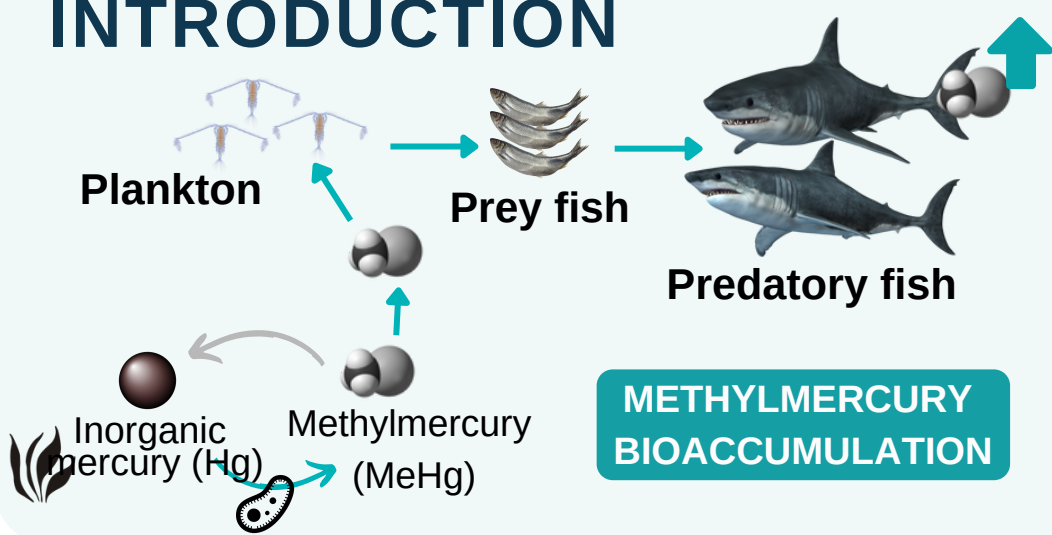


MERCURY IN DIFFERENT SPECIES OF FISHES IN SPAIN AND ASSOCIATED RISKS

NATALIA MOLERO GUERRA. June 2022.

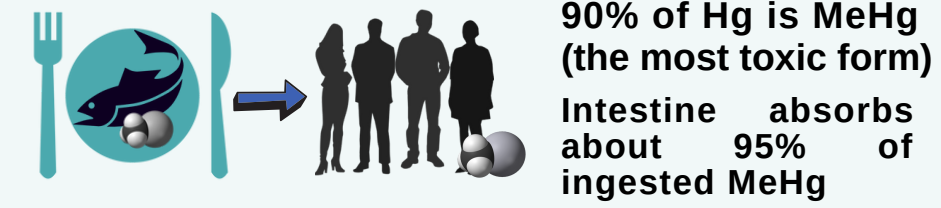
INTRODUCTION



Its toxicity in humans results from negative effects on:

- Nervous system (mainly in child development)
- Reproductive system
- Hormonal system
- Digestive system
- Cardiovascular system
- Immunological system

Main source of MeHg in humans



Food intake: 90% of total exposure

Regulation (EC) No 1881/2006 of the maximum level of Hg in fish: 1 mg/kg or 0.5 mg/kg, depending on the species

Fish is a traditional food in the Mediterranean diet

Spain is the 3rd country in the world with the highest fish consumption

About half of the fish comes from the coasts that bathe the nation:

the Atlantic and the Mediterranean.



OBJECTIVES

General objective: Knowing the concentration of mercury in fish species in Spain and the associated risks.

Specific objectives:

- (1) Determine Hg concentrations in the fish species from the Spanish coast of the Atlantic and the Mediterranean and their temporal evolution
- (2) Determine Hg concentrations in the most consumed species and analyze if they pose a risk to the population
- (3) Analyze the species with the highest content of Hg to identify those that exceed the legal limits established by the European Union

RESULTS

1) MERCURY CONCENTRATION IN FISH SPECIES FROM THE SPANISH COASTS AND ITS TEMPORAL EVOLUTION



Trachurus trachurus:

0,030 mg/kg (2008) vs. 0,107 mg/kg (2013)

Micromessistius poutassou:

0,048 mg/kg (2013) vs 0,056 mg/kg (2016)

Merluccius merluccius:

0,15 mg/kg (2008) vs 0,30 mg/kg (2017)

Scomber scombrus:

