CODEX ALIMENTARIUS COMMISSION

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World Health Organization

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Agenda item 5 **CX/FO 26/29/5**

December 2025

JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX COMMITTEE ON FATS AND OILS

Twenty- Ninth Session

Kuala Lumpur, Malaysia

9 -13 February 2026

PROPOSED DRAFT REVISIONS TO CODEX STANDARDS ON FATS AND OILS TO LIMIT *TRANS*-FATTY ACID INTAKE

(Prepared by the Electronic Working Group chaired by Canada and co-chaired by Saudi Arabia)

(At Step 3)

Codex Members and Observers wishing to submit comments on the proposed draft revisions to the Codex Standards on Fats and Oils to Limit *Trans*-Fatty Acid (TFA) intake, should do so as instructed in CL 2025/79 -FO available on the Codex webpage/Circular Letters 2025.

INTRODUCTION

1. The World Health Organization (WHO) launched the REPLACE Initiative in 2018 to eliminate the use of industrially produced *trans*-fatty acids (iTFA) from the global food supply. This initiative provides governments with technical support and policy guidance[1]. The WHO recommends[3] that countries adopt one of two best-practice policy options for eliminating iTFA from the global food supply:

    a) A mandatory national limit of 2g iTFA per 100g of total fat in all fats, oils and foods; or

    b) A mandatory national ban[2] on the production and use of PHO in all foods.

2. iTFA are primarily formed during the industrial process of partially hydrogenating fats and oils (PHO) and are strongly linked to increased risk of coronary heart disease and premature death[3]. Despite progress, an estimated five billion people worldwide remained at risk in 2023 due to continued exposure[4]. Accelerating policy action and industry reformulation is critical to closing this gap and protecting global health.

3. At its 28th Session of the Codex Committee on Fats and Oils (CCFO28) in February 2024, the Committee initiated work to support WHO's REPLACE Initiative. A discussion paper (CX/FO 24/28/11), prepared by Canada in collaboration with Egypt, the European Union, India, Saudi Arabia, Uganda, the United States of America, and WHO, proposed revisions to existing Codex standards on fats and oils. These revisions aim to include a limit on iTFA and/or a prohibition on PHO in the following three standards:

    a) *Standard for Edible Fats and Oils Not Covered by Individual Standards* (CXS 19-1981)

    b) *Standard for Fat Spreads and Blended Spreads* (CXS 256-1999)

    c) *Standard for Named Animal Fats* (CXS 211-1999)

    Recognizing diverse national and/or regional frameworks, the Committee agreed that Codex standards should allow flexibility for countries to adopt either approach for the elimination of iTFA.

4. This initiative builds on more than a decade of Codex efforts to address *trans*-fatty acids, beginning with work on labelling claims such as "free of *trans* fats" under the *Guidelines on Nutrition Labelling* (CAC/GL

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[1] WHO, 2018. Replace *Trans* Fat. An Action Package to Eliminate Industrially-Produced *Trans*-Fatty Acids. https://www.who.int/docs/default-source/documents/replace-transfats/replace-action-package.pdf

[2] **Terminology Note:** In this report, the term "prohibition" is used in place of "ban" to align with Codex drafting conventions. WHO refers to this measure as a "mandatory national ban on PHO," but Codex standards typically use "prohibit" or "shall not permit" for regulatory language.

[3] Saturated fatty acid and *trans*-fatty acid intake for adults and children: WHO guideline. Geneva: World Health Organization; 2023. Licence: CC BY-NC-SA 3.0 IGO. Saturated fatty acid and trans-fatty acid intake for adults and children: WHO guideline

[4] Countdown to 2023: WHO 5-year milestone report on global *trans* fat elimination 2023. Geneva: World Health Organization; 2024. Licence: CC BY-NC-SA 3.0 IGO. Countdown to 2023: WHO report on global trans-fat elimination 2020

2-1985). However, persistent analytical challenges, particularly the inability to reliably detect very low TFA levels and distinguish industrial from ruminant sources, limited progress on this work. In response, Codex shifted its focus in 2019 from labelling to ingredient-based regulation, prioritizing provisions to set limits on iTFA and/or prohibit PHO, in alignment with WHO's REPLACE initiative.

5. This report summarizes the EWG's work to develop proposed revisions to the three targeted Codex standards on fats and oils. These revisions include draft definitions, provisions to set a mandatory iTFA limit and/or PHO prohibition, and considerations for enforcement and analytical methods. The current proposals align with WHO's REPLACE framework and aim to provide clear, science-based guidance to support this global public health goal.

TERMS OF REFERENCE

6. CCFO28 agreed:

   a) to submit for approval by CAC47, the proposal for new work on the proposed revisions to Codex standards on fats and oils to reduce *trans*-fatty acid intake (REP24/FO Appendix XI).

   b) to establish an EWG, chaired by Canada and co-chaired by Saudi Arabia, and working in English, subject to the approval of new work by CAC47, to prepare the proposed draft revisions for circulation for comments at Step 3 and consideration by CCFO29; and

   c) that the report of the EWG should be made available at least three months before CCFO29.

PARTICIPATION AND METHODOLOGY

7. The EWG began its work in July 2024 following the circulation of an invitation to all interested Codex Members and Observers. A total of 24 Members and 9 Observers registered to participate[5]. The group collaborated via the Codex EWG Forum from December 2024 to September 2025.

8. Two rounds of consultation were conducted:

   a) **Working Document 1 (WD1):** Focused on identifying key areas for revision in three Codex standards and introduced initial proposals for definitions and provisions related to setting a mandatory iTFA limit and/or a PHO prohibition. Participants responded to 11 targeted questions, with 22 responses analyzed to inform WD2.

   b) **Working Document 2 (WD2):** Presented refined proposals based on WD1 feedback, aligning more closely with WHO's REPLACE framework. WD2 included seven new questions and five proposed recommendations to the Committee. A total of 20 responses were analyzed to further shape the proposed revisions.

9. Based on input from both rounds, the Chairs and Co-Chairs developed a consolidated set of proposed revisions to the three targeted Codex standards. These revisions aim to support the global elimination of iTFA and are presented in Annex II of this report.

SUMMARY OF THE DISCUSSION

10. This section provides a high-level summary of the feedback received from Codex Members and Observers during the two rounds of consultation. It highlights key areas of convergence and divergence and outlines how this input informed the development of the proposed draft revisions to the targeted Codex standards. The 12 recommendations presented in the discussion below are submitted for review and consideration by the Committee at CCFO29.

Scope of Work

11. The Project Document (REP24/FO Appendix XI) identified the following main aspects to be covered in the revision of these standards:

   a) Include a prohibition on PHO and/or limits on iTFA.

   b) Ensure that the scope of the above prohibition and/or limits, apply to fats and oil products used as ingredients in other food products, and consideration of enforcement option to focus on ingredient permission rather than in the consumer products given analytical challenges in differentiating between iTFA and ruminant TFA.

   c) Introduce as necessary any definitions in the standards, such as a definition for Partially

[5] **EWG Participants:** *Members*: Brazil, Canada, Colombia, Costa Rica, Egypt, European Union, Ghana, Grenada, Hungary, India, Iran, Japan, Malaysia, Netherlands, New Zealand, Peru, Qatar, Russia, Saudi Arabia, Thailand, United Arab Emirates, United Kingdom, United States of America, Uruguay; *Observers*: Federation of the European Vegetable Oil and Protein meal Industry (FEDIOL)), Federation of Indian Chambers of Commerce and Industry (FICCI), Food Industry Asia (FIA), International Dairy Federation (IDF), International Margarine Association for Europe (IMACE), Instituto de la Grasa, Noncommunicable Disease Alliance (NCDA), United Nations International Children's Emergency Fund (UNICEF), World Health Organization (WHO).

Hydrogenated Oils (PHO).

d) Provide flexibility to facilitate different approaches to implementation of the standards.

12. The proposed revisions to the standards, and considerations for possible application in other Codex texts, focus on the following elements, each of which are described in detail in this section:

a) Development and placement of new definitions within the CCFO standards, including:

i. Appropriate location of definitions within the standards.

ii. Drafting of definitions for partially hydrogenated fats and oils, fully hydrogenated fats and oils, and industrially produced *trans*-fatty acids.

b) Alignment with the existing Codex definition for *trans*-fatty acids (TFA).

c) Inclusion of a provision to set a limit on iTFA and/or prohibit PHO, including:

i. Appropriate location for the provision within the standards.

ii. Drafting of the provision's wording to reflect WHO best practices while maintaining Codex's voluntary nature.

d) Clarification of existing terminology within Codex texts, including:

i. Use of the terms "hydrogenated" and "hydrogenation" without qualification (i.e. partially or fully) within the CCFO standards.

ii. Potential clarification of these terms without qualification in other relevant Codex texts.

e) Consideration of appropriate methods of analysis and sampling to support verification of compliance of the proposed provision.

13. The following sections detail the EWG's approach to implementing these objectives, in the order that they appear above, beginning with the development and placement of new definitions.

Placement and Development of New Definitions

Location of Definitions within Targeted CCFO Standards

14. There was majority support for placing the proposed definitions in "Section 2: Descriptions" of all three targeted standards. This approach reflects Codex precedent and guidance in Section 2.6, paragraph 90, of the *Codex Alimentarius Commission Procedural Manual (Thirtieth Edition)*[6], which specifies that the Description section should include product definitions and any additional definitions necessary to clarify the meaning of the standard.

