when that antidote, selenium, itself turns out to be poisonous in high doses.**

The argument that selenium neutralises mercury does not enjoy scientific consensus, and to claim that mercury is harmless to humans in the presence of selenium is very dangerous.[121-122] However, this false argument is widely – and increasingly – repeated by the fishing industry, including Pesca España, CEPESCA, ANAPESCA and Atuna, the journal of industrial tuna fishing. **When citing this argument, they often invoke the same figure of authority:** a certain Nicholas Ralston, a doctor of biochemistry (Figure 18).

This researcher from the University of North Dakota (USA) wears two hats: he is an expert on the effects of the mercury-selenium combination and, importantly, a **champion of conflicts of interest.** He is **funded, among other sources, by the US Tuna Foundation, the Fisheries Scholarship Fund, the Seafood Industry Research Fund, Conxemar (a Spanish lobby) and InterFish España,** which all have close ties to the fishing industry (Annex I – Figure 8).

Figure 18 **Left picture is from a presentation by Nicholas Ralston (pictured right), a fervent promoter of selenium and de facto sales representative for tuna fishing. Available on the Atuna industry news website: https://www.atuna.com/wp-content/uploads/2013/04/mercury-fa1.pdf**



7. THE EUROPEAN UNION STRUGGLES TO SHAKE OFF THE INFLUENCE OF THE FISHING INDUSTRY

2012
The European Food Safety Authority (EFSA) calculates its own tolerable weekly intake (TWI) and proposes an intake lower than that set by the Joint FAO-WHO Expert Committee (JECFA), but higher than that set by the US Environmental Protection Agency (EPA)

In 2002, the European Union created its own health agency: the European Food Safety Authority (EFSA).[123] In 2012, the European Commission asked the EFSA to examine the public health risks linked to the presence of methylmercury in food. Depending on the findings of this scientific body, the Commission would decide whether or not to revise the standards. The EFSA then calculated its own TWI, based on the same clinical studies as those used by the JECFA. It concluded that below 1.3 µg of methylmercury ingested per week, there are theoretically no health risks.[11] This is 20% lower than the TWI set by the JECFA, but almost twice as high as the maximum intake recommended by the US EPA.[11] **This discrepancy between tolerable intakes once again highlights the arbitrary nature of this calculation. Given that the same studies are available, it should not be possible for the results to differ by a factor of two.**

> **Once again, the omega-3 argument came to the rescue of the poison-contaminated fish, even though omega-3s do not counteract the harmful effects of mercury.**

2012
The EFSA concludes that the European population is overexposed to mercury and points the finger at tuna consumption… before qualifying its statement

In its assessment, the EFSA also evaluated the overexposure of Europeans to methylmercury by age group. The available results were not very detailed, but they did show that among fish eaters, **the 5% most exposed to methylmercury far exceed the TWI.** Within this group, infants, whose brains are still developing, **were almost four times over the limit.**[11]

The European Commission then asked the EFSA to assess the risks associated with **methylmercury ingestion, but this time taking into account the benefits of eating fish.**[124] Once again, the omega-3 argument came to the rescue of the poison-contaminated fish, even though omega-3s do not counteract the harmful effects of mercury (see Chapter 6).

In 2015, the EFSA published this new assessment and concluded that: ***"In particular tuna,*** *swordfish, cod, whiting and pike were* ***major contributors to methylmercury dietary exposure"***.[125] In spite of this, the EFSA chose not to make any recommendations, concluding its assessment with a caveat: "*Because a variety of fish species are consumed across Europe,* ***it is not possible to make general recommendations on fish consumption.***

The Scientific Committee therefore recommends that each country needs to consider its own pattern of fish consumption, especially the species of fish consumed, and ***carefully assess the risk of exceeding the TWI of methylmercury while obtaining the health benefits from consumption of fish/seafood."***[125]

2015
he European Commission attempts to raise the mercury limits for the fish with the highest mercury content, but is prevented from doing so by the public backlash

Freed from any moral constraints by the EFSA, the European Commission decided to review the standards governing maximum permitted mercury levels.

The working group meeting on the subject in 2015 proposed lowering the maximum permitted mercury content for species that have lower levels of mercury anyway, and **to drastically increase it for highly contaminated species like swordfish.**[126] At that time, given the 1 mg/kg limit in force, 50% of swordfish could not be sold. If this limit were increased to 2.5 mg/kg (i.e. **five times more than the limit for other fish and eight times more than the lowest limit),** only 10% of swordfish would be non-compliant. Problem solved.

Figure 19 **Extract from the proposal made by the Industrial and Environmental Contaminants working group to the Commission in 2015.**
↓
Document obtained by Foodwatch Germany. Once again, the only criterion used to revise the standard was the actual level of mercury contamination.

data : number of samples; P95: 95% of samples have a contamination level loer than that given in the P95 column; current ML : current maximum limit.

Entry / species	# data (total Hg)	P95 (mg/kg)	Current ML	Possible future ML
Emperor, orange roughy, rosy soldierfish (Hoplostethus species)	None	N/A	1,0	1,0
Kingklip (Genypterus capensis)	None	N/A	1,0	1,0
Pink cusk eel (Genypterus blacodes)	None	N/A	1,0	1,0
Plain bonito (Orcynopsis unicolor)	None	N/A	1,0	1,0
Poor cod (Tricopterus minutes)	None	N/A	1,0	1,0
Sail fish (Istiophorus platypterus)	None	N/A	1,0	1,0
Tuna (Thunnus species, Euthynnus species, Katsuwonus pelamis)	452	1,035	1,0	1,0
Shark (all species)	43	1,835	1,0	2,0
Portuguese dogfish (Centroscymnus coelolepis)	138	1,866	1,0	2,0
Bonito (Sarda sarda)	8	2,024	1,0	2,0
Marlin (Makaira species)	9	2,431	1,0	2,0
Swordfish (Xiphias gladius)	202	2,916	1,0	2,0

Figure 20 **Extract from the proposal made by the Industrial and Environmental Contaminants working group to the Commission in 2015.**
↓
Document obtained by Foodwatch Germany.

