



Food and Agriculture Organization
of the United Nations



World Health
Organization

JOINT FAO/WHO EXPERT COMMITTEE ON FOOD ADDITIVES (JECFA)

Limit test for heavy metals in food additive specifications

Explanatory note

Background

1. The 49th meeting¹ of JECFA (1997) discussed the limits for arsenic, lead and other heavy metals in food additive specifications. It concluded that the validity of the limit test for heavy metals (expressed as lead) was compromised due to lack of specificity and potential loss of metals and arsenic during the dry-ashing procedure. The meeting suggested replacing this general test by specific tests for the specific elements, using more specific and sensitive analytical methods.
2. The 51st meeting² (1998) decided to require confirmation of actual levels determined in food additives (i.e. analytical data) proposed by manufacturers or sponsors of additives for JECFA review. It was confirmed that the Committee would aim to set limits that were as low as practicable.
3. At the same meeting, a general limit of 2 mg/kg for lead was adopted. For additives to be consumed in substantial amounts, a limit of 1 mg/kg or lower would be proposed. A higher level of e.g. 5 mg/kg would require evidence that the lead level could not be reduced to these levels.
4. The 53rd meeting³ of JECFA (1999) decided to review and to replace the limit test for heavy metals with limits for individual metals of concern in all existing specifications. This review would be based on functional use and should be completed within five years. It was proposed that the call for data for the next meeting would include requests for suggestions about limits for individual heavy metals and arsenic and supporting data for emulsifiers.
5. The Committee reaffirmed at this meeting the following general limits:

Heavy metal	Proposed general limit
Arsenic	None (except if indicated by manufacturing method or source)
Lead	2 mg/kg (1 mg/kg or lower in case of high consumption)
Cadmium	1 mg/kg
Mercury	1 mg/kg

Deviation from these levels in either direction would need to be justified by "good reasons".

Review process (55th to 59th)

6. At the 55th meeting⁴ (2000) the review project started with the evaluation of **43 emulsifiers**:

Heavy metal	Proposed general limits
Arsenic	3 mg/kg for phosphates No limits for other emulsifiers
Lead	2 mg/kg for organic emulsifiers 4 mg/kg for inorganic phosphates

7. At this meeting it was also decided to consider the limits as proposals that would give interested parties the possibility to comment⁵. Requests for higher limits should be justified with supporting data. A deadline for such comments was set (approx. eight months after the 55th meeting).

8. The 57th meeting⁶ proposed new arsenic and heavy metal limits for **10 anticaking agents, 17 flavour enhancers, 10 sweetening agents, and 13 thickening agents**:

Heavy metal	Proposed limits
Arsenic	3 mg/kg for ferrocyanides of calcium, potassium and sodium
Lead	2 mg/kg for thickening agents and magnesium oxide 1 mg/kg for flavour enhancers and sweetening agents 4 mg/kg for phosphates 5 mg/kg for silicate anticaking agents
Cadmium	No limits as there were no concerns for their presence in any of the substances under review
Mercury	

The Committee emphasized that, following replacement of the limit test for heavy metals (as lead) by individual elements, the absence of a particular element from a specification means that the level of contamination is so low as to be of no concern.

9. The 59th meeting⁷ proposed limits for **52 colours** and **40 acidity regulators**.

Natural colours	
Heavy metal	Proposed limits
Arsenic	Limits for arsenic were maintained because of information received concerning plant sources for certain natural colours growing in areas where the ground water is high in arsenic. It was agreed to review these limits at a future meeting when arsenic is on the agenda for evaluation.
Lead	2 mg/kg with the exception of certain natural colours for which some evidence for higher levels had been provided.
Cadmium	No limits
Mercury	1 mg/kg for annatto extracts

Synthetic colours	
Heavy metal	Proposed limits
Arsenic	None
Lead	2 mg/kg
Cadmium	No limits
Mercury	

10. Also at the 59th JECFA, the Committee concluded that, because of the high levels of heavy metals in the present specifications for the three **inorganic colours**, aluminium powder, iron oxides and titanium dioxide, a reconsideration of their full specifications was needed. Therefore the Committee maintained the existing limits and decided to call for data on the raw materials, manufacturing methods, and analytical data on impurities for review at a future meeting.

11. No data were received for the **acidity regulators** at the 59th meeting. Following its past practice the Committee proposed:

Heavy metal	Proposed limits
Arsenic	3 mg/kg of arsenic for phosphates and calcium compounds
Lead	2 mg/kg 4 mg/kg of lead for phosphates
Cadmium	Limits were not considered to be of concern and were not specified
Mercury	

Future work

12. The forthcoming 61st meeting of the Committee will assess antioxidants and some other food additives.

Publication policy

13. The revision of the limit test for heavy metals (as lead) constitutes a change of the specifications in its own right. **For a food additive, the valid JECFA specification consists of the most recently published full specification plus subsequent modifications introduced with the revision of the heavy metal test.** Modified specifications will be republished in the second edition of the Compendium of food additive specifications (FAO Food and Nutrition Paper 52). The revisions are discussed by the Codex Committee on Food Additives and Contaminants (CCFAC) and proposed to the Codex Alimentarius Commission for adoption.

¹ Evaluation of certain food additives and contaminants (Forty-ninth report of the Joint FAO/WHO Expert Committee on Food Additives). WHO Technical Report Series, No. 884, 1999, p 7.

² Evaluation of certain food additives (Fifty-first report of the Joint FAO/WHO Expert Committee on Food Additives). WHO Technical Report Series, No. 891, 2000, p 17.

³ Evaluation of certain food additives and contaminants (Fifty-third report of the Joint FAO/WHO Expert Committee on Food Additives). WHO Technical Report Series, No. 896, 2000, p 11f.

⁴ Evaluation of certain food additives and contaminants (Fifty-fifth report of the Joint FAO/WHO Expert Committee on Food Additives). WHO Technical Report Series, No. 901, 2001, p 78f.

⁵ Compendium of food additive specifications, Addendum 8. FAO Food and Nutrition Paper, No. 52, Add. 8, 2000, p 203.

⁶ Compendium of food additive specifications, addendum 9. FAO Food and Nutrition Paper, No. 52, Add. 9, 2002, p 193

⁷ Summary and conclusions. Joint FAO/WHO Expert Committee on Food Additives, Fifty-ninth meeting, 2002, p (www.fao.org/es/ESN/Jecfa/59corr.pdf)