15. It is further proposed to revise "Section 2: Descriptions" of all three standards to enhance clarity and consistency, in alignment with the recent revisions to the *Standard for Named Vegetable Oils* (CXS 210-1999), and the *Procedural Manual*'s guidance to maintain uniform presentation of commodity standards. Specifically, the Description section of all three standards would be divided into two subsections:

a) "**2.1 Product definitions**": This subsection would contain clear descriptions of the specific products covered by the standard; and

b) "**2.2 Other definitions**": This subsection would contain additional definitions necessary to clarify the meaning of the standard, including those proposed for addition by this EWG.

16. This harmonized structure will facilitate clearer organization of product-specific terms and general definitions that clarify the meaning of the standard, making it easier for users to locate and interpret these terms.

Recommendation 1

The EWG recommends that the Committee consider the following approach for the integration of the proposed definitions across the CCFO standards:

a) Include the proposed definitions within "Section 2: Descriptions" for all three standards.

b) Introduce two subsections within Section 2 ("**2.1 Product definitions**" and "**2.2 Other definitions**") separating the descriptions of products covered by the standard from additional definitions needed to clarify the meaning of the standard.

This proposal is reflected in draft revisions to the three targeted standards in Annex II.

[6] FAO & WHO. 2025. Codex Alimentarius Commission Procedural Manual – Thirtieth edition. Rome. https://doi.org/10.4060/cd4216en

Drafting of Definitions

17. WD1 proposed process-based definitions for partial and full hydrogenation, describing hydrogenation as the chemical transformation of unsaturated fats, rather than characterizing the resulting fats and oils. Feedback revealed differing views on whether definitions should emphasize the production process or the resulting product characteristics, such as *trans*-fatty acid content, iodine value, or physical properties.

18. Many respondents noted that commodity standards typically define ingredients based on product attributes rather than production methods to support compliance and enforcement. Others supported retaining process-based language to ensure scientific clarity and alignment with WHO's REPLACE guidance, which describes PHO and iTFA formation as outcomes of industrial hydrogenation. To balance these perspectives, the EWG agreed on product-based terminology, with process descriptions. This hybrid approach supports Codex consistency, facilitates enforcement, and maintains alignment with WHO's dual best-practice policy options.

19. The proposed definitions are presented for the Committee's consideration and further discussion at CCFO29. The latest revisions, incorporating feedback from WD2 are presented below.

Partially Hydrogenated Fats and Oils and Fully Hydrogenated Fats and Oils

20. While "partially hydrogenated oils (PHO)" is the term used in WHO guidance and many regulatory contexts, the EWG proposed the broader term "partially hydrogenated **fats and** oils," along with its counterpart, "fully hydrogenated fats and oils," to reflect the diversity of hydrogenated ingredients used in food manufacturing. For simplicity, the acronyms "PHO" and "FHO" are retained throughout this report.

21. The EWG considered whether to include measurable parameters within these definitions, such as iodine value, or iTFA thresholds, in the definitions for PHO and FHO. While some respondents supported including these parameters for enforcement clarity, others raised concerns about scientific reliability, regulatory rigidity, and misclassification risks. Key points raised included:

    a) **Iodine Value:** Iodine value is an established method for assessing the degree of unsaturation in fats and oils, but it does not distinguish between *cis*- and *trans*-fatty acids. Therefore, iodine value cannot specifically identify PHO, nor can it quantify iTFA content. However, iodine value can be used as a practical enforcement parameter, particularly to distinguish FHO, which have low iodine value due to near-complete saturation, from PHO.

    b) **iTFA Thresholds and WHO Context:** Embedding a numerical iTFA threshold within the PHO definition (e.g., <2% iTFA) to align with the WHO best-practice is not appropriate because it does not accurately reflet the typical iTFA content of PHO. PHO generally contain much higher levels of iTFA, ranging from approximately 25% to 45% of the oil, while FHO and non-hydrogenated and refined oils typically contain less than 2% iTFA[7]. Therefore, using a 2% iTFA limit as a definitional criterion for PHO risks misclassification and does not capture the true compositional characteristics of these oils.

22. To address these concerns, the Chairs decided not to include measurable parameters within the core definitions. Instead, such parameters may be referenced in footnotes attached to the relevant provisions (e.g. the iTFA limit or PHO prohibition), thereby assisting jurisdictions that rely on them for compliance purposes. This approach preserves Codex neutrality while supporting national flexibility. This is consistent with the *Codex Alimentarius Commission Procedural Manual* (30th Edition)[8], which specifies that enforcement considerations and analytical criteria should be included in the provisions section rather than in the description or definitions section of standards. For further details on enforcement considerations related to iodine value and iTFA thresholds, refer to the Methods of Analysis section.

23. The latest draft definition for "partially hydrogenated fats and oils" is:

> "***Partially hydrogenated fats and oils*** **(PHO)** are produced through a chemical process that adds hydrogen to some of the double bonds in unsaturated fats and oils, using a catalyst. This converts those double bonds into single bonds, making the fat more saturated. During this process, some of the remaining double bonds undergo geometric isomerization, changing from the natural cis configuration to the *trans* configuration. The process can be controlled to create fats and oils with a wide range of physical properties, such as texture and melting point, regardless of the original oil composition. It also leads to the formation of *trans*-fatty acids, which may vary depending on the degree of hydrogenation."

[7] Ackman RG and Mag TK. (1998). Trans fatty acids and the potential for less in technical products. In: Trans Fatty Acids in Human Nutrition. Eds. Sébédio JL and Christie WW. Dundee, UK: The Oily Press, pp. 35-56.

[8] Section 2.6 of the 30th edition of the Codex Procedural Manual: Format for Codex commodity standards, paragraphs 90 and 91, and Section 2.12: The use of analytical results)

Recommendation 2

The Committee is invited to review and provide input on the proposed definition of "partially hydrogenated fats and oils", including clarity, technical accuracy, and suitability for inclusion in the targeted CCFO standards.

This proposal is reflected in the draft revisions to the three targeted standards in Annex II.

24. The latest draft definition for "fully hydrogenated fats and oils" is:

> "***Fully hydrogenated fats and oils (FHO)*** are produced through a chemical process in which hydrogen is added to all the double bonds in unsaturated fats and oils, using a catalyst. This process converts all unsaturated bonds into saturated single bonds, resulting in a fully saturated fat structure. Because the hydrogenation is complete, the formation of industrially produced *trans*-fatty acids (iTFA) is minimized. The resulting fats and oils are typically solid or semi-solid at room temperature due to their higher melting point and exhibit enhanced stability and resistance to oxidation".

Recommendation 3

The Committee is invited to review and provide input on the proposed definition of "fully hydrogenated fats and oils", including clarity, technical accuracy, and suitability for inclusion in the targeted CCFO standards.

This proposal is reflected in the draft revisions to the three targeted standards in Annex II.

Industrially Produced *Trans*-Fatty Acids (iTFA)

25. The proposed definition aims to clarify the scope of iTFA for enforcement of the mandatory iTFA limit, recognizing that the existing Codex definition of *trans*-fatty acids in the *Guidelines on Nutrition Labelling* (GNL, CXG 2-1985) does not distinguish between industrially produced and naturally occurring ruminant TFAs (rTFA). While chemically similar, iTFA are formed through industrial processes, whereas rTFA occur naturally in meat and dairy products. This distinction is critical because regulatory measures target iTFA, the primary source of *trans*-fatty acids in processed foods.

26. All respondents agreed on the need for a distinct iTFA definition, though some requested explicit exclusion of rTFA, the EWG agreed that the term "industrially produced" already implies this distinction. The EWG did not put forward an rTFA definition, noting that the proposed revisions do not reference rTFA and that additional definitions should only be included when necessary to clarify the meaning of the standard, in line with the Codex Procedural Manual [9]. As an alternative, the EWG suggested that the Committee consider revising the existing definition of *trans*-fatty acids in the GNL (CXG 2-1985) to better differentiate between iTFA and rTFA. This option is explored further in the next section.

27. The latest draft definition for "industrially produced trans-fatty acids" (iTFA) is:

> "***industrially produced trans-fatty acids (iTFA)*** are *trans*-fatty acids primarily formed during the industrial process of partial hydrogenation of unsaturated fats and oils. Smaller amounts may also be produced during other processes, such as oil refining and deodorization. iTFA are defined solely by their method of production and are difficult to chemically distinguish from naturally occurring TFA".

Recommendation 4

The Committee is invited to review and provide input on the proposed definition of "industrially produced *trans*-fatty acids", including its clarity, technical accuracy, and suitability for inclusion in the targeted CCFO standards.

This proposal is reflected in the draft revisions to the three targeted standards in Annex II.

Alignment with Existing Codex Definition for *Trans*-Fatty Acids (TFA)

28. The EWG considered whether revising the Codex definition of TFA in the *Guidelines on Nutrition Labelling* (CXG 2-1985) would improve clarity and support interpretation application of iTFA-related provisions. The current definition broadly covers all TFA for labelling purposes but does not distinguish between

[9] Section 2.6 – Format for Codex Commodity Standards (Paragraph 90): "*There may also be additional definitions when these are required to clarify the meaning of the standard*."

industrially produced and ruminant sources, nor clarify the status of conjugated linoleic acid (CLA). This may create ambiguity when applying an iTFA limit that excludes rTFA.