- **Occurrence data show that Swordfish (Xiphias gladius) is the fish species that contains the highest level of mercury. What could be the future ML for swordfish, taking into account the following theoretical statistical non-compliance rates (based on the available occurrence data):**
  - **1,0 mg/kg → 49,8 % non-compliance**
  - **1,5 mg/kg → 32,4 % non-compliance**
  - **2,0 mg/kg → 14,5 % non-compliance**
  - **2,5 mg/kg → 10,0 % non-compliance**

2022
The European Commission finally revises the maximum permitted mercury levels, maintaining the initial double standard for the most problematic species

In 2018, citizens' movements took up the issue, including Foodwatch, which ran a petition signed by nearly 80,000 Europeans. The push for "extra-high limits" was dead in the water.[127] The regulation was ultimately amended in 2022 by Regulation 2022/617, which cited the EFSA findings and concluded:

> "(5) Taking into account the outcome of the Authority's scientific opinions and statement, the maximum levels for mercury should be reviewed, to reduce further the dietary exposure to mercury in food.
>
> (6) As recent occurrence data show that there would be a margin to lower the maximum levels for mercury in various fish species, the maximum levels for those fish species should be modified accordingly."

The European Commission has finally acknowledged the overexposure of the European population to mercury and the need to regulate maximum authorised levels more strictly to better protect public health. However, while the EFSA clearly indicated "tuna, swordfish, cod, whiting and pike" as the species responsible for our exposure to mercury, **the European Commission has left the permitted mercury content of tuna, swordfish and pike unchanged, at 1 mg/kg fresh weight** (i.e. 2 to 3 mg/kg for canned tuna). Cod and whiting were not among the species that benefited from the exception afforded to tuna and swordfish.

In the 2022 revision, a new exception appeared in the regulation: f**or species for which the Commission had "*a margin to lower the maximum levels*", the maximum level is now set at 0.3 mg/kg,** lower than the limit for seafood products in general (0.5 mg/kg). But this changes nothing for the most contaminated species. They **continue to benefit from higher maximum authorised levels.** Europeans' exposure to methylmercury is not falling.

What about France?

- **Since 2002, the French Agency for Food, Environmental and Occupational Health & Safety (Anses) has been studying methylmercury contamination in seafood** and warning pregnant women about predatory fish, including tuna.
- In 2011, Public Health France (the national public health agency) tested the hair mercury levels of 1,800 individuals, finding that **all persons tested, children included, were contaminated with methylmercury.**
- In 2012, ANSES published specific recommendations regarding the risks associated with methylmercury.

Position of the Ministry of Agriculture

Despite recurrent warnings from Anses and Santé Publique France, and decades of research into the health risks of mercury, the French government does not seem to have reacted to protect its population. Instead, in 2015, when the Ministry of Agriculture's mercury checks showed that twelve out of twenty-five swordfish tested exceeded the maximum permitted levels, it declared:

> *The current limit for swordfish and sharks does not reflect the levels of contamination frequently encountered. It would therefore be appropriate to set the limit for Hg [(mercury)] content in these species by applying the principle usually used to set contaminant limits (the ALARA principle)].*

Figure 21 **Health surveillance of animal and plant foodstuffs in France: 2015 review of surveillance and control plans** https://agriculture.gouv.fr/telecharger/82490

In other words: **faced with the over-contamination of predatory fish with mercury, the Ministry of Agriculture would prefer to weaken the standards to mask this contamination, rather than control swordfish more strictly to effectively protect the public.**

France is in favour of using the ALARA method to set maximum permitted mercury levels in seafood.

We asked the Directorate General for Food (DGAL, under the Ministry of Agriculture) how the frequencies of mercury testing are determined (see Chapter 9), why no canned tuna is tested in France, and **what concentration factor is used when analysing the mercury content of a can of tuna** (since the maximum limit is set for fresh tuna, a conversion factor is necessary to verify the compliance of a canned product). The person responsible assured us that they were seriously addressing our inquiry and would provide a detailed response. **A month later, we received a rejection from the Director General of Food** (see Figure 22). Regarding the conversion factor used to determine whether a sampled can complies with regulations, DGAL responded that it ***"does not have certain information [...] particularly concentration, dilution, or transformation factors."*** Yet, it is DGAL that establishes the sampling methods at borders and within French territory (control and monitoring plan). In the absence of a conversion factor, it cannot determine whether canned tuna complies with European legislation on mercury.

Figure 22 **Excerpt of the response from the General Directorate of Food (dependent on the Ministry of Agriculture) following our letter (received on October 3, 2024).**

MINISTÈRE
DE L'AGRICULTURE
DE LA SOUVERAINETÉ
ALIMENTAIRE ET DE LA FORÊT
Liberté
Égalité
Fraternité

Direction générale de l'alimentation

Maître [redacted]
[redacted] Cabinets d'avocats
Pour l'Association BLOOM

Objet : réponse à la demande d'information environnementales du 29 juillet 2024

Cher Maître,

Je vous informe que la DGAL ne peut donner suite à la demande d'information de l'association BLOOM que vous représentez.

Par ailleurs, la demande d'accès aux informations relatives au point 3 de la première question (cause d'absence de prélèvement) ne porte pas sur une information relative à l'environnement.

