

codex alimentarius commission



FOOD AND AGRICULTURE
ORGANIZATION
OF THE UNITED NATIONS

WORLD
HEALTH
ORGANIZATION



JOINT OFFICE: Viale delle Terme di Caracalla 00100 ROME Tel: 39 06 57051 www.codexalimentarius.net Email: codex@fao.org Facsimile: 39 06 5705 4593

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JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX COMMITTEE ON PROCESSED FRUITS AND VEGETABLES

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METHODS OF ANALYSIS AND SAMPLING FOR PROCESSED FRUITS AND VEGETABLES

This paper is for information only. It contains methods of analysis and sampling including Codex recommended methods of analysis and sampling (CAC/RMs) currently in force for selected processed fruits and vegetables. As CODEX/STAN 234-1999¹ (List of Methods of Analysis and Sampling in force in Codex Standards) does not contain all the methods of analysis for processed fruits and vegetables that have been endorsed by the Codex Committee on Methods of Analysis and Sampling, the document is presented as follows:

- Part I: Methods of analysis and sampling endorsed by the Codex Committee on Methods of Analysis and Sampling for inclusion in CX/STAN 234-1999 and in the individual standards for processed fruits and vegetables.
- Part II: Methods of analysis and Sampling for selected processed fruits and vegetables as contained in CX/STAN 234-1999.
- Part III: Codex methods of analysis and sampling (CAC/RMs) for selected processed fruits and vegetables.

¹ CODEX/STAN 234-1999 is available for downloading on the Codex website at:
<http://www.codexalimentarius.net/search/advanced.do?lang=en>

Part I: Methods of analysis and sampling endorsed by the Codex Committee on Methods of Analysis and Sampling for inclusion in CX/STAN 234-1999 and in the individual standards for processed fruits and vegetables.

1) **General Methods of Analysis for Processed Fruits and Vegetables**

COMMODITY	PROVISION	METHOD	PRINCIPLE	Type	Status	Note
Processed fruits and vegetables	Calcium	AOAC 968.31	Titrimetry	II	E ²	Replaces CAC/RM 38-1970
Processed fruits and vegetables (except pickled cucumbers)	Fill of containers	CAC/RM 46-1972	Weighing	I	E ²	Retain the current method Delete references to “metal containers” and refer to ISO 90.1:1986 for determination of water capacity in metal containers
Processed fruits and vegetables	Packing medium ≥ 10°Brix Canned berry fruits (raspberry, strawberry)	AOAC 932.12 ISO 2173:1978	Refractometry	I	E ²	
Processed fruits and vegetables	Sodium chloride	ISO 3634:1979	Potentiometry	III	E ²	Provision should read: “chloride expressed as sodium chloride”
Processed fruits and vegetables	Sulphites	EN 1988-1:1998-02 AOAC 990.28	Optimized Monier-Williams method	III	E ²	General method for sulphites as endorsed for food additives ³
Processed fruits and vegetables	Total solids	AOAC 920.151	Gravimetry	I	E ²	

² 24th CCMAS, November 2002, ALINORM 03/23, App. VI/H.1.

³ 24th CCMAS, November 2002, ALINORM 03/13, App. VI/G.1

2) **Methods of Analysis for specific commodities falling within this category**

COMMODITY	PROVISION	METHOD	PRINCIPLE	Type	Status	Note
Canned Bamboo Shoots	Drained weight and Net weight	AOAC 968.30	Gravimetry	I	E ⁴	General method for processed fruits and vegetables
Canned Bamboo Shoots	pH	AOAC 981.12 Follow the instruction for liquid and solid component mixtures (G(a)(1))	Potentiometry	I	E ⁴	
Canned Bamboo Shoots	Sampling	CAC/GL 50/2004 General Guidelines on Sampling				Replace CODEX STAN 233-1999 ⁵
Canned Stone Fruits	Drained weight	AOAC 968.30	Gravimetry	I	E ²	General method for processed fruits and vegetables
Canned Stone Fruits	Soluble solids	AOAC 932.14C ISO:2173:1978	Refractometry	I	E ²	General method for processed fruits and vegetables
Kimchi	Drained weight	AOAC 968.30	Gravimetry	I	E ⁶	General method for processed fruits and vegetables
Kimchi	Mineral impurities	AOAC 971.33	Ashing	I	E ⁶	
Kimchi	Salt (sodium chloride)	AOAC 971.27 (Codex General Method)	Potentiometry (Determination of chloride, expressed as sodium chloride)	II	E ⁶	
Kimchi	Total acidity	AOAC 942.15	Titrimetry	I	E ⁶	

⁴ 21st CCMAS (March 1997), ALINORM 97/23A, App. V-Part 2/D.