29. The WHO guideline on *Saturated fatty acid and trans-fatty acid intake for adults and children*[10], published in 2023, defines TFA as "all fatty acids with a double bond in the *trans* configuration", explicitly including CLA and making no distinction between industrial and ruminant sources. This reflects current scientific evidence showing no significant difference in health effects between CLA and other TFAs when consumed at similar levels.

30. The proposal in WD2 to refer this matter to the Codex Committee on Nutrition and Foods for Special Dietary Uses (CCNFSDU) received broad support. The following feedback was provided:

    a) Alignment with WHO definition seen as improving consistency and enforcement and helping avoid conflicting interpretations when CCFO provisions specify iTFA limits that exclude rTFA.

    b) Concerns raised about potential conflicts with national dietary guidance if CLA is included.

    c) Some respondents consider the current Codex definition sufficient for nutrition labelling purposes.

31. The EWG noted that revisiting the overarching TFA definition in CXG 2-1985 may offer a more coherent approach across Codex texts, rather than introducing additional definitions (e.g., rTFA) within CCFO standards. While WHO's definition provides a clear and inclusive framework, revising CXG 2-1985 would have implications beyond CCFO. Any revision should balance global consistency with the practical need for alignment with the revisions to the CCFO standards without creating unnecessary complexity in Codex texts.

Recommendation 5

The Committee is invited to review and provide input on the proposal to refer the matter of revising the Codex definition of *trans*-fatty acids in CXG 2-1985 to CCNFSDU, following the CCFO's completion of this work.

Inclusion of a Prohibition on PHO and/or a Limit on iTFA

32. The EWG was tasked with proposing revisions to include a provision that either sets a mandatory limit on iTFA or prohibits PHO. This provision is intended to support global public health and align Codex standards with WHO's best-practice policy options for iTFA elimination.

Proposed Location of Provision

33. In response to WD1, there was strong majority support to place the provision within "Section 3: Essential Composition and Quality Factors" of each targeted standard, reflecting its mandatory nature. This placement emphasizes that compliance with the provision is integral to meeting the standard. However, the *Standard for Edible Fats and Oils Not Covered by Individual Standards* (CXS 19-1981) does not currently include this section; instead, it contains an Appendix titled "Other Quality and Composition Factors," which states that compliance with these factors is optional. Therefore, WD2 proposed introducing a new Section 3 in CXS 19-1981 to house the provision, noting that inclusion in the Appendix would undermine its mandatory intent. No objections were raised by eWG members in response to this proposal.

34. To ensure clarity and consistency across the standards, while reinforcing the mandatory nature of this provision, the eWG proposes that the Committee adopt the following structural revisions:

    a) ***Standard for Edible Fats and Oils Not Covered by Individual Standards* (CXS 19-1981):** Align the standard to the format codex commodity standard as provided for in the Procedural Manual by introducing a new Section 3 titled "Essential Composition and Quality Factors" in the main body of the standard to house the provision.

    b) ***Standard for Fat Spreads and Blended Spreads* (CXS 256-1999):** Insert the provision between "3.1 Composition" and "3.2 Permitted Ingredients," ensuring prominence before optional ingredients.

    c) ***Standard for Named Animal Fats* (CXS 211-1999):** Introduce subsection 3.1 for the current composition provisions and introduce subsection 3.2 for the new provision.

[10] Saturated fatty acid and *trans*-fatty acid intake for adults and children: WHO guideline. Geneva: World Health Organization; 2023. Licence: CC BY-NC-SA 3.0 IGO. https://www.who.int/publications/i/item/9789240067233

Recommendation 6

The eWG recommends that the Committee consider placement of the provision to prohibit PHO and/or restrict iTFA in the "Essential Composition and Quality Factors" section of each standard, as outlined above, and add such a section when missing from the standard with a view to align the structure of such a standard with the Codex Procedural Manual.

This proposal is reflected in the draft revisions to the three targeted standards in Annex II.

Proposed wording of the Provision

35. Initial drafts in WD1 proposed that the iTFA limit of not more than 2 grams per 100 grams of total fat would apply to fats and oils, consistent with the scope of work outlined in the Project Document (REP24/FO Appendix XI). Feedback in from respondents requested the revision of the scope to extend the application of the iTFA limit to the final food product, in order to improve alignment with WHO best-practice approaches. While one Member noted that this adjustment diverges from the scope in the Project Document (REP24/FO Appendix XI), the majority of respondents supported alignment of the provision's scope for iTFA limits with the WHO best-practice policy approach, noting that it reflects current global regulatory practice and is critical for public health impact and international consistency.

36. In order to improve alignment with the WHO, the provision put forward for discussion at CCFO29 now proposes that the iTFA limit applies to fall foods, not only fats and oils, or final food products. This position is consistent with WHO guidance, as articulated in recent publications, including *Countdown to 2023: WHO 5-year milestone report on global trans-fat elimination 2023*[11], and the *WHO Validation Programme for Trans Fat Elimination: Technical Criteria for Monitoring and Enforcement Systems*[12]. These documents clarify that the iTFA limit applies to all foods, including, fats, oils, and composite food products where fats and oils are used as ingredients. To ensure clarity and alignment with WHO's approach, it is proposed to add a footnote to the provision referring to the Codex definition of "food" as stated in the *Codex Procedural Manual*:

> "Food means any substance, whether processed, semi-processed or raw, which is intended for human consumption, and includes drink, chewing gum and any substance which has been used in the manufacture, preparation or treatment of "food" but does not include cosmetics or tobacco or substances used only as drugs."

This footnote will help clarify the scope of application of the provision for all foods in a manner consistent with both WHO guidance and Codex principles.

37. The EWG also considered the need for flexibility in implementation of the provision. While WHO recommends that countries adopt either of the two best-practice approaches for iTFA elimination, more recently, the best-practice approach includes the option of both approaches being adopted[13]. The draft provision proposes the use of "and/or" to reflect the possibility of adopting one or both approaches, encouraging mandatory action, but allowing countries to adopt an approach based on national regulatory frameworks and capacities. This wording acknowledges member feedback received during consultations, where some Members expressed a preference for the mandatory implementation of both measures concurrently to maximize public health impact and regulatory clarity, while others preferred voluntary language to accommodate national circumstances.

38. To provide flexibility for Members while encouraging alignment with WHO best practices, the EWG proposed using the term "should" rather than "shall." This phrasing maintains the voluntary nature of Codex standards, which are not a substitute for or alternative to national legislation (see Codex Procedural Manual, Section 1.3). The use of "should" avoids triggering World Trade Organization (WTO) notification requirements under the *Agreement on the Application of Sanitary and Phytosanitary Measures* (SPS Agreement), while still promoting strong public health action. This approach respects national sovereignty and regulatory diversity, allowing Members to implement measures according to their regulatory context.

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[11] Countdown to 2023: WHO 5-year milestone report on global *trans* fat elimination 2023. Geneva: World Health Organization; 2024. Licence: CC BY-NC-SA 3.0 IGO. Countdown to 2023: WHO report on global trans-fat elimination 2020

[12] Technical criteria for monitoring and enforcement systems: WHO Validation Programme for Trans Fat Elimination. Geneva: World Health Organization; 2024. Available from: https://cdn.who.int/media/docs/default-source/nutritionlibrary/replace-transfat/tfa-technical-criteria-monitoring-2024.pdf?sfvrsn=27a88d6c_5

[13] WHO Validation Programme for Trans Fat Elimination, notes: *"1 Best-practice policy: i) mandatory national ban on the production, use or sale of partially hydrogenated oils (PHO ban): or ii) mandatory national restriction that limits iTFA to a maximum of 2% of total fat in all fats, oils and foods (iTFA 2% limit): or iii) a combination of the PHO ban and iTFA 2% limit"*

It also aligns with Codex principles that emphasize the importance of protecting consumer health without creating unjustified barriers to trade[14].

39. The EWG presents the following draft wording of the provision for discussion at CCFO29:

> "Competent national and/or regional authorities should implement mandatory legislative or regulatory measures to:
>
> i. Set a limit of industrially produced *trans*-fatty acids to not more than 2 g per 100 g of total fat in all foods*; and/or
>
> ii. Prohibit the production for food use, and the use of partially hydrogenated fats and oils in all foods"
>
> *"Food", as defined in the *Codex Alimentarius Commission Procedural Manual*

Recommendation 7

The Committee is invited to review and provide input on the current draft wording of the proposed provision and comment on:

a) Its clarity, enforceability, and alignment with WHO best practices.

b) The appropriateness of using "should" rather than "shall" to maintain Codex flexibility while promoting strong public health action.

c) The proposed footnote referring to the Codex definition of food, for clarification of the scope of application for both options within the provision.

This proposal is reflected in the draft revisions to the three targeted standards in Annex II.