Enfin, la DGAL ne dispose pas de certaines informations qui font l'objet de demande d'accès (première question, point 4 et seconde question, point 3) concernant notamment les facteurs de concentration, de dilution ou de transformation.

8. CHECKS? WHAT CHECKS?

In the course of our investigation, we identified another major problem: that the "mercury risk" is not under control. Checks are virtually non-existent and no one really knows what levels of mercury are present in the cans of tuna sold across Europe.

Most of the tuna eaten in France is caught and canned abroad, for example in the Seychelles or Madagascar.[76] **Between the time a tuna is caught and its arrival in France, there are very few inspection requirements. The few checks carried out by the French authorities are largely unable to guarantee the conformity of the products on our shop shelves. Worse still, checks are only conducted on fresh tuna; cans are not tested. We have no guarantee from our own government that the tuna products we eat in France are not contaminated with mercury.**

European law states that food companies are responsible for not selling products with mercury levels over the regulatory limits.[128] **But we have not found any legislation that stipulates how often tests must be conducted, or at what stage in the supply chain these tests should be carried out. Companies therefore appear to be free to carry out tests as often or as rarely as they see fit.** What's more, the health risk posed by mercury only manifests over the long term. There is little to no risk of an immediate scandal being triggered, as would happen with histamine or E. coli bacteria contamination. This means we have no guarantee that anyone is rigorously monitoring mercury levels in tuna products. The government's inspection regime is too weak to pose any real threat to fraudulent producers. Even though official checks are rare, many tuna products are recalled every year in Europe because they contain too much mercury.[129]

Furthermore, **because the limits have been intentionally set to be difficult to exceed, few samples actually exceed them. This gives a false sense of security that the mercury contamination problem is under control** and the number of tests can be reduced even further.

When the ship docks

In the tropics (Indian Ocean, Pacific Ocean, Atlantic Ocean), where most of the tuna we eat in France are caught, it is already extremely difficult to trace which vessel is catching which fish and how many tonnes of which species of tuna (see our report "*Tuna's Black Box: On the trail of an opaque and untraceable global market*"[76]). We have no information about mercury testing at this stage of the supply chain.

At the canning factories

Factories are free to set their own testing schedules. Moreover, in some countries, only a small number of laboratories are able to carry out mercury tests to regulatory standards and these tests are very expensive.

The same company could therefore have different practices depending on which country it exports from. For example, it might test every batch of tuna produced in country X, but only one batch every six months in country Y. In both cases, it could obtain a valid health certificate for export to the European Union.[130]

During checks by the authorities in the canning country
To export tuna to Europe, shipments from foreign operators must be accompanied by a health certificate issued by a "competent authority" in each exporting country, recognised by the European Commission. This competent authority is responsible for checking that the tuna complies with European standards. The European Commission is supposed to regularly check and guarantee that this competent authority is doing its job properly. Following a 2011 audit, the European Commission reported on the practices of the competent authority of the Seychelles: **in 2009, for tens of millions of kilos of tuna landed and processed in the Seychelles, only ten samples were tested by the Seychelles authority.** One of these ten exceeded the maximum mercury content permitted for export to the European Union. **However, the European Commission did not identify this almost total absence of mercury testing (and a finding of 10% non-compliance) as a shortcoming.**[47,131]

On arrival at the EU border

When tuna or tuna products arrive on European shores, they are supposed to be subject to border checks. Their paperwork, including the health certificate, is then checked. In 3% of cases, French customs officials were also supposed to physically test the tuna, but mercury is only a "secondary priority" for testing.

Since 2023, the Ministry of Agriculture has removed the mention of 'mercury' from the instructions for testing canned tuna.[132] Regardless of their mercury contamination levels, **canned tuna is never tested for mercury when entering France.**

On the shelf or in the warehouse

Once the tuna is available in shops, it can be sampled by the French authorities for additional checks. In reality, the testing rate is very low: **nationwide 25 tests were carried out per year on fresh tuna from 2016 to 2021, and 42 in 2022, but no cans were tested.**[48] As a result, the **checks conducted by the French authorities are unable to properly guarantee the conformity of the tuna sold to French consumers. Indeed, absolutely no checks are conducted on canned tuna,** which account for 90% of tuna sales (nearly 64,000 tonnes).[36] Yet, even with as few as 25 and 42 samples, the French authorities have found that the limits are exceeded on a regular basis. **This clearly indicates that there is widespread contamination across the country. Yet the number of checks carried out is still low and there are no consequences for non-conformity.**

When it comes to health, the canned tuna market is a veritable black hole.

CONCLUSION

Once again, industrial lobbies are wielding their considerable power to protect their interests to the detriment of public health. Without a thought for the children whose brain development will be damaged or for the adults accumulating mercury in their cerebral cortexes year after year, gradually losing their health, the tuna industry continues to do everything it can to weaken health standards and clear the way for its copious profits. Worse still, it is manufacturing doubt to conceal the dangers of mercury, even going so far as to encourage pregnant people to eat tuna, a fish inevitably contaminated with mercury.

The health standards that are supposed to control the risks of mercury contamination are not doing their job: protecting all people's health. People who regularly consume predatory fish are slowly but surely being poisoned by mercury. The effects of mercury poisoning are well known, but it is often difficult to get a diagnosis. The few testimonies we have heard tell of endless medical investigations to find the source of the patient's ailments. Furthermore, pregnant people are not sufficiently warned that the mercury in certain fish, like tuna, poses a high risk to the health of their fetus.

