

8. EUROPEAN LEGISLATION AND OFFICIAL CONTROLS ON PAHS IN FOOD

Polycyclic aromatic hydrocarbons (PAHs) in food are subject to specific European rules. These rules do not claim that compliant products are free of PAHs: they establish maximum concentrations for specified food categories that must not be exceeded when products are placed on the market. Alongside the limits, the system includes food-business operators' responsibilities, sampling, laboratory analysis and checks by competent authorities.

EUROPEAN CONTAMINANTS REGULATION

The principal reference is Commission Regulation (EU) 2023/915, which sets maximum levels for various contaminants in food and replaced Regulation (EC) No 1881/2006. PAHs are listed among process contaminants in Annex I, Section 5.1. The consolidated version must be checked when assessing an actual product because provisions may be amended and may impose particular conditions.

For PAHs, the legislation uses two separate parameters: benzo[a]pyrene measured individually, and the sum of four substances known as PAH4, comprising benzo[a]pyrene, benz[a]anthracene, benzo[b]fluoranthene and chrysene. Compliance with the benzo[a]pyrene limit alone does not replace compliance with the PAH4 limit when both apply.



WHY LIMITS DIFFER BETWEEN FOODS

There is no single European limit applicable to all foods. Section 5.1 sets different levels for cocoa products, dried herbs, oils and fats, smoked meat and fish products, foods for infants and young children and other specific categories. Differences in composition, production processes, contamination routes and consumption habits help explain why legislation does not treat all food matrices identically.

Examples illustrate why the footnotes matter: for dried herbs, the Regulation lists 10 µg/kg for benzo[a]pyrene and 50 µg/kg for PAH4; for banana chips, the corresponding figures are 2 and 20 µg/kg. For cocoa beans and certain derived products covered by their entry, levels are instead expressed as µg/kg of fat: comparing them directly with results per kilogram of whole food can produce incorrect conclusions. These examples do not replace checking the entry applicable to an individual product.

DEROGATIONS FOR CERTAIN TRADITIONALLY SMOKED FOODS

The legislation provides narrowly defined derogations for certain foods traditionally smoked in particular Member States, subject to specific conditions. These are neither a general exemption for all artisanal foods nor an acknowledgement that concentrations above ordinary limits are harmless. The provisions specify eligible product categories, territories and maximum levels, alongside continued monitoring and good smoking practices. The applicability of a derogation must be verified before it is invoked.

WHO IS RESPONSIBLE FOR COMPLIANCE?

Food business operators have primary responsibility for marketing compliant foods. Public authorities verify compliance through controls that are also risk-based. Regulation (EU) 2017/625 provides the general framework for official controls throughout the agri-food chain; relevant programmes cover foods produced in the Union and imports, subject to applicable conditions.

Official control does not mean testing every package or systematically searching every batch for every possible contaminant. Samples, frequencies and matrices are selected through programmes and priorities. This is essential for realistic surveillance, but does not allow a particular concentration to be assigned to an individual untested product.

SAMPLING AND LABORATORY ANALYSIS



Reliability depends on the entire chain: identifying the batch, representative sampling, storage, sample preparation, extraction and quantification. A non-representative sample may distort the assessment of a batch even when the instruments are accurate. For relevant process contaminants, including PAHs, the methodological reference is Regulation (EC) No 333/2007, as amended; the current version should be consulted. Commission Implementing Regulation (EU) 2023/2782, by contrast, concerns mycotoxins and should not be cited as the PAH sampling regulation.

PAHs may be determined using appropriately validated chromatographic methods and detection suitable for the concentrations of interest. Laboratories must document performance characteristics such as selectivity, recovery, precision, limit of quantification (LOQ) and measurement uncertainty. Competent laboratories and validated procedures are essential to meaningful results.

HOW A PAH4 SUM IS ASSESSED

The regulation specifies that the maximum levels for the PAH4 sum refer to 'lower-bound' concentrations: for this calculation, individual results below their respective LOQs are treated as zero. This does not mean that the substance is necessarily absent; it is an explicit analytical convention. The sum may therefore depend in part on individual analytes' LOQs and must not be confused with a complete description of every PAH.

Official assessments of possible exceedances must also apply rules on recovery and measurement uncertainty relevant to the method and matrix. A small difference from the limit should not be interpreted by isolating one number from its analytical context. Establishing non-compliance requires a technically and legally appropriate comparison with the applicable maximum level.

WHAT COMPLIANCE DOES — AND DOES NOT — GUARANTEE

A compliant food meets the legal requirements applicable to PAHs with maximum levels in its category, taking account of sampling and measurement rules. This is concrete, important information that contributes to public-health protection. It does not certify the absence of every PAH or other contaminants, nor establish that consumers' total exposure across the diet is zero.

Health assessment also considers how much food is eaten, how often, by whom and alongside what other exposure sources. Legal limits are risk-management tools and do not necessarily correspond to individual toxicological thresholds. Analytical results should therefore be interpreted alongside the food category, units, LOQs, date and applicable legal reference.

CONCLUSION

European PAH legislation combines category-specific limits, operator responsibilities and official controls. Its value does not lie in promising zero contamination, but in establishing verifiable requirements and common procedures. Understanding exactly what is measured and how compliance is assessed makes it possible to recognise the strength of official controls without attributing claims they cannot support.

SCIENTIFIC AND REGULATORY REFERENCES

[European Commission – Regulation \(EU\) 2023/915, text and amendments \(EUR-Lex\).](#)

[European Commission – Regulation \(EC\) No 333/2007, sampling and analysis \(EUR-Lex\).](#)

[European Parliament and Council – Regulation \(EU\) 2017/625, official controls \(EUR-Lex\).](#)

[European Commission – Sampling and analysis for contaminants.](#)

[EFSA CONTAM Panel \(2008\) – Polycyclic Aromatic Hydrocarbons in Food. EFSA Journal 6\(8\):724.](#)