Clarification of Existing Terminology with Codex Texts

Clarifying the terms "hydrogenated" and "hydrogenation" in CCFO Standards

40. The EWG reviewed the presence of the terms "hydrogenated" and "hydrogenation" in the three targeted CCFO standards, which do not specify whether they refer to fully or partially hydrogenated fats and oils. Specifically:

a) ***Standard for Edible Fats and Oils Not Covered by Individual Standards* (CXS 19-1981):** The term "hydrogenation" appears in the Scope.

b) ***Standard for Fat Spreads and Blended Spreads* (CXS 256-1999):** The term "hydrogenation" is used in Section 2.2 Description of "Edible Fats and Oils".

c) ***Standard for Named Animal Fats* (CXS 211-1999):** The term "hydrogenated" appears in Section 2: Description i.e. 2.1 Lard - "Lard subject to processing" and 2.2 Rendered pork fat - "Rendered pork fat subject to processing".

41. This lack of specificity may lead to inconsistent interpretation, particularly in jurisdictions that regulate iTFA by setting a maximum content limit rather than prohibiting PHO outright. Given the global public health objective of eliminating iTFA, the EWG agreed that clarification of this terminology is necessary to support consistent interpretation and enforcement across different regulatory approaches.

42. Most EWG members supported adding a clarifying footnote where these terms appear in all three standards. This approach aligns with WHO guidance, supports enforcement, and maintains Codex's voluntary and science-based framework. To ensure clarity and consistency with Codex formatting practices, the EWG recommends that the clarifying footnote be inserted as a roman numeral footnote directly in the text, rather than as a numbered reference to other Codex texts. This approach mirrors the precedent set in the *Standard for Fat Spreads and Blended Spreads* (CXS 256-1999), where a roman numeral footnote is used in the composition section to clarify the use of the term "margarine." This formatting ensures the clarification is immediately visible and contextually relevant to the provision.

43. The EWG presents the following draft wording of the clarifying footnote for discussion at CCFO29:

> "The term "hydrogenation" may refer to either full or partial hydrogenation, as applicable under national and/or regional legislation or regulations. This reflects the global public health objective of eliminating industrially produced *trans*-fatty acids (iTFA) from the food supply, by setting a mandatory limit of not more than 2 g iTFA per 100 g of total fat in all foods, and/or by prohibiting the production and use of partially hydrogenated fats and oils in all foods."

[14] *Codex Procedural Manual*, 30th edition, Appendix A1.1, Statements of principle concerning the role of science in the Codex decision-making process and the extent to which other factors are taken into account).

Recommendation 8

The Committee is invited to review and provide input on the draft wording of the clarifying footnote for hydrogenation in the above paragraph and provide comments on the clarity and alignment with WHO best practices.

This proposal is reflected in the draft revisions to the three targeted standards in Annex II.

Clarifying the terms "hydrogenated" and "hydrogenation" in broader Codex texts

The EWG also considered the need to clarify terminology in broader Codex texts, particularly in the *General Standard for the Labelling of Prepackaged Foods* (GSLPF, CXS 1-1985). Section 4.2.3.1 includes the terms "hydrogenated" and "partially hydrogenated," in reference to class names for "refined oils other than olive". (see *Figure 1*). **4.2.3.1** Except for those ingredients listed in section 4.2.1.4, and unless a general class name would be more informative, the following class names may be used:

NAME OF CLASSES	**CLASS NAMES**
Refined oils other than olive	'Oil' together with either the term 'vegetable' or 'animal', qualified by the term 'hydrogenated' or 'partially hydrogenated', as appropriate

Figure 1. Section 4.2.3.1 of the General Standard for the Labelling of Prepackaged Foods (CXS 1-1985)

44. In WD2, the Chairs proposed that the Committee refer this issue to the Codex Committee on Food Labelling (CCFL) for consideration of a revision to this provision, for the class name, such as, 'oil' together with either the term, 'vegetable' or "animal', qualified by the term '**fully** hydrogenated' or 'partially hydrogenated', as appropriate." This revision would help to clearly distinguish fully hydrogenated oils from partially hydrogenated oils, which are associated with iTFA formation. Such clarification would improve consistency, support enforcement, and align with global efforts to eliminate the use of iTFA.

45. This recommendation was supported by a strong majority of EWG respondents. Some opposed the change, suggesting it may become unnecessary if PHO are broadly prohibited. However, WD2 clarified that WHO's best-practice approach allows for either a mandatory iTFA limit and/or a PHO prohibition, meaning clarity around terminology remains important.

46. One Member noted that changing terminology could have broader implications for labelling and consumer understanding. The Chairs acknowledged this concern and emphasized that further analysis would fall within CCFL's responsibility if new work is undertaken.

47. Another Member suggested that broader revisions to Codex texts may be needed to fully support WHO's REPLACE initiative. Since the mandatory iTFA limit applies to final food products, not just fats and oils, revisions to CCFO standards alone may be insufficient.

Recommendation 9

The EWG recommends that the Committee consider the proposal to refer the matter of potential revisions to Section 4.2.3.1 of the *General Standard for the Labelling of Prepackaged Foods* (CXS 1-1985) to CCFL to improve clarity and support enforcement of the work of the CCFO, following its completion.

Methods of Analysis and Sampling

48. Codex work on analytical methods for TFA spans more than a decade and has involved close collaboration with the Codex Committee on Methods of Analysis and Sampling (CCMAS). Early efforts focused on enabling "free of" *trans*-fatty acids claims under the *Guidelines on Nutrition Labelling* (GNL, CXG 2-1985), but these were suspended due to analytical limitations, particularly the inability to measure TFA content consistently across diverse food matrices at the proposed level for the "free of" TFA claim (i.e.,1 g per 100 g of fat).

49. In accordance with the *Codex Procedural Manual*, commodity standards now reference the Recommended *Methods of Analysis and Sampling* (CXS 234-1999) rather than listing individual methods. This ensures consistency across Codex texts and avoids duplication of technical content. Methods included in CXS 234-1999 must first be validated by a recognized Standards Development Organization (SDO), such as AOAC, AOCS, or ISO, and are then subsequently endorsed by CCMAS. Accordingly, the

EWG focused on identifying suitable methods of analysis for compliance with the proposed provision, which could then be referred to CCMAS for endorsement.

50. The *Standard for Edible Fats and Oils Not Covered by Individual Standards* (CXS 19-1981) currently does not include a "Methods of Analysis" section in the main body; it appears only in the Appendix entitled "Other Quality and Composition Factors," which is considered supplementary and optional. In contrast, other targeted standards include this section in the main body to support enforcement of mandatory provisions. To ensure clarity and effective enforcement of the iTFA limit and/or PHO prohibition, it is proposed to add a "Methods of Analysis" section in the main body of CXS 19-1981, referencing the *Recommended Methods of Analysis and Sampling* (CXS 234-1999) relevant to these provisions. The existing reference in the Appendix would be retained to maintain linkage to optional factors, consistent with Codex practice.

Recommendation 10

It is recommended that the Committee consider the structural revision to CXS 19-1981 to include a "**Methods of Analysis**" section in the main body while retaining this section in the Appendix, ensuring consistency across Codex standards and to support effective enforcement of the iTFA limit and/or PHO prohibition.

This proposal is reflected in the draft revisions to CXS 19-1981 in Annex II.

Verification of Compliance with an iTFA Limit

51. Compliance with an iTFA limit is verified first by laboratory determination of total TFA using gas chromatography with flame ionization detection (GC-FID) of fatty acid methyl esters (FAME)[15] prepared from the fat/oil fraction following methods endorsed in CXS 234-1999. Some of these methods are endorsed for fats and oils and widely used for regulatory purposes. For composite foods, fat extraction is typically required prior to analysis of total TFA content.

52. However, these methods measure only total TFA and cannot distinguish iTFA from rTFA. Therefore, for the commodities covered by the three standards under revision, and for foods containing these commodities, verification of compliance with an iTFA limit requires a hybrid approach: laboratory analysis of extracted fat for total TFA, combined with documentation to estimate rTFA content and infer iTFA content.

53. WHO's *Technical Criteria for Monitoring Industrially Produced Trans-Fatty Acids in Foods* (2024)[16] outlines this hybrid enforcement model. It recommends ingredient declarations, PHO-free certifications, supplier records, and analytical markers to support verification. For products containing both iTFA and rTFA, it outlines acceptable analytical approaches for estimating iTFA when total TFA exceeds 2% of total fat These include:

    a) Using known iTFA content of the source vegetable fat/oil (via supplier data or direct testing).

    b) Identifying individual fatty acids as markers of dairy fat in composite foods.

    c) Measuring the ratio of butyric acid (C4:0) to total TFA in laboratory tests, as described in the European Commission's technical workflow for composite foods.

Verification of Compliance with a PHO Prohibition

54. Compliance with a PHO prohibition cannot be verified through laboratory analysis as no validated analytical methods exist to directly detect PHO in foods. Therefore, non-analytical means such as documentation audits, ingredient declarations, and supply chain checks must be used for verification of compliance. Some jurisdictions use iodine value as a screening tool to help differentiate FHO from PHO at the ingredient level (typically iodine value ≥ 4 for PHO).

55. WHO's REPLACE framework emphasizes that PHO prohibition verification of compliance should focus on identifying the source of TFA rather than relying solely on analytical detection. This approach ensures enforcement targets iTFA derived from PHO, while avoiding unintended penalties on products containing naturally occurring rTFA.

[15] **Note on Terminology:** Gas chromatography methods referenced in WHO and Codex documents employ flame ionization detection (FID). WHO protocols may use the term "GC-flame" informally; however, this refers to GC-FID, which is the standard terminology in Codex-endorsed methods (CXS 234-1999). For consistency, this document uses GC-FID throughout.