Methylmercury contamination in fish is concealed behind the facade of omega-3s. Criticising the consumption of predatory fish is seen as harmful to public health. But, **tuna and other predatory fish with high levels of mercury (e.g. swordfish) are not among the so-called "oily" fish that are rich in omega-3s. If people ate far less of these predatory fish they would not lose anything from a health point of view. Quite the opposite.**

Finally, **the last line of defence against the risks of mercury contamination, namely checks along the supply chain, are being cut to the bone.** This leaves the path clear for fish contaminated with high levels of mercury to end up on our plates.

Tests carried out on nearly 150 cans of tuna across five European countries have unfortunately proved that tuna is far from safe.

If tuna did not benefit from an exception to the mercury limit for seafood products, one in three cans would be banned from sale. **Compared with the lowest maximum levels allowed in seafood products, one in every two cans tested could not be sold.** The tuna industry, the regulations in force and current nutrition recommendations have created a dangerous environment in which public health comes second to commercial interests.

Sabotaging public health is not industrial fishing's only misdeed. Tuna fished in the Indian and Pacific Oceans (the majority of those eaten in Europe) are caught using fishing techniques that destroy the environment, kill marine animals, violate human rights and devastate the small-scale fisheries of the countries on these oceans, whose food sovereignty depends on them.

BLOOM call for strict protections for our health. The exceptions granted to the most contaminated fish make no sense from a health standpoint and unnecessarily jeopardise public health. Checks and requirements on the industry must be strengthened and consumers must be better warned about the risks to which they are exposed. Such measures can only serve to benefit both our health and the ecosystems ravaged by industrial tuna fishing.

BIBLIOGRAPHIE

1 https://www.pewtrusts.org/en/research-and-analysis/reports/2020/10/netting-billions-2020-a-global-tuna-valuation.

2 BLOOM Association Les Lobbies Thoniers Font La Loi https://bloomassociation.org/wp-content/uploads/2023/01/Les-lobbies-thoniers-font-la-loi.pdf.

3 Compilation BLOOM Des Données Des ORGP Thonières (CTOI, IATTC, ICCAT, WCPFC). (2023)

4 European Commission. Directorate General for Maritime Affairs and Fisheries. *et al*. Le marché européen du poisson : édition 2023.

5 France AgriMer Consommation Des Produits de La Pêche et de l'aquaculture - (2023) https://www.franceagrimer.fr/fam/content/download/74286/document/STA_MER_CONSO_2023.pdf?version=2.

6 BLOOM Association Violence En Boîte https://bloomassociation.org/wp-content/uploads/2023/05/violence-en-boite.pdf.

7 BLOOM Association La Guerre Des Thons https://bloomassociation.org/wp-content/uploads/2023/04/guerre-des-thons.pdf.

8 Mercure et santé https://www.who.int/fr/news-room/fact-sheets/detail/mercury-and-health (accessed 2023-03-10).

9 European Environment Agency. Mercury in Europe's Environment: A Priority for European and Global Action.

10 ONU (2018) Global Mercury Assessment https://www.unep.org/resources/publication/global-mercury-assessment-2018.

11 EFSA Panel on Contaminants in the Food Chain (CONTAM) (2012) Scientific Opinion on the Risk for Public Health Related to the Presence of Mercury and Methylmercury in Food https://doi.org/10.2903/j.efsa.2012.2985.

12 U.S. Environmental Protection Agency (2001) CASRN 22967-92-6 - Methylmercury (MeHg) Integrated Risk Information System (IRIS).

13 Jacobson *et al*. (2015) Relation of Prenatal Methylmercury Exposure from Environmental Sources to Childhood IQ https://doi.org/10.1289/ehp.1408554.

14 Freire *et al*. (2010) Hair Mercury Levels, Fish Consumption, and Cognitive Development in Preschool Children from Granada, Spain, https://doi.org/10.1016/j.envres.2009.10.005.

15 Oken *et al*. (2008) Maternal Fish Intake during Pregnancy, Blood Mercury Levels, and Child Cognition at Age 3 Years in a US Cohort https://doi.org/10.1093/aje/kwn034.

16 Chevrier *et al*. (2009) Qualitative Assessment of Visuospatial Errors in Mercury-Exposed Amazonian Children https://doi.org/10.1016/j.neuro.2008.09.012.

17 Sagiv *et al*. (2012) Prenatal Exposure to Mercury and Fish Consumption During Pregnancy and Attention-Deficit/Hyperactivity Disorder–Related Behavior in Children https://doi.org/10.1001/archpediatrics.2012.1286.

18 Yang *et al*. (2020) Toxicity of Mercury: Molecular Evidence https://doi.org/10.1016/j.chemosphere.2019.125586.

19 Fukuda *et al*. (1999) An Analysis of Subjective Complaints in a Population Living in a Methylmercury-Polluted Area https://doi.org/10.1006/enrs.1999.3970.

20 Genchi *et al*. (2017) Mercury Exposure and Heart Diseases https://doi.org/10.3390/ijerph14010074.

21 Branco *et al*. (2021) https://doi.org/10.1016/bs.ant.2021.01.001.

22 Yaginuma-Sakurai *et al*. (2010) Intervention Study on Cardiac Autonomic Nervous Effects of Methylmercury from Seafood https://doi.org/10.1016/j.ntt.2009.08.009.

23 Maqbool *et al*. (2017) Immunotoxicity of Mercury: Pathological and Toxicological Effects https://doi.org/10.1080/10590501.2016.1278299.

24 Xue *et al*. (2007) Maternal Fish Consumption, Mercury Levels, and Risk of Preterm Delivery https://doi.org/10.1289/ehp.9329.

25 Benefice *et al*. (2010) Fishing Activity, Health Characteristics and Mercury Exposure of Amerindian Women Living alongside the Beni River (Amazonian Bolivia) https://doi.org/10.1016/j.ijheh.2010.08.010.

