

Because you care
about CONSUMERS' HEALTH



Food Fraud and Authenticity Service: Fish and Seafood

Products at high risk of food fraud

Fish and Seafood

Seafood is a global commodity extensively traded around the World to meet consumers' needs in terms of quantity and species. As the fish market expands, so does the opportunity for fraud.

Global fish consumption is projected to rise in the next decade, and the production will not be completely able to keep up, leading to higher prices and temptation for fraud. Adulteration can happen at **each step of the supply chain**: restaurant, retailer or supplier level. **Species mislabeling is one of the most common fraud.**

Most common frauds

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SHORT-WEIGHTING: addition of **water and salts** to sell smaller quantities of fish than advertised.



REPLACEMENT WITH OTHER SPECIES: adulteration with **cheaper fish species** is very common, especially in **minced and homogenized products**: pangasius sold for cod or grouper, farmed salmon for wild one, tilapia for snapper, etc.



EXTENSION OF SHELF-LIFE: **formaldehyde** (not-allowed) or **sulfur dioxide** (labeling required) added to fish to **preserve it for longer**.



FRESHNESS COUNTERFEITING: **artificial enhancement** of fish **appearance** is very common: **carbon monoxide** added to **tuna to enhance the red color** and make it appear in better conditions, **hydrogen peroxide** to bleach blue fish, **citric acid** to preserve color in mussels and bleach cephalopods.



FISH MISLABELING: the intentional **mislabeling of fish species** is the **most common fraud in this sector**. The substitutes for the labeled fish are typically **cheaper, less desirable, but more readily available fish** sold as higher quality one. Also common is the sale of **farmed fish sold as wild** and **defrosted as fresh**.



The challenge of fraud detection

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When dealing with fish products' fraud and authenticity, it is very important to consider the **whole food chain**, as many parameters like **food processing, animal feed**, etc., may interfere.

Our analytical service

Fish and Seafood

Mérieux NutriSciences offers a comprehensive analytical service for fraud detection in fish and fish products. According to the specific need, different analytical approaches are used and combined together:

- **Sample-based:** targeted tests on single samples
- **Project-based:** specific design of the experimental protocol according to the fraud characteristics and customers' needs (targeted tests and non-targeted screening)

	ADDRESSED ISSUE	ANALYTICAL DETERMINATION	METHOD
SAMPLE-BASED	Short-weighting of fish to fraudulently increase the weight	Identification of water and polyphosphates	Mineral profile, ICP-OES
	Counterfeiting of fish freshness	Detection of histamine, Nitrogen of trimethylamine (TMA-N), Total Volatile Nitrogen (TVN) formaldehyde, etc.	HPLC, HPLC-UV
	Replacement with other species	Identification of DNA species in the product	DNA Barcoding, DNA Metabarcoding
	Counterfeiting of fish appearance	Detection of nitrates and nitrites, carbon monoxide (CO), peroxide hydrogen, etc.	GC-FID
	Adulteration with prohibited anti-bacterial	Detection of malachite green, Chrystal Violet	LC-MS/MS
	Adulteration with antibiotics	Detection of antibiotics	LC-MS, GC-MS
	Fraudulent labeling	Detection of omega 3/omega 6, SO2	GC-FID, titrimetry
PROJECT-BASED	Mislabeling of geographic origin	Food profiling and authenticity database (targeted/non-targeted)	Non-targeted metabolomics Isotopic Ratio Mass Spectrometry (IRMS) Near Infrared Spectroscopy (NIR) Fourier Transform Infrared Spectroscopy (FTIR) ...
	Authenticity verification: wild vs farmed fish, maintenance of quality standards, etc.		



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