[16] World Health Organization. *Technical Criteria for Monitoring Industrially Produced Trans-Fatty Acids in Foods*. Geneva: WHO; 2024. Available from: https://cdn.who.int/media/docs/default-source/nutritionlibrary/replace-transfat/tfa-technical-criteria-monitoring-2024.pdf?sfvrsn=27a88d6c_5

Footnote to Support Hybrid Compliance Verification Approaches

56. Hybrid compliance verification approaches, which combine analytical testing with non-analytical measure such as documentation review and screening tools, should be explicitly described in the commodity standard when enforcement cannot rely solely on laboratory testing. In line with Codex practice and CCMAS guidance in *Principles for the Use of Sampling and Testing in International Food Trade* (CAC/GL 83-2013), such approaches may be included as a footnote to the relevant provision for clarity or, where more detailed procedures are required, in an Annex to the standard. This ensures transparency and consistency with Section 2.12 of the *Codex Procedural Manual*, which calls for clear specification of compliance assessment procedures. Hybrid approaches are particularly relevant for provisions such as iTFA limits and PHO prohibitions, where analytical methods alone cannot fully verify compliance. WHO's *Technical Criteria for Monitoring iTFA in Foods (2024)* also recommends hybrid models for enforcement.

57. Members noted that variations in how jurisdictions implement the provision (i.e., adopting a PHO prohibition versus setting an iTFA limit) result in different compliance verification approaches. For example, one jurisdiction may verify compliance primarily through documentation for a PHO prohibition, while another relies on laboratory testing for an iTFA limit. These differences can lead to inconsistencies in product eligibility across markets, creating potential non-tariff barriers and undermining Codex's objective of facilitating fair trade. Harmonized guidance on hybrid compliance verification approaches, clearly defining the roles of analytical testing, documentation, and screening tools, would help reduce regulatory divergence and support predictable trade flows.

58. To support clarity and harmonization, the EWG recommends including a footnote to the provision to explain the enforcement model for both the iTFA limit and PHO prohibition. This footnote should clarify the roles of analytical testing, documentation, and iodine value screening, linking relevant enforcement mechanisms to measurable provisions in accordance with Section 2.12 of the *Procedural Manual*. Two options for the proposed footnote are presented below: the first option offering a concise explanation, while the second provides more detail on the approach for each option within the provision.

a) **Footnote Option1 (Concise):**

"For checking the compliance with this provision, non-analytical measures such as ingredient declarations and process controls shall be used instead of, or in addition to, the relevant methods of analysis and sampling contained in the R*ecommended methods of analysis and sampling* (CXS 234-1999), as compliance cannot rely solely on analytical methods."

b) **Footnote Option 2 (Detailed):**

"For checking the compliance with this provision:

i. For the iTFA limit, a hybrid approach shall be used, combining analytical methods contained in the *Recommended Methods of Analysis and Sampling* (CXS 234-1999) for total *trans*-fatty acid quantification, with non-analytical measures such as ingredient declarations, PHO-free certifications, and supply chain records to estimate ruminant TFA content and infer iTFA quantity.

ii. For the PHO prohibition, compliance shall be verified through documentation, as there are no validated analytical methods to directly detect PHO in foods. Iodine value (IV) may be used as a screening tool at the ingredient level to help differentiate fully hydrogenated oils from PHO, noting that IV ≥ 4 is typically associated with PHO."

Recommendation 11

It is recommended that the Committee:

a) Consider the inclusion of a footnote in the provision to clarify the compliance verification approach.

b) Review the two proposed footnote options presented above (one concise and one detailed) for wording of the footnote.

Both footnote options for this proposal are reflected in the draft revisions to the three targeted standards in Annex II.

(If the footnote is supported and its wording is agreed upon by the Committee, it will be referred to CCMAS for technical review and confirmation of appropriateness, given that it references analytical methods and screening tools, as noted in Recommendation 12.)

Summary of EWG Review of Methods of Analysis

59. The EWG reviewed existing methods and proposed approaches for verifying compliance with the provision for the iTFA limit and/or PHO prohibition. Detailed tables (*Tables A.1–A.5*) in Annex I provide a comprehensive review of Codex-endorsed and other relevant methods, including clarification of the endorsement status, scope of validation by a Standards Development Organization (SDO), and applicability for composite foods. *Table 1* summarizes the acceptability and next steps for these methods for compliance verification of the provision.

Table 1. Summary of Acceptability and Next Steps for Methods for Compliance Verification

Annex I Tables	Category	Validation by SDO	CCMAS Endorsement	Recommended Action
A.1	iTFA limit: integrated methods (for use in composite foods)	Validated for composite foods	Endorsed for infant formula only	Propose CCMAS endorsement of AOAC 996.06 for composite foods for iTFA limit (hybrid approach)
A.2	iTFA limit: analysis-only methods (for use in extracted fat fraction of composite foods)	Limited validation for specific commodities	Endorsed for fats and oils; nutrition labelling	Validation by SDO for broader use
A.3	PHO prohibition: iodine value determination for screening in fat/oil	Not validated for PHO detection	Iodine value endorsed for unsaturation only	Propose CCMAS endorsement as screening tool at ingredient level for PHO prohibition
A.4	WHO surveillance protocols for monitoring only	Not validated	Not endorsed	Validation by SDO
A.5	Investigative methods for research only	Not validated	Not endorsed	Validation by SDO

60. In line with Section 2.10 of the *Codex Procedural Manual*, preference should be given to methods which have applicability for routine use and which can serve as the single designated reference method for dispute resolution. CCMAS typically endorses one primary method per provision (usually Type I or II) for clarity and consistency. Therefore, based on current endorsement status, as well as SDO validation status, the EWG recommends:

    a) **For the iTFA limit:** Clarify hybrid approach within the standards (per Recommendation 11)**.** Use GC-FID methods to quantify total TFA in extracted fat, combined with documentation for iTFA determination. AOAC 996.06, which includes fat extraction and is validated for composite foods, should be prioritized for CCMAS endorsement for this broader scope as the single designated method for compliance verification, in line with CCMAS practice.

    b) **For the PHO prohibition**: Clarify non-analytical approach within the standards (per Recommendation 11)**.** Rely on documentation-based verification of compliance. Iodine value methods in *Table A.3* may be used only as an indicative screening tool at the ingredient level only, not for enforcement, subject to CCMAS endorsement for this limited purpose.

    c) **For future consideration:** Additional integrated methods in *Table A.1* (e.g. AOAC 2012.13 / ISO 16958 | IDF 231) should be considered for future endorsement to support harmonization. Analysis-only methods in *Table A.2* should remain informational references and may be considered for endorsement once validated for use in extracted fat fractions of composite foods. WHO surveillance protocols in *Table A.4* and investigative methods in *Table A.5* should not be used for enforcement but may be explored for rapid screening in research contexts.

Next steps for CCMAS endorsement

61. To enable use for compliance verification of the provision in the targeted standards, CCMAS should:

    a) **For the iTFA limit:** Endorse AOAC 996.06 as the single designated method for TFA quantification in composite foods for iTFA limit verification and note AOAC 2012.13 / ISO 16958| IDF 231 for future endorsement to support harmonization.

    b) **For the PHO prohibition**: Endorse iodine value methods as an indicative screening tool (Type I) for ingredient-level checks, with explicit limitations, noting the absence of an analytical method for PHO detection.

62. The Committee may also wish to seek CCMAS advice on the use of a footnote in the standards to clarify the compliance verification approach, including their review of the technical accuracy of the proposed Footnote Option 2, as it references analytical methods and screening tools.

Recommendation 12

It is recommended that the Committee request CCMAS to review and endorse methods and related provisions necessary for verification of compliance, as follows:

a) **iTFA limit:** Review AOAC 996.06 for endorsement for TFA quantification in composite foods, to enable its use in the hybrid approach for iTFA compliance verification, in line with CCMAS principle of endorsing one primary method per provision.

b) **PHO prohibition**: Review the iodine value methods listed in for endorsement as an indicative screening tool (Type I) at the ingredient level for fats and oils, with explicit limitations (i.e., not for enforcement), to support documentation-based verification.

c) **Compliance verification footnote**: Review the footnote on compliance verification (if agreed by the Committee under Recommendation 11) for technical accuracy and appropriateness, as part of CCMAS endorsement work.

CONCLUSION

63. The EWG has substantially advanced its work on revising three Codex standards to support global efforts to eliminate the use of iTFA from the global food supply, in alignment with WHO's REPLACE initiative. Key achievements include:

a) Consensus on structural changes and placement of new definitions and provisions within the standards.

b) Development of definitions for partially hydrogenated fats and oils (PHO), fully hydrogenated fats and oils (FHO), and industrially produced *trans*-fatty acids (iTFA).

c) Drafting of a provision for mandatory measures to limit iTFA to not more than 2 g per 100 g of total fat in all foods, and/or prohibit the production and use of PHO in all foods.

d) Inclusion of clarifying footnotes on terminology and compliance verification approaches.

e) Identification of analytical methods and compliance verification approaches for referral to CCMAS.

64. These proposed revisions are consolidated in Appendix I for Committee review at CCFO29. The EWG considers its work substantially complete and invites CCFO29 to review and finalize this work.