26 Bjørklund *et al*. (2019) Mercury Exposure and Its Effects on Fertility and Pregnancy Outcome https://doi.org/10.1111/bcpt.13264.

27 Maeda *et al*. (2019) Associations of Environmental Exposures to Methylmercury and Selenium with Female Infertility: A Case–Control Study https://doi.org/10.1016/j.envres.2018.10.007.

28 Carta *et al*. (2003) Sub-Clinical Neurobehavioral Abnormalities Associated with Low Level of Mercury Exposure through Fish Consumption https://doi.org/10.1016/S0161-813X(03)00080-9.

29 DEMO/COPHES *et al*. (2013) Economic Benefits of Methylmercury Exposure Control in Europe: Monetary Value of Neurotoxicity Prevention https://doi.org/10.1186/1476-069X-12-3.

30 IARC (CIRC) List of classifications https://monographs.iarc.who.int/list-of-classifications.

31 Dasharathy *et al*. (2022) Mutagenic, Carcinogenic, and Teratogenic Effect of Heavy Metals https://doi.org/10.1155/2022/8011953.

32 Skalny *et al*. (2022) Mercury and Cancer: Where Are We Now after Two Decades of Research? https://doi.org/10.1016/j.fct.2022.113001.

33 Crespo-López *et al*. (2009) Mercury and Human Genotoxicity: Critical Considerations and Possible Molecular Mechanisms https://doi.org/10.1016/j.phrs.2009.02.011.

34 EFSA Panel on Contaminants in the Food Chain (CONTAM) (2012) Scientific Opinion on the Risk for Public Health Related to the Presence of Mercury and Methylmercury in Food https://doi.org/10.2903/j.efsa.2012.2985.

35 Imprégnation de la population française par le mercure. Programme national de biosurveillance, Esteban (2014-2016).

36 FranceAgriMer Chiffres-Clés Des Filières Pêche et Aquaculture En France En 2022 https://www.franceagrimer.fr/Actualite/Filieres/Peche-et-aquaculture/2022/Retrouvez-les-chiffres-cles-de-la-peche-et-aquaculture-Francaise-et-un-point-sur-les-entreprises-de-mareyage.

37 National Institute for Health (NIH) Omega-3 Fatty Acids - Fact Sheet for Health Professionals https://ods.od.nih.gov/factsheets/Omega3FattyAcids-HealthProfessional/ (accessed 2024-06-06).

38 Leblanc *et al*. (2006) CALIPSO - Etude des Consommations ALimentaires de produits de la mer et Imprégnation aux éléments traces, PolluantS et Oméga 3.

39 CCCF Report of the Eighth Session of the Codex Committee on Contaminants in Foods (2014) https://www.fao.org/fao-who-codexalimentarius/sh-proxy/de/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FMeetings%252FCX-735-08%252FREP14_CFe.pdf.

40 DGAL Surveillance Sanitaire Des Denrées Animales et Végétales En France : Bilan 2015 Des Plans de Surveillance et de Contrôle https://agriculture.gouv.fr/telecharger/82490.

41 Règlement (UE) 2023/915 de La Commission Concernant Les Teneurs Maximales Pour Certains Contaminants Dans Les Denrées Alimentaires.

42 Directive 2002/32/CE Du Parlement Européen et Du Conseil Du 7 Mai 2002 Sur Les Substances Indésirables Dans Les Aliments Pour Animaux (Version 2019).

43 Joint FAO/ WHO Expert Committee on Food Additives Lead https://apps.who.int/food-additives-contaminants-jecfa-database/Home/Chemical/3511.

44 EFSA Panel on Contaminants in the Food Chain (CONTAM) (2010) Scientific Opinion on Lead in Food https://doi.org/10.2903/j.efsa.2010.1570.

45 Consommation de poissons et exposition au méthylmercure | Anses - Agence nationale de sécurité sanitaire de l'alimentation, de l'environnement et du travail https://www.anses.fr/fr/content/consommation-de-poissons-et-exposition-au-m%C3%A9thylmercure (accessed 2024-06-08).

46 BLOOM AskTheEU : Information regarding maximum levels for certain contaminants in foodstuffs https://www.asktheeu.org/en/request/information_regarding_maximum_le#outgoing-26092.

47 Commission européenne Audit de l'autorité Compétente Des Seychelles Par La Commission Européenne (2011) https://ec.europa.eu/food/audits-analysis/audit-report/details/2691.

48 DGAL Instructions Techniques de La DGAL : DGAL/SDPAL/2016-2, DGAL/SDPAL/2017-20, DGAL/SDPAL/2018-93, DGAL/SDPAL/2019-81, DGAL/SDPAL/2020-71, DGAL/SDPAL/2021-113, DGAL/SDEIGIR/2022-28. Les Instructions Ultérieures (2023 et 2024) Ne Rendent Pas Public Le Détail Des Analyses de Mercure Espèce Par Espèce.

49 Zhang *et al*. (2021) Global Health Effects of Future Atmospheric Mercury Emissions https://doi.org/10.1038/s41467-021-23391-7.

50 Zhang *et al*. (2020) A Global Model for Methylmercury Formation and Uptake at the Base of Marine Food Webs https://doi.org/10.1029/2019GB006348.

51 UNO ONU (2018) - Tech Global Mercury Assessment.Pdf.

52 Médieu *et al*. (2024) Stable Tuna Mercury Concentrations since 1971 Illustrate Marine Inertia and the Need for Strong Emission Reductions under the Minamata Convention https://doi.org/10.1021/acs.estlett.3c00949.

