

## **WHICH FOODS MAY CONTAIN MORE DIOXINS AND PCBs?**

Dioxins, furans and polychlorinated biphenyls (PCBs) are persistent environmental contaminants that may occur in food far from their original sources. They are neither ingredients nor substances normally added to food: their presence results from environmental contamination and transfer through production chains. Concentrations vary considerably with origin, animal species, lipid content, diet and the environmental history of the area.

The question 'which foods contain the most?' needs qualification. A food may have relatively high concentrations per gram of fat yet contribute little to overall exposure because it is rarely eaten; another, containing lower levels but consumed frequently, may contribute more to the dose received. Furthermore, data for dioxins and dioxin-like PCBs, expressed as toxic equivalents (TEQ), are not directly interchangeable with those for non-dioxin-like PCBs, which are generally expressed by mass.

## **FISH AND SEAFOOD: A HIGHLY DIVERSE CATEGORY**

Fish and other aquatic organisms can take up these contaminants from water, sediments and, above all, their diet. Accumulation may be substantial in certain species and geographical areas, but it is wrong to assume automatically that all fish contain high levels. The environment of origin, position in the food web, age, physiology and distribution of lipids between tissues all matter.

Oily fish such as herring and salmon may accumulate dioxins and PCBs in muscle differently from lean fish. In lean fish, a greater proportion may accumulate in the liver, so a lean fish fillet and its liver should not be regarded as equivalent. Eels, associated with sedimentary habitats and long life cycles, also warrant attention in particular environmental contexts. Differences between marine waters, lakes, rivers and contaminated basins may be decisive.

Feed composition is important in farmed fish. Marine ingredients such as fish oil and fishmeal can be routes of entry, while ingredient selection, testing and farm management can alter exposure. There is consequently no universal rule that farmed fish are always more or less contaminated than wild fish.

## **MILK, CHEESE AND OTHER DAIRY PRODUCTS**

In ruminants, ingestion of contaminated forage, soil and feed can lead to the transfer of some of these substances into milk fat. Butter, cream and cheese are therefore relevant matrices for monitoring, but concentrations depend on the animals' exposure, product composition and processing. A higher-fat cheese is not necessarily more contaminated

per gram of fat: the actual analytical concentration and the unit in which it is expressed must be known.

The 2026 EFSA assessment identifies milk and dairy products as food groups contributing significantly to overall exposure in many European dietary surveys. This reflects both contamination and consumption habits; it does not mean that all dairy products have high concentrations or fail to comply with legal limits.

## **MEAT, OFFAL AND ANIMAL FATS**

Beef, lamb, pork, poultry and game meat may contain different quantities of dioxins and PCBs according to environmental conditions and animal feed. In animal products, distribution among tissues also depends on species and the congener concerned. Fat is often a useful matrix for evaluating lipophilic contaminants, but it is not the only relevant tissue: in some species and for certain compounds, the liver and other offal may have profiles different from muscle.

In monitored supply chains, feed quality and prevention of accidental contamination are decisive. For game, direct connections with the local environment may make the area's history of emissions and deposition important. It is not scientifically justified to claim that all meat from a particular species or production method is systematically more contaminated without comparing consistent datasets.

## **EGGS: THE ROLE OF THE REARING ENVIRONMENT**

Eggs are a matrix sensitive to contamination of hens through feed, soil and materials swallowed while scratching. In contaminated areas, outdoor access may increase contact with soil and particles, but labels such as 'free-range', 'organic' or 'caged' cannot on their own predict dioxin and PCB levels. Feed origin and soil characteristics are also essential.

The lipid-rich yolk is particularly relevant for these contaminants. Interpreting a result requires distinguishing a fat-based concentration from one expressed for the whole egg and checking which parameter was actually measured. A detectable result does not in itself amount to a breach of legal limits.

## **PLANT FOODS AND OILS: NOT AUTOMATICALLY EXCLUDED**

Plant foods generally tend to have lower levels than many animal-derived products, but they are not immune to contamination. Atmospheric deposition on plant surfaces, contact with dust and soil and certain processing practices can contribute to residues. Leaves and exposed surfaces may behave differently from the inner parts of fruits or seeds.

Although vegetable oils are fatty matrices, they should not be equated with animal fats: contamination pathways and possible profiles differ. European legislation nonetheless sets maximum levels for vegetable oils and fats. The appearance of a plant-food category among contributors to dietary exposure in EFSA's findings also demonstrates that frequent consumption can matter even when concentrations are modest.

## FOOD TO MONITOR

Categories and matrices of interest: not a risk classification

### Fish and seafood

Species, provenance,  
diet and lipids



### Milk and dairy products

Small fish, butter  
and whole milk



### Meat and offal

Environment  
and animal feed



### Eggs

Small eggs, soil  
and scratching



### Oils and vegetable products

Deposition, processing  
and supply chain



## WHAT THE 2026 EFSA DATA SHOW

The 2026 EFSA update, using the WHO 2022 toxic equivalency factors, identifies 'milk and dairy products' and 'fish and seafood' as categories contributing more than 10% of average dietary exposure in numerous European surveys. In particular surveys and age groups, estimated contributions reach up to 43% for milk and dairy products and up to 67% for fish and seafood. 'Vegetables and vegetable products' and 'meat and meat products' also exceed 10% in several surveys.

These percentages are maxima observed in particular surveys, not shares that apply across Europe. They depend on diet, data availability and how results below quantification limits are handled. They are neither universal rankings of concentrations nor grounds for describing any single category as 'the most dangerous'.

## ORIGIN, FREQUENCY OF CONSUMPTION AND PREPARATION

Origin may be more informative than the food name alone. Products from the same species but different ecosystems can have very different contamination levels. Areas subject to targeted surveillance or affected by historical contamination require particular attention to monitoring results and any official advisories.

Some preparation methods that remove part of the fat may reduce the quantity of certain contaminants consumed in a portion, but the effect varies by food and offers no safety guarantee. Washing and ordinary cooking do not reliably eliminate dioxins and PCBs already incorporated into tissues. In general, dietary variety and compliance with official advice have a stronger basis than absolute rankings between food products.

## HOW TO READ A FOOD RANKING CORRECTLY

A sound comparison requires knowing at least: which compounds were tested; whether the result concerns dioxins, dioxins plus dioxin-like PCBs or non-dioxin-like PCBs; the unit (per gram of food, fat or fresh weight); sample origin; number of analyses; treatment of non-quantifiable results; and the usual consumption of the population studied. Without this information, an apparently straightforward ranking can be misleading.

The central message is that fish, dairy products, meat and eggs are important matrices for monitoring, but actual contamination must be measured and placed in context. Legal compliance and assessment of total exposure are related but distinct questions. Health criteria, analytical techniques and European limits are examined in the following chapters.

## SCIENTIFIC AND REGULATORY REFERENCES

[EFSA CONTAM Panel \(2026\). Update of the risk assessment on dioxins and dioxin-like PCBs in feed and food. EFSA Journal 24\(6\), e10103.](#)

[EFSA \(2026\). Update of the risk assessment of dioxins and dioxin-like PCBs in feed and food — Plain language summary.](#)

[EFSA CONTAM Panel \(2018\). Risk for animal and human health related to the presence of dioxins and dioxin-like PCBs in feed and food. EFSA Journal 16\(11\), 5333.](#)

[European Commission. Regulation \(EU\) 2023/915 on maximum levels for certain contaminants in food, Annex I, Section 4.1 \(consult the consolidated text and subsequent amendments\).](#)