RECOMMENDATIONS

65. The Committee is invited to:

a) Review and endorse the proposed draft revisions to the three targeted Codex standards in the **Annex II**, in accordance with Recommendations 1-4, 10, and 11.

b) Upon completion of its work, consider referring related matters to other Codex Committees, as follows:

i. **CCFL:** To review and consider potential revisions to labelling terminology in the *General Standard for the Labelling of Prepackaged Foods* (CXS 1-1985), in accordance with Recommendation 9.

ii. **CCNFSDU:** To review and consider revisions to the Codex definition of *trans*-fatty acids in the *Guidelines on Nutrition Labelling* (CXG 2-1985), in accordance with Recommendation 5.

iii. **CCMAS:** To review and consider endorsement of analytical methods and related provisions necessary for compliance verification, including the footnote for the compliance verification approach, if agreed by the Committee under Recommendations 11 and 12.

ANNEX I

EWG REVIEW OF METHODS OF ANALYSIS

1. This Annex provides a detailed review of analytical methods relevant to verifying compliance with the iTFA limit and PHO prohibition. It includes Codex-endorsed methods and other protocols referenced by WHO or validated by a Standards Development Organization (SDO), with information on endorsement status, validation scope, and applicability for composite foods.

2. Methods are organized into three functional categories:

   a) Codex-endorsed methods for total TFA quantification: used for verifying compliance with the iTFA limit.

   b) Codex-endorsed methods for iodine value determination: used as an indicative screening tool for PHO prohibition at the ingredient level.

   c) Surveillance and investigative methods: referenced by WHO or proposed by members for monitoring or exploratory purposes; these are not eligible for Codex endorsement until validated by an SDO.

3. *Tables A.1–A.5* summarize each method, including, as applicable, endorsement details from CXS 234-1999 (principle, CCMAS type classification, commodity scope, provision), validation status, and applicability for composite foods.

Codex-Endorsed Methods for Total TFA Analysis

4. Ideally, a Type I method would be used for total TFA quantification as the first step for verification of compliance with the iTFA limit. However, CCMAS has not endorsed a Type I method for TFA quantification across all food categories. Current GC-FID methods are classified as Type II or III for specific commodities and provisions. They are acceptable for regulatory and nutrition labelling purposes but are not formally designated for dispute resolution across all foods.

5. Codex-endorsed methods for total TFA quantification fall into two categories, distinguished by whether the validated procedure includes fat extraction or assumes it has already been done:

   a) **Integrated Methods:** These methods, listed in *Table A.1*, combine fat extraction and GC analysis within a single validated procedure. They are designed for direct analysis of composite foods without requiring separate extraction steps. Although validated by an SDO for composite foods, Codex currently endorses them only for infant formula. They are candidates for CCMAS endorsement for verifying iTFA limits in composite foods.

   b) **Analysis-Only Methods:** These methods, listed in *Table A.2*, are intended for use in fats and oils and are endorsed for such commodities. When applied to composite foods, they assume prior fat extraction, which is outside their validated scope. Notably, AOCS Ce 1h-05 is endorsed for verifying fat content for labelling purposes, and AOCS Ce 1i-07 is endorsed for fatty acid analysis in infant formula but, like other analysis-only methods, does not include fat extraction and is not broadly validated for composite foods. While these methods could technically be applied to extracted fat fractions of composite foods, such use is not yet validated and therefore cannot be considered for Codex-endorsement.

Table A.1. Endorsed Integrated Methods for Total TFA Quantification

Method[1]	Endorsement Details from CXS 234-1999				Validation and Applicability for Composite Foods (Including Extracted Fat Fraction) [4]
	Principle[2]	Type[3]	Commodity	Provision	
AOAC 996.06	Gas chromatography	III	Infant formula	Fatty acids (including trans fatty acid); Total fatty acids	Validated for composite foods (includes fat extraction step); not yet endorsed for this scope
AOAC 2012.13 / ISO 16958 | IDF 231	Gas chromatography	II	Infant formula	Total fatty acids	Validated for composite foods (direct transesterification); not yet endorsed for this scope

Table A.2. Endorsed Analysis-Only Methods for Total TFA Quantification in Fats and Oils

Method[1]	Endorsement Details from CXS 234-1999				Validation and Applicability for Composite Foods (Including Extracted Fat Fraction) [4]
	Principle[2]	Type[3]	Commodity	Provision	
ISO 12966-2 and ISO 12966-4	Gas chromatography of methyl esters	II	Named vegetable oils	Fatty acid composition	Validated for fats/oils only; assumes fat extraction; could be applied to extracted fat fraction of composite foods, but not validated by ISO for this application
	Gas chromatography (FID) of methyl esters	III	Olive oils and olive pomace oils	Fatty acid composition; *Trans* fatty acids content	
	Preparation of methyl esters and gas chromatography	III	Fish oils; Named animal fats	Fatty acid composition	
AOCS Ce 1h-05	Gas-liquid chromatography	II	Guidelines for nutrition labelling	Polyunsaturated fatty acids, footnote indicating it can also be used to measure *trans* unsaturated fatty acids	Validated for labelling purposes only; does not include fat extraction; could be applied to extracted fat fraction of composite foods, but not validated for this application
AOCS Ce 2-66 and AOCS Ce 1h-05	Gas chromatography of methyl esters	II	Named vegetable oils	Fatty acid composition	Not validated for composite foods; assumes fat extraction; could be applied to extracted fat fraction, but not validated for this application
	Gas chromatography (FID) of methyl esters	III	Olive oils and olive pomace oils	TFA content	
AOCS Ce 2-66 and AOCS Ch 2-91 / Ce 1h-05	Gas chromatography (FID) of methyl esters	III	Olive oils and olive pomace oils	Fatty acid composition	Not validated for composite foods; assumes fat extraction; could be applied to extracted fat fraction of composite foods but not validated for this application.
AOCS Ce 2c-66 and AOCS Ce 1i-07/ AOCS Ce 1j-07	Preparation of methyl esters and gas chromatography	III	Fish oils	Fatty acid composition	Not validated for composite foods; does not include fat extraction; could technically be applied to extracted fat fraction of composite foods, but not validated for this application
AOCS Ce 1i-07	Gas chromatography	III	Infant formula	Fatty acids (including TFA)	Not validated for composite foods; does not include fat extraction; could technically be applied to extracted fat fraction of composite foods, but not validated for this application

Codex-Endorsed Methods for Iodine Value Determination

6. Codex-endorsed titrimetric methods for determination of iodine value, listed in *Table A.3* are Type I methods for determining unsaturation in fats and oils within their endorsed scope. While definitive for iodine value measurement, these methods cannot detect PHO and are unsuitable for composite foods or enforcement of iTFA limits. Iodine value determination may serve only as an indicative as a screening tool at the ingredient level.

Table A.3. Endorsed Methods for Iodine Value Determination

Method[1]	Endorsement Details from in CXS 234-1999				Validation and Applicability for Composite Foods (Including Extracted Fat Fraction) [4]
	Principle[2]	Type[3]	Commodity	Provision	
ISO 3961 / AOAC 993.20 / AOCS Cd 1d-92 / NMKL 39	Titrimetric (Wijs) method	I	Named animal fats; Named vegetable oils; Olive oils and olive pomace oils; Unrefined shea butter	Iodine value	Not validated for composite foods; measures degree of unsaturation in fats and oils only; cannot detect PHO

Surveillance Protocols and Investigative Methods

7. Surveillance protocols referenced in *WHO's Technical Criteria for Monitoring iTFA in Foods (2024)* are listed in *Table A.4.* These support population-level monitoring and hybrid enforcement models but are not eligible for Codex endorsement until validated by a recognized SDO.

Table A.4. Surveillance Protocols

Method	Purpose[2]	Status
WHO Global Protocol (2020)	Comprehensive GC-FID procedure for TFA analysis	Used for surveillance and hybrid enforcement models
WHO Simplified Protocol (2023)	Streamlined GC-FID method for low-resource labs	Used for surveillance and hybrid enforcement models
JRC Calculation-Based Method (2021)	Estimates iTFA in composite foods using marker fatty acids	Used for estimating iTFA in composite foods

8. Investigative methods listed in *Table A.5* offer rapid screening but lack SDO validation and are not referenced by WHO. These methods lack specificity for iTFA and cannot distinguish ruminant vs. industrial sources. They are unsuitable for enforcement until validated and endorsed by CCMAS.