53 European Environment Agency (2018) Mercury in Europe's Environment: A Priority for European and Global Action.

54 https://connecticuthistory.org/ending-the-danbury-shakes-a-story-of-workers-rights-and-corporate-responsibility/.

55 Stéphane Foucart Le Mystère de La Baie Empoisonnée de Minamata.

56 Japon Sous Mercure (1975) https://www.rts.ch/archives/radio/culture/henri-guillemin-vous-parle-de/4716021-japon-sous-mercure-25-04-1975.html.

57 Updated: Global Dental Amalgam Tracker | EnvMed Network https://environmentalmedicine.eu/mercury-free-dentistry-for-planet-earth/ (accessed 2024-06-07).

58 Les Mercuriens (2016).

59 https://www.non-au-mercure-dentaire.org/_fichiers/la_france_doit_renoncer_au_mercure_dentaire-mars_2014.pdf.

60 EnvMed Network | European Network for Environmental Medicine https://environmentalmedicine.eu/ (accessed 2024-09-25).

61 Règlement - 2024/1849 du Parlement européen et du Conseil du 13 juin 2024 modifiant le règlement (UE) 2017/852 relatif au mercure en ce qui concerne les amalgames dentaires et les autres produits contenant du mercure ajouté faisant l'objet de restrictions à l'exportation, à l'importation et à la fabrication https://eur-lex.europa.eu/legal-content/FR/TXT/?uri=OJ%3AL_202401849 (accessed 2024-09-25).

62 Swiderski Quicksilver: A History of the Use, Lore and Effects of Mercury.

63 Yves Géry *et al*. Les Abandonnés de La République.

64 Substance Priority List | ATSDR https://www.atsdr.cdc.gov/spl/index.html (accessed 2024-06-07).

65 ECHA CLH REPORT FOR METHYLMERCURIC CHLORIDE https://echa.europa.eu/documents/10162/735ab9f0-4d10-10b0-430e-841c19d2acae.

66 Rooney (2014) The Retention Time of Inorganic Mercury in the Brain — A Systematic Review of the Evidence https://doi.org/10.1016/j.taap.2013.12.011.

67 Rapport Législatif de Christiane Taubira à l'Assemblée Nationale. (2011)

68 Virtanen *et al*. (2012) Serum Long-Chain n-3 Polyunsaturated Fatty Acids, Mercury, and Risk of Sudden Cardiac Death in Men: A Prospective Population-Based Study https://doi.org/10.1371/journal.pone.0041046.

69 J. Schubert *et al*. "Combinedd Effectts in Toxicology - A Rapid Systematic Testing Procedure : Cadmium, Mercury and Lead", Journal of Toxicology and Environmental Health, (1978).

70 BLOOM Association Le Far-West de La Pêche Thonière En Afriqiue https://bloomassociation.org/wp-content/uploads/2022/11/Dossier-BLOOM-La-Far-West-de-la-peche-thoniere.pdf.

71 BLOOM Association Les Yeux Grand Fermés https://bloomassociation.org/wp-content/uploads/2023/03/les-yeux-grands-fermes.pdf.

72 BLOOM Association Lining up the Ducks https://bloomassociation.org/wp-content/uploads/2023/04/Lining-up-the-ducks_FR.pdf.

73 BLOOM Association Le Label de La Mort - MSC https://bloomassociation.org/wp-content/uploads/2023/09/msc-peches-thonieres.pdf.

74 BLOOM Association Délibéremment Ignorants https://bloomassociation.org/wp-content/uploads/2023/11/Deliberement-ignorants.pdf.

75 BLOOM Association Du Paradis à l'abîme https://bloomassociation.org/wp-content/uploads/2023/11/Deliberement-ignorants.pdf.

76 BLOOM Association La Boîte Noire Du Thon https://bloomassociation.org/wp-content/uploads/2024/05/rapport-La-boite-noire-du-thon.pdf.

77 Filmalter *et al*. (2013) Looking behind the Curtain: Quantifying Massive Shark Mortality in Fish Aggregating Devices https://doi.org/10.1890/130045.

78 Mongabay news Fisheries observer turns up dead in latest incident in Ghana waters https://web.archive.org/web/20240321172040/https://news.mongabay.com/2023/12/fisheries-observer-turns-up-dead-in-latest-incident-in-ghana-waters/.

79 https://Liguecontrelobesite.Org/Actualite/Taille-Poids-et-Tour-de-Taille-Photographie-2020-Des-Francais/. (2021)

80 Evaluation of Certain Food Additives and Contaminants: Sixty-First Report of the Joint FAO/WHO Expert Committee on Food Additives.

81 https://www.fao.org/4/w9114f/W9114f03.htm.

82 FAO (1960) Conférence Pour l'Europe https://www.fao.org/4/w9114f/W9114f03.htm.

83 COMMISSION MIXTE FAO/OMS DU CODEX ALIMENTARIUS RAPPORT DE LA PREMIÈRE SESSION https://www.fao.org/fao-who-codexalimentarius/sh-proxy/en/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FMeetings%252FCX-701-01%252Fal63_12f.pdf.

84 CCCF REPORT OF THE 13rd SESSION OF THE CODEX COMMITTEE ON CONTAMINANTS IN FOODS https://www.fao.org/fao-who-codexalimentarius/sh-proxy/de/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FMeetings%252FCX-735-13%252FREPORT%252FFinal%25252oReport%252FREP19_CFe.pdf.

85 Joint FAO/WHO Expert Committee on Food Additives (1972) Evaluation of Mercury, Lead, Cadmium and the Food Additives Amaranth, Diethylpyrocarbonate, and Octyl Gallate.