⁵ ALINORM 04/27/23, para. 15 and Appendix III; ALINORM 04/27/41, Appendix V.

⁶ 22nd CCMAS (November 1998), ALINORM 99/23, App. III, Part 1/B.

COMMODITY	PROVISION	METHOD	PRINCIPLE	Type	Status	Note
Pickles	Arsenic	AOAC 952.13 (Codex General Method)	Colorimetry, diethyldithiocarbamate	II	E ⁶	
Pickles	Arsenic	ISO 6634:1982	Spectrophotometry, silver diethyldithiocarbamate	III	E ⁶	
Pickles	Lead	AOAC 972.25 (Codex General Method)	Atomic absorption spectrophotometry	II	E ⁶	
Pickles	Sampling	CAC/GL 50/2004 General Guidelines on Sampling				
Pickles	Tin	AOAC 980.19 (Codex General Method)	Atomic absorption spectrophotometry	II	E ⁶	

Part II: Methods of Analysis and Sampling for selected processed fruits and vegetables as contained in CX/STAN 234-1999.

COMMODITY	PROVISION	METHOD	PRINCIPLE	Type
Processed fruits and vegetables	Drained weight	AOAC 968.30	Sieving	I
Processed fruits and vegetables	Fill of containers	CAC/RM 46-1972	Weighing	I
Processed fruits and vegetables	Soluble solids	ISO 2173:1978 AOAC 932.14C	Refractometry	I
Canned green peas	Calcium	AOAC 968.31	Complexometric titrimetry	II
Canned green peas	Solids, alcohol insoluble	AOAC 938.10	Sieving	I
Canned mature processed peas	Solids, total	AOAC 964.22	Gravimetry (vacuum oven)	I
Canned palmito	Mineral impurities	ISO 762:1982 (confirmed 1992)	Gravimetry	I
Canned tomatoes	Calcium	AOAC 968.31	Complexometric titrimetry	II
Canned tomatoes	Drained weight	CAC/RM 37-1970 - Method II	Sieving	I
Canned tomatoes	Mould count	AOAC 965.41	Howard mould count	I
Citrus marmalade	Calcium	AOAC 968.31	Complexometric titrimetry	II
Jams (fruit preserves) and jellies	Calcium	AOAC 968.31	Complexometric titrimetry	II
Jams (fruit preserves) and jellies	Mineral impurities	AOAC 971.33	Gravimetry	I
Processed tomato concentrates	Mineral impurities	AOAC 971.33	Gravimetry	IV
Processed tomato concentrates	Natural tomato soluble solids	AOAC 970.59	Refractometry	I
Processed tomato concentrates	Sodium chloride	AOAC 971.27 (Codex general method)	Potentiometry	II

Part III: Codex Methods of Analysis and Sampling (CAC/RMs) for selected processed fruits and vegetables.

CODEX METHODS OF ANALYSIS AND SAMPLING (CAC/RMs)

CAC/RM Reference	Method
CAC/RM 36-1970	Determination of Drained Weight - Method I
CAC/RM 37-1970	Determination of Drained Weight - Method II
CAC/RM 39-1970	Tough String Test
CAC/RM 45-1972	Determination of Proper Fill in lieu of Drained Weight
CAC/RM 46-1972	Determination of Water Capacity of Containers
CAC/RM 47-1972	Determination of Alcohol Insoluble Solids
CAC/RM 48-1972	Method of Distinguishing Type of Peas
CAC/RM 49-1972	Determination of Mineral Impurities (Sand)