Table A.5. Investigative Methods for Rapid Screening

Method	Purpose	Status
Infrared Spectroscopy (FTIR)	Rapid screening of total saturated, *trans*, MUFA, PUFA	Investigative use only; not suitable for enforcement
Capillary Zone Electrophoresis (CZE)	Rapid cis/*trans* fatty-acid analysis in foods without animal fats	Investigative use only; not suitable for enforcement

Annex I Table Notes:

- **[1] Method Numbering Convention in CXS 234-1999**
    - "and" indicates that both methods are required together (e.g., ISO 12966-2 and ISO 12966-4).
    - "/" indicates alternative methods that may be used interchangeably (e.g., ISO 3961 / AOAC 993.20).
    - "|" indicates a joint publication of the same method by two organizations (e.g., ISO 16958 and IDF 231)
- **[2] Analytical Principles/ Purpose**
    - All gas chromatography (GC) methods listed employ flame ionization detection (FID), even if not explicitly stated in the "Principle" column.
    - Differences in wording differences in the "Principle" column (e.g., "Gas chromatography" vs. "Preparation of methyl esters and gas chromatography") reflect whether methylation steps are included in the method.
    - For WHO surveillance protocols (*Table A.4*), original terminology for analytical principles has been harmonized to GC–FID for consistency with Codex conventions.
- **[3] Method Type Classification**
    - **Type I – Defining Method:** Establishes the accepted value; used for setting standards.
    - **Type II – Reference Method:** Designated for dispute resolution and calibration where Type I does not apply.
    - **Type III – Alternative Approved Method:** Meets CCMAS criteria for routine control, inspection, or regulatory purposes.
    - **Type IV – Tentative Method:** Traditionally used or recently introduced but not yet fully validated for CCMAS endorsement; often applied for screening or indicative purposes only
- **[4] Validation for Composite Foods:** Codex endorsement applies only to the commodities specified in CXS 234-1999. Use in composite foods reflects application and validation status reported by SDOs (AOAC, ISO, AOCS) and published literature; these uses are outside Codex endorsement.

ANNEX II – PART I

PROPOSED DRAFT REVISIONS TO THE STANDARD FOR EDIBLE FATS AND OILS NOT COVERED BY INDIVIDUAL STANDARDS (CXS 19-1981)

(STEP 3)

(Proposed revisions, to Sections 1, 2, 3 and 8, are indicated in **bold and underlined text**)

1. SCOPE

This standard (formerly CAC/RS 19-1969) applies to oils and fats and mixtures thereof in a state for human consumption. It includes oils and fats that have been subjected to processes of modification (such as trans- esterification or **hydrogenation**[i]) or fractionation.

This standard does not apply to any oil or fat which is covered by one of the following:

- *Standard for named animal fats* (CXS 211-1999),[1]
- *Standard for named vegetable oils* (CXS 210-1999),[2]
- *Standard for olive oils and olive-pomace oils* (CXS 33-1981),[3] and
- *Standard for fish oils* (CXS 329-2017).[4]

2. DESCRIPTIONS

2.1 Product definitions

Edible fats and oils are foodstuffs defined in Section 1 which are composed of glycerides of fatty acids. They are of vegetable, animal or marine origin. They may contain small amounts of other lipids such as Phosphatides, of unsaponifiable constituents and of free fatty acids naturally present in the fat or oil. Fats of animal origin must be produced from animals in good health at the time of slaughter and be fit for human consumption.

Virgin fats and oils are edible vegetable fats and oils obtained, without altering the nature of the oil, by mechanical procedures, e.g. expelling or pressing, and the application of heat only. They may be purified by washing with water, settling, filtering and centrifuging only.

Cold pressed fats and oils are edible vegetable fats and oils obtained, without altering the oil, by mechanical procedures, e.g. expelling or pressing, without the application of heat. They may have been purified by washing with water, settling, filtering and centrifuging only.

2.2 Other definitions

Fully hydrogenated fats and oils **(FHO) are produced through a chemical process in which hydrogen is added to all the double bonds in unsaturated fats and oils, using a catalyst. This process converts all unsaturated bonds into saturated single bonds, resulting in a fully saturated fat structure. Because the hydrogenation is complete, the formation of industrially produced *trans*-fatty acids (iTFA) is minimized. The resulting fats and oils are typically solid or semi-solid at room temperature due to their higher melting point and exhibit enhanced stability and resistance to oxidation.**

Partially hydrogenated fats and oils **(PHO) are produced through a chemical process that adds hydrogen to some of the double bonds in unsaturated fats and oils, using a catalyst. This converts those double bonds into single bonds, making the fat more saturated. During this process, some of the remaining double bonds undergo geometric isomerization, changing from the natural cis configuration to the trans configuration. The process can be controlled to create fats and oils with a wide range of physical properties, such as texture and melting point, regardless of the original oil composition. It also leads to the formation of *trans*-fatty acids, which may vary depending on the degree of hydrogenation.**

Industrially produced trans-fatty acids (iTFA) **are *trans*-fatty acids obtained through industrial processes, primarily formed during the partial hydrogenation of unsaturated fats and oils, though smaller amounts may also be produced during other industrial processes, such as oil**

[i] The term "hydrogenation" may refer to either full or partial hydrogenation, as applicable under national and/or regional legislation or regulations. This reflects the global public health objective of eliminating industrially produced *trans*-fatty acids (iTFA) from the food supply, by setting a mandatory limit of not more than 2 g iTFA per 100 g of total fat in all foods, and/or by prohibiting the production and use of partially hydrogenated fats and oils in all foods.

refining and deodorization. iTFA are defined solely by their method of production and cannot be chemically distinguished from other TFA.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

Competent national and/or regional authorities should implement mandatory legislative or regulatory measures to:

a) **Set a limit of industrially produced *trans*-fatty acids (iTFA) to not more than 2 g per 100 g of total fat in all foods [ii]; and/or**

b) **Prohibit the production for food use, and the use of partially hydrogenated fats and oils (PHO) in all foods [iii].**

8. METHODS OF ANALYSIS AND SAMPLING

For checking the compliance with this standard, the methods of analysis and sampling contained in the *Recommended methods of analysis and sampling* (CXS 234-1999)[12] relevant to the provisions in this standard, shall be used.

[ii] **Food" as defined in the *Codex Alimentarius Commission Procedural Manual*.**

[iii] **ENFORCEMENT FOOTNOTE OPTIONS FOR COMMITTEE CONSIDERATION:**

OPTION 1 (CONCISE):

For checking the compliance with this provision, non-analytical measures such as ingredient declarations and process controls shall be used instead of, or in addition to, the relevant methods of analysis and sampling contained in the *Recommended methods of analysis and sampling* (CXS 234-1999), as compliance cannot rely solely on analytical methods.

OPTION 2 (DETAILED):

For checking the compliance with this provision:

a) **For the iTFA limit, a hybrid approach shall be used, combining analytical methods contained in the *Recommended methods of analysis and sampling* (CXS 234-1999) for total *trans*-fatty acid quantification, with non-analytical measures such as ingredient declarations, PHO-free certifications, and supply chain records to estimate ruminant TFA content and infer iTFA quantity.**

b) **For the PHO prohibition, compliance shall be verified through documentation, as there are no validated analytical methods to directly detect PHO in foods. Iodine value (IV) may be used as a screening tool at the ingredient level to help differentiate fully hydrogenated oils from PHO, noting that IV ≥ 4 is typically associated with PHO.**

ANNEX II - PART II

PROPOSED DRAFT REVISIONS TO THE STANDARD FOR FAT SPREADS AND BLENDED SPREADS (CXS 256-1999)

(STEP 3)

(Proposed revisions, to Sections 2 and 3, are indicated in **bold and underlined text**)

2. DESCRIPTION

2.1 Product definitions

2.1.1 Fat spreads and blended spreads

The products covered by this standard are foods that are plastic or fluid emulsions, principally of water and edible fats and oils**.**

2.1.2 Edible fats and oils

"Edible fats and oils" means foodstuffs composed of glycerides of fatty acids. They are of vegetable or animal (including milk) or marine origin. They may contain small amounts of other lipids such as Phosphatides, of unsaponifiable constituents and of free fatty acids naturally present in fat or oil. Fats of animal origin must, if originating from slaughtered animals, be obtained from animals in good health at the time of slaughter and fit for human consumption as determined by a competent authority recognized in national legislation. Fats and oils that have been subjected to processes of physical or chemical modification including fractionation, inter-esterification or **hydrogenation**[i] are included.

2.2 Other definitions

2.2.1 Fully hydrogenated fats and oils

"Fully hydrogenated fats and oils" (FHO) are produced through a chemical process in which hydrogen is added to all the double bonds in unsaturated fats and oils, using a catalyst. This process converts all unsaturated bonds into saturated single bonds, resulting in a fully saturated fat structure. Because the hydrogenation is complete, the formation of industrially produced trans-fatty acids (iTFA) is minimized. The resulting fats and oils are typically solid or semi-solid at room temperature due to their higher melting point and exhibit enhanced stability and resistance to oxidation.

2.2.2 Partially hydrogenated fats and oils

"Partially hydrogenated fats and oils" (PHO) produced through a chemical process that adds hydrogen to some of the double bonds in unsaturated fats and oils, using a catalyst. This converts those double bonds into single bonds, making the fat more saturated. During this process, some of the remaining double bonds undergo geometric isomerization, changing from the natural cis configuration to the trans configuration. The process can be controlled to create fats and oils with a wide range of physical properties, such as texture and melting point, regardless of the original oil composition. It also leads to the formation of trans-fatty acids, which may vary depending on the degree of hydrogenation.