86 CCFAC (1985) Report of the Eighteenth Session of the Codex Committee on Food Additives (1985).

87 Commissiewerkgroep Contaminanten | ROW-EU levensmiddelen | Regulier Overleg Warenwet https://www.row-minvws.nl/row-eu-levensmiddelen/toxicologische-veiligheid/contaminanten (accessed 2024-09-25).

88 OMC - Marrakech SPS - (1994) - Accord Sur l'Application Des Mesures Sanitaires et Phytosanitaires.Pdf.

89 CCFAC Report of the 36th Session of the Codex Committee on Food Additives (2004) https://www.fao.org/fao-who-codexalimentarius/sh-proxy/de/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FMeetings%252FCX_711-37%252Fal28_12e.pdf.

90 CCFAC Report of the 38th Session of the Codex Committee on Food Additives (2006) https://www.fao.org/fao-who-codexalimentarius/sh-proxy/en/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FMeetings%252FCX_711-38%252Fal29_12e.pdf.

91 G. Adegoke *et al*. (2006) WHO Technical Report Series – JECFA 67 – 2006 https://doi.org/10.13140/RG.2.1.1155.7521.

92 none (2003) Correspondence about Publication Ethics and Regulatory Toxicology and Pharmacology https://doi.org/10.1179/oeh.2003.9.4.386.

93 Crépet *et al*. (2005) Management Options to Reduce Exposure to Methyl Mercury through the Consumption of Fish and Fishery Products by the French Population https://doi.org/10.1016/j.yrtph.2005.03.006.

94 FAO - The State of World Fisheries and Aquaculture (2022), http://www.fao.org/documents/card/en/c/cc0461en

95 https://www.zeromercury.org/mercury-added-skin-lightening-creams-campaign/

96 Metherel *et al*. (2024) Dietary Docosahexaenoic Acid (DHA) Downregulates Liver DHA Synthesis by Inhibiting Eicosapentaenoic Acid Elongation https://doi.org/10.1016/j.jlr.2024.100548.

97 Welch *et al*. (2010) Dietary Intake and Status of n–3 Polyunsaturated Fatty Acids in a Population of Fish-Eating and Non-Fish-Eating Meat-Eaters, Vegetarians, and Vegans and the Precursor-Product Ratio of - Linolenic Acid to Long-Chain n–3 Polyunsaturated Fatty Acids: Results from the EPIC-Norfolk Cohort https://doi.org/10.3945/ajcn.2010.29457.

98 Craig *et al*. (2021) The Safe and Effective Use of Plant-Based Diets with Guidelines for Health Professionals https://doi.org/10.3390/nu13114144.

99 Burdge *et al*. (2003) Effect of Altered Dietary n -3 Fatty Acid Intake upon Plasma Lipid Fatty Acid Composition, Conversion of [13 C] - Linolenic Acid to Longer-Chain Fatty Acids and Partitioning towards - Oxidation in Older Men https://doi.org/10.1079/BJN2003901.

100 Welch *et al*. (2010) Dietary Intake and Status of n–3 Polyunsaturated Fatty Acids in a Population of Fish-Eating and Non-Fish-Eating Meat-Eaters, Vegetarians, and Vegans and the Precursor-Product Ratio of - Linolenic Acid to Long-Chain n–3 Polyunsaturated Fatty Acids: Results from the EPIC-Norfolk Cohort https://doi.org/10.3945/ajcn.2010.29457.

101 Report of the Joint FAO/WHO Expert Consultation on the Risks and Benefits of Fish Consumption. Rome, 25029 (January 2010).

102 Det vi ikke vet om laksen – Morgenbladet https://www.morgenbladet.no/aktuelt/2018/04/05/det-vi-ikke-vet-om-laksen/ (accessed 2023-05-16).

103 Rapporten som renvasket laksen – Morgenbladet https://www.morgenbladet.no/aktuelt/2018/09/28/rapporten-som-renvasket-laksen/ (accessed 2023-05-16).

104 Om selskapet Olivita AS - Olivita https://olivita.no/kundeservice/om-selskapet-olivita-as/ (accessed 2023-05-16).

105 Skaare *et al*. (1990) Levels of Polychlorinated Biphenyls, Organochlorine Pesticides, Mercury, Cadmium, Copper, Selenium, Arsenic, and Zinc in the Harbour Seal, Phoca Vitulina, in Norwegian Waters https://doi.org/10.1016/0269-7491(90)90148-6.

106 https://web.archive.org/web/20230402034410/https://iattc.org/en-US/About/Staff/Detail/jpulvenis.

107 Codex Comittee CCCF (2013) Report of the 7th Session of the Codex Committee on Contaminants in Foods.

108 CCCF Report of the Seventh Session of the Codex Committee on Contaminants in Foods (2013) https://www.fao.org/fao-who-codexalimentarius/sh-proxy/de/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FMeetings%252FCX-735-07%252FREP13_CFe.pdf.

109 CCCF Report of the Ninth Session of the Codex Committee on Contaminants in Foods (2015) https://www.fao.org/fao-who-codexalimentarius/sh-proxy/de/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FMeetings%252FCX-735-09%252FREP15_CFe.pdf.

110 Electronic Working Group of the CCCF led by the Netherlands, Canada and New Zealand Proposed Draft Maximum Levels for Methylmercury in Fish Including Associated Sampling Plans https://www.fao.org/fao-who-codexalimentarius/sh-proxy/en/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FMeetings%252FCX-735-12%252FWD%252Fcf12_07e.pdf.

111 CCCF meetings reports https://www.fao.org/fao-who-codexalimentarius/committees/committee/related-meetings/en/?committee=CCCFefsa.