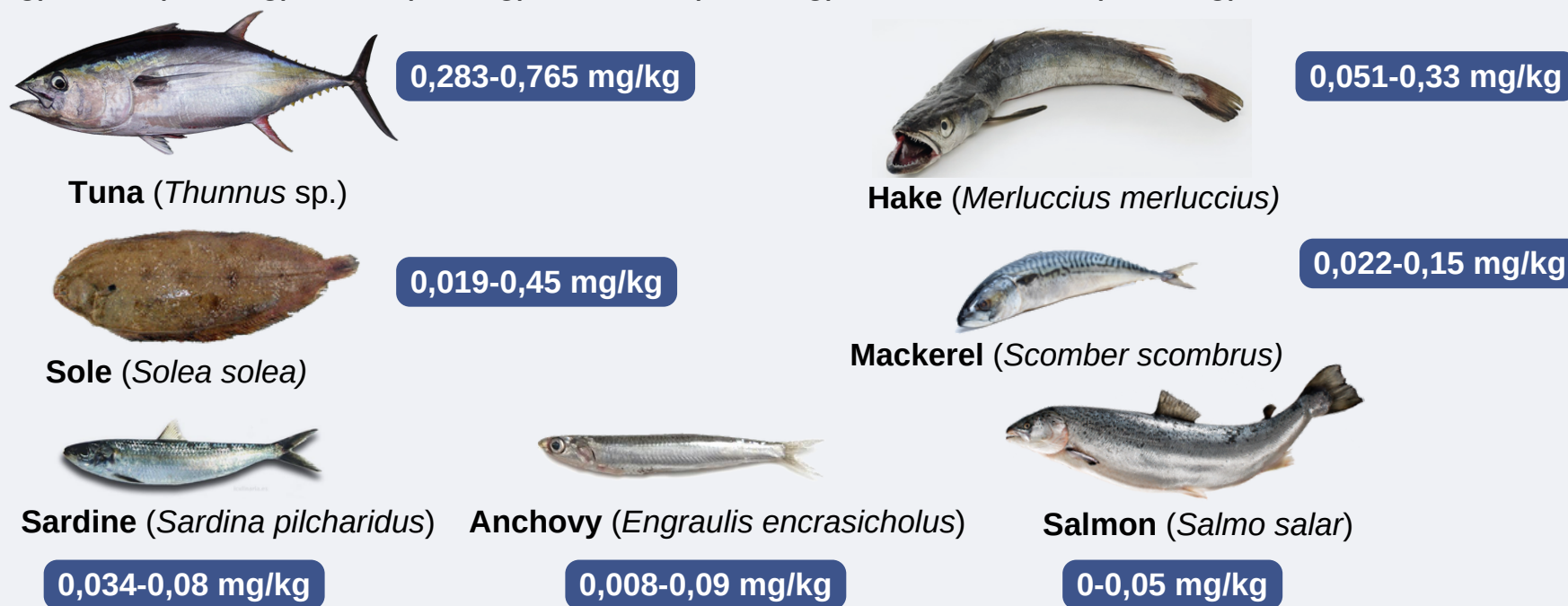
0,040 mg/kg (2008) vs 0,073 mg/kg (2016)

Engraulis encrasicolus:

0,049 mg/kg (1994) vs 0,018 mg/kg (2013) vs 0,008 mg/kg (2016)

2) MERCURY CONCENTRATION IN THE MOST CONSUMED FISH SPECIES IN SPAIN AND ASSOCIATED RISKS

- Fishery products consumption in Spain: 24,83 kg/year per capita.
- The main form of fish consumption is fresh fish: 10,58 kg/year per capita.
- The most consumed fish species in Spain (fresh form): hake (1,56 kg), salmon (1,47 kg), anchovy (0,96kg), sole (0,57kg), tuna (0,5 kg), sardine (0,43 kg) and mackerel (0,31 kg)



3) FISH SPECIES IN SPAIN WITH MERCURY CONCENTRATIONS HIGHER THAN EUROPEAN REGULATIONS

Table 1. Fish species in Spain exceeding 1 mg/kg

Specie	N	Hg (mg/kg)	Reference
<i>Helicolenus dactylopterus</i>	5	4,77**	(Chouvelon et al. 2018)
<i>Lamna nasus</i>	1	3*	(Llull et al. 2017)
<i>Lepidorhombus bosci</i>	5	2,32**	(Chouvelon et al. 2018)
<i>Galeus melastomus</i>	12	2,19**	(Chouvelon et al. 2018)
<i>Scyliorhinus canicula</i>	10	2,12**	(Chouvelon et al. 2018)

*wet weight; ** dry mass; N: sample size

Table 2. Fish species in Spain exceeding 0,5 mg/kg

Specie	N	Hg (mg/kg)	Reference
<i>Merluccius merluccius</i>	5	0,855**	(Sánchez-Muros et al. 2018)
<i>Dentex dentex</i>	17	0,850*	(Llull et al. 2017)
	28	0,780*	(Junqué et al. 2018)
<i>Solea Solea</i>	8	0,704*	(Schuhmacher et al. 1994)
<i>Diplodus sargus</i>	81	0,647*	(Merciai et al. 2018)
<i>Auxis rochei</i>	5	0,568**	(Sánchez-Muros et al. 2018)

*wet weight; ** dry mass; N: sample size

CONCLUSIONS

- The risk of eating a specific fish specie depends on the amount consumed and its Hg content. Considering both factors, salmon, anchovy, sardine and mackerel entail the lowest risk. Hake and sole have an intermediate risk and tuna has the greatest.
- To get fish benefits while limiting Hg intake the recommendation is to include 3-4 servings of fish/week. It is advisable to prioritize those with the lowest concentration and to limit tuna and those with the highest amounts. Specially, the vulnerable population should eliminate or reduce their intake to less than 120g/month.
- Mediterranean fish species accumulate higher levels of Hg than those in the Atlantic because of the 'Mediterranean mercury anomaly' phenomenon. On the other hand, there is an increasing temporal trend in Hg concentration.
- The difference in Hg concentration between the Atlantic and the Mediterranean species is very noticeable in large species (predators). Smaller species hardly show any variations.
- In Spain there is a great variety of species that exceed the maximum limits of Hg allowed by Regulation (CE) 1881/2006. Individuals exceeding 1 mg/kg are mainly large predators (tunas, sharks, swordfish). Those that exceed 0,5 mg/kg are smaller species, fundamentally benthic.

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