2.2.3 Industrially produced *trans*-fatty acids

"Industrially produced trans-fatty acids" (iTFA) are trans-fatty acids obtained through industrial processes, primarily formed during the partial hydrogenation of unsaturated fats and oils, though smaller amounts may also be produced during other industrial processes, such as oil refining and deodorization. iTFA are defined solely by their method of production and cannot be chemically distinguished from other TFA.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Composition

3.1.1 Fat spreads

3.1.1.1 For these products, any milk fat content must be no more than 3 percent of the total fat content.

[i] **The term "hydrogenation" may refer to either full or partial hydrogenation, as applicable under national and/or regional legislation or regulations. This reflects the global public health objective of eliminating industrially produced *trans*-fatty acids (iTFA) from the food supply, by setting a mandatory limit of not more than 2 g iTFA per 100 g of total fat in all foods, and/or by prohibiting the production and use of partially hydrogenated fats and oils in all foods.**

3.1.1.2 The fat content shall be as follows:

c)	Margarine	≥ 80%
d)	Fat spreads[ii]	< 80%

3.1.2 Blended spreads

3.1.2.1 These are blended spreads in which milk fat is more than 3 percent of the total fat content. However, a higher minimum percentage of milk fat may be specified in accordance with the requirements of the country of the retail sale.

3.1.2.2 The fat content shall be as follows:

(a) Blends	≥ 80%
(b) Blended fat spread	< 80%

3.2 Competent national and/or regional authorities should implement mandatory legislative or regulatory measures to:

a) Set a limit of industrially produced *trans*-fatty acids (iTFA) to not more than 2 g per 100 g of total fat in all foods[iii] ; and/or

b) Prohibit the production for food use, and the use of partially hydrogenated fats and oils (PHO) in all foods[iv] .

[ii] The term "margarine" may, in some cases, be used in the name of the food as provided for in Section 7.1.1

[iii] "Food" as defined in the *Codex Alimentarius Commission Procedural Manual*.

[iv] ENFORCEMENT FOOTNOTE OPTIONS FOR COMMITTEE CONSIDERATION:

OPTION 1 (CONCISE):

For checking the compliance with this provision, non-analytical measures such as ingredient declarations and process controls shall be used instead of, or in addition to, the relevant methods of analysis and sampling contained in the *Recommended methods of analysis and sampling* (CXS 234-1999), as compliance cannot rely solely on analytical methods.

OPTION 2 (DETAILED):

For checking the compliance with this provision:

a) For the iTFA limit, a hybrid approach shall be used, combining analytical methods contained in the *Recommended methods of analysis and sampling* (CXS 234-1999) for total *trans*-fatty acid quantification, with non-analytical measures such as ingredient declarations, PHO-free certifications, and supply chain records to estimate ruminant TFA content and infer iTFA quantity.

b) For the PHO prohibition, compliance shall be verified through documentation, as there are no validated analytical methods to directly detect PHO in foods. Iodine value (IV) may be used as a screening tool at the ingredient level to help differentiate fully hydrogenated oils from PHO, noting that IV ≥ 4 is typically associated with PHO.

ANNEX II - PART III

PROPOSED DRAFT REVISIONS TO THE STANDARD FOR NAMED ANIMAL FATS (CXS 211-1999)

(STEP 3)

(Proposed revisions, to Sections 2 and 3, are indicated in **bold and underlined text**)

2. DESCRIPTION

2.1 Product definitions

2.1.1 Lard

Pure rendered lard is the fat rendered from fresh, clean, sound fatty tissues from swine (*Sus scrofa*) in good health, at the time of slaughter, and fit for human consumption. The tissues do not include bones, detached skin, head skin, ears, tails, organs, windpipes, large blood vessels, scrap fat, skimmings, settlings, pressings, and the like, and are reasonably free from muscle tissues and blood.

Lard subject to processing may contain refined lard, lard stearin and **hydrogenated[i]** lard, or be subject to processes of modification provided that it is clearly labelled.

2.1.2 Rendered pork fat

Rendered pork fat is the fat rendered from the tissues and bones of swine (*Sus scrofa*) in good health, at the time of slaughter, and fit for human consumption. It may contain fat from bones (properly cleaned), from detached skin, from head skin, from ears, from tails and from other issues fit for human consumption.

Rendered pork fat subject to processing may also contain refined lard, refined rendered pork fat, **hydrogenated[i]** lard, **hydrogenated[i]** rendered pork fat, lard stearin and rendered pork fat stearin provided that it is clearly labelled.

Premier jus (oleo stock) is the product obtained by rendering at low heat the fresh fat (killing fat) of heart, caul, kidney and mesentery collected at the time of slaughter of bovine animals in good health at the time of slaughter and fit for human consumption, as well as cutting fats.

2.1.3 Edible tallow

Edible tallow (dripping) is the product obtained by rendering the clean, sound, fatty tissues (including trimming and cutting fats), attendant muscles and bones of bovine animals and/or sheep (*Ovis aries*) in good health at the time of slaughter and fit for human consumption.

Edible tallow subject to processing may contain refined edible tallow, provided that it is clearly labelled.

2.2 Other definitions

2.2.1 Fully hydrogenated fats and oils

Fully hydrogenated fats and oils (FHO) are produced through a chemical process in which hydrogen is added to all the double bonds in unsaturated fats and oils, using a catalyst. This process converts all unsaturated bonds into saturated single bonds, resulting in a fully saturated fat structure. Because the hydrogenation is complete, the formation of industrially produced trans-fatty acids (iTFA) is minimized. The resulting fats and oils are typically solid or semi-solid at room temperature due to their higher melting point and exhibit enhanced stability and resistance to oxidation.

2.2.2 Partially hydrogenated fats and oils

Partially hydrogenated fats and oils (PHO) are produced through a chemical process that adds hydrogen to some of the double bonds in unsaturated fats and oils, using a catalyst. This converts those double bonds into single bonds, making the fat more saturated. During this process, some of the remaining double bonds undergo geometric isomerization, changing from the natural cis configuration to the trans configuration. The process can be controlled to create fats and oils with a wide range of physical properties, such as texture and

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[i] The term "hydrogenated" may refer to either full or partial hydrogenation, as applicable under national and/or regional legislation or regulations. This reflects the global public health objective of eliminating industrially produced *trans*-fatty acids (iTFA) from the food supply, by setting a mandatory limit of not more than 2 g iTFA per 100 g of total fat in all foods, and/or by prohibiting the production and use of partially hydrogenated fats and oils in all foods.

melting point, regardless of the original oil composition. It also leads to the formation of trans-fatty acids, which may vary depending on the degree of hydrogenation.

2.2.3 Industrially produced *trans*-fatty acids

Industrially produced *trans*-fatty acids (iTFA) are *trans*-fatty acids obtained through industrial processes, primarily formed during the partial hydrogenation of unsaturated fats and oils, though smaller amounts may also be produced during other industrial processes, such as oil refining and deodorization. iTFA are defined solely by their method of production and cannot be chemically distinguished from other TFA.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Gas-liquid chromatography (GLC) ranges of fatty acid composition (expressed as percentages)

Samples falling within the appropriate ranges specified below are in compliance with this standard.

	Lard rendered pork fat	**Premier jus tallow**
C6:0	< 0.5 in total	< 0.5 in total
C8:0		
C10:0		
C12:0		
C14:0	1.0–2.5	2–6
C14:ISO	< 0.1	< 0.3
C14:1	< 0.2	0.5–1.5
C15:0	< 0.2	0.2–1.0
C15:ISO	< 0.1	< 1.5 in total
C15:ANTI ISO	< 0.1	
C16:0	20–30	20–30
C16:1	2.0–4.0	1–5
C16:ISO	< 0.1	< 0.5
C16:2	< 0.1	< 1.0
C17:0	< 1	0.5–2.0
C17:1	< 1	< 1.0
C17:ISO	< 0.1	< 1.5 in total
C17: ANTI ISO	< 0.1	
C18:0	8–22	15–30
C18:1	35–55	30–45
C18:2	4–12	1–6
C18:3	< 1.5	< 1.5
C20:0	< 1.0	< 0.5
C20:1	< 1.5	< 0.5
C20:2	< 1.0	< 0.1
C20:4	< 1.0	< 0.5
C22:0	< 0.1	< 0.1
C22:1	< 0.5	not detected

3.2 Competent national and/or regional authorities should implement mandatory legislative or regulatory measures to:

a) Set a limit of industrially produced *trans*-fatty acids (iTFA) to not more than 2 g per 100 g of total fat in all foods[ii]; and/or

b) Prohibit the production for food use, and the use of partially hydrogenated fats and oils (PHO) in all foods[iii].

[ii] **"Food" as defined in the *Codex Alimentarius Commission Procedural Manual*.**

[iii] **ENFORCEMENT FOOTNOTE OPTIONS FOR COMMITTEE CONSIDERATION:**

OPTION 1 (CONCISE):

For checking the compliance with this provision, non-analytical measures such as ingredient declarations and process controls shall be used instead of, or in addition to, the relevant methods of analysis and sampling contained in the *Recommended methods of analysis and sampling* (CXS 234-1999), as compliance cannot rely solely on analytical methods.

OPTION 2 (DETAILED):

For checking the compliance with this provision:

a) For the iTFA limit, a hybrid approach shall be used, combining analytical methods contained in the *Recommended methods of analysis and sampling* (CXS 234-1999) for total *trans*-fatty acid quantification, with non-analytical measures such as ingredient declarations, PHO-free certifications, and supply chain records to estimate ruminant TFA content and infer iTFA quantity.

b) For the PHO prohibition, compliance shall be verified through documentation, as there are no validated analytical methods to directly detect PHO in foods. Iodine value (IV) may be used as a screening tool at the ingredient level to help differentiate fully hydrogenated oils from PHO, noting that IV ≥ 4 is typically associated with PHO.