112 Codex Comittee CCCF (2014) Report of the 8th Session of the Codex Committee on Contaminants in Foods.

113 Codex Alimentarius Comission (2018) Report of the 12th Session of the Codex Committee on Contaminants in Foods – REP18/CF https://www.fao.org/fao-who-codexalimentarius/committees/committee-detail/related-meetings/fr/?committee=CCCF.

114 @ClaireNouvian (association BLOOM) (Tweet du 20 novembre 2023) https://twitter.com/ClaireNouvian/status/1726536321362231638?s=20.

115 Pesca España desmonta mitos sobre el mercurio y explica por qué el selenio neutraliza toda amenaza https://industriaspesqueras.com/noticia.php?id=78161 (accessed 2024-06-08).

116 Mercurio y Selenio | Pesca España https://pescaespana.org/proyectos/mercurio-y-selenio/ (accessed 2024-06-10).

117 NdP_PescaEspana_Nace-Pesca-Espana-En-Defensa-Del-Sector-Pesquero-y-La-Variedad-Tradicion-y-Sostenibilidad-de-Los-Productos-Del-Mar.Pdf https://pescaespana.org/wp-content/uploads/2022/12/NdP_PescaEspana_Nace-Pesca-Espana-en-defensa-del-sector-pesquero-y-la-variedad-tradicion-y-sostenibilidad-de-los-productos-del-mar.pdf (accessed 2024-06-10).

118 InfluenceMap Industry Influence on Biodiversity Policy https://influencemap.org/report/Industry-Associations-Biodiversity-Policy-19612 (accessed 2024-06-10).

119 1972 - Ganther *et al*. - Selenium : Relation to Decreased Toxicity of Methylmercury Added to Diets Containing Tuna.

120 Sugiura *et al*. (1978) 1978 - Selenium Protection against Mercury Toxicity: High Binding Affinity of Methylmercury by Selenium-Containing Ligands in Comparison with Sulfur-Containing Ligands https://doi.org/10.1016/S0006-3061(00)80288-4.

121 Yang *et al*. (2008) 2008 - Yang - Selenium and Mercury in Organisms: Interactions and Mechanisms https://doi.org/10.1139/A08-001.

122 Burger *et al*. (2013) Selenium/Mercury Molar Ratios in Freshwater, Marine, and Commercial Fish from the USA: Variation, Risk, and Health Management https://doi.org/10.1515/reveh-2013-0010.

123 Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32002R0178.

124 Scientific Opinion on Health Benefits of Seafood (Fish and Shellfish) (2014) Consumption in Relation to Health Risks Associated with Exposure to Methylmercury https://doi.org/10.2903/j.efsa.2014.3761.

125 Statement on the Benefits of Fish/Seafood Consumption Compared to the Risks of Methylmercury in Fish/Seafood https://doi.org/10.2903/j.efsa.2015.3982.

126 2015_EU_WG_Quecksilber_Beratungsdokument_DG_Sante.Pdf.

127 Foodwatch DE (2018) https://www.foodwatch.org/de/erfolg-grenzwerte-fuer-quecksilber-in-fisch-werden-nicht-gelockert.

128 Règlement (CE) N° 178/2002 Du Parlement Européen et Du Conseil Du 28 Janvier 2002 Établissant Les Principes Généraux et Les Prescriptions Générales de La Législation Alimentaire, Instituant l'Autorité Européenne de Sécurité Des Aliments et Fixant Des Procédures Relatives à La Sécurité Des Denrées Alimentaires.

129 Comission européenne Rapid Alert System for Food and Feed (RASFF) https://webgate.ec.europa.eu/rasff-window/screen/search?searchQueries=eyJkYXRlIjp7InNoYXJoUmFuZ2UiOiIyMDIyLTEyLTMxVDIzOjAwOjAwLjAwMFoiLCJlbmRSYW5nZSI6IjIwMjQtMDYtMjhUMjI6MDA6MDAuMDAwWiJ9LCJjb3VudHJpZXMiOnt9LCJoeXBlIjp7fSwibm9oaWZpY2FoaW9uU3RhdHVzIjp7Im5vdGlmaWNhdGlvblNoYXR1cyI6W1sxXV19LCJwcm9kdWNOIjp7InByb2R1Y3RDYXRlZ29yeSI6W1sxODQoNV1dfSwicmlzayI6e30sInJlZmVyZW5jZSI6IiIsInN1YmplY3QiOiJtZXJjdXJ5IiwicGFnZVNpemUiOjI1fQ%3D%3D (accessed 2024-06-09).

130 Fish4ever La qualité et l'exigence dans la pêche au thon à la ligne : rapport sur l'histamine & le mercure https://web.archive.org/web/20240313155121/https:/online.flipbuilder.com/exei/ojfz/ (accessed 2024-06-09).

131 Règlement Européen CE 625/2017 - Concernant Les Contrôles Officiels et Les Autres Activités Officielles Servant à Assurer Le Respect de La de La Législation Alimentaire et de La Législation Relative Aux Aliments Pour Animaux Ainsi Que Des Règles Relatives à La Santé et Au Bien-Être Des Animaux, à La Santé Des Végétaux et Aux Produits Phytopharmaceutiques. Pdf.

132 DGAL DGAL/SDASEI/2020-11 du 07/01/2020 : Plan de Surveillance de La Contamination Biologique et Physico-Chimique Des Produits d'origine Animale Destinés à La Consommation Humaine Ou Animale En Poste de Contrôle Frontalier - (Année 2020).

133 Takaoka *et al*. (2018), Survey of the Extent of the Persisting Effects of Methylmercury Pollution on the Inhabitants around the Shiranui Sea, Japan, 10.3390/toxics6030039



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