CODEX ALIMENTARIUS COMMISSION

Food and Agriculture Organization of the United Nations

World Health Organization

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Agenda Item 4 **CRD05-rev**

JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX COMMITTEE ON FATS AND OILS

26th Session

Kuala Lumpur, Malaysia, 25 February - 1 March 2019

RECOMMENDED METHODS OF ANALYSIS AND SAMPLING

CODEX STAN 234-1999 (A.1.1. Fats and Oils and Related Products)

(Prepared by the Codex Secretariat)

A.1.1. Fats and Oils and Related Products

Fats and Oils (all)	Arsenic	AOAC 952.13 (Codex general method)	Colorimetry (diethyldithiocarbamate)	II
Fats and Oils (all)	Arsenic	AOAC 942.17 (Codex general method)	Colorimetry (molybdenum blue)	III
Fats and Oils (all)	Arsenic	AOAC 986.15 (Codex general method)	Atomic absorption spectrophotometry	III
Fats and oils	Butylhydroxyanisole, butylhydroxytoluene, tert-butylhydroquinone, & propyl gallate	AOAC 983.15; or AOCS Ce-6-86	Liquid chromatography	II
Fats and Oils (all)	Insoluble impurities	ISO 663	Gravimetry	I
Fats and Oils (all)	Lead	AOAC 994.02 ISO 12193 (Codex general method) or AOCS Ca 18c-91	Atomic absorption spectrophotometry (direct graphite furnace)	II
Fats and Oils (all)	Matter volatile at 105°C	ISO 662	Gravimetry (open-drying)	I
Fats and Oils (all)	Soap content	BS 684 Section 2.5; or AOCS Cc 17-95	Gravimetry	I
Fats and oils not covered by individual standards	Acid Value	ISO 660; or AOCS Cd 3d-63	Titrimetry	I
Fats and oils not covered by individual standards	Copper and Iron	AOAC 990.05 ISO 8294 or AOCS Ca 18b-91 (Codex general method)	Atomic absorption Spectrophotometry (direct graphite furnace)	II
Fats and oils not covered by individual standards	Peroxide value	AOCS Cd 8b-90 ISO 3960	Titrimetry using *iso*-octane	I

A.1.1. Fats and Oils and Related Products

Fat spreads and blended spreads	Fat content	ISO 17189 | IDF 194	Gravimetry	I
Fish oils	Fatty acid composition	ISO 5508	Gas chromatography	III
Fish oils	Fatty acid composition	ISO 12966-2	Gas chromatography	III
Fish oils	Fatty acid composition	AOCS Ce 1b-89	GLC	III
Fish oils	Fatty acid composition	AOCS Ce 1-07	Capillary GLC	III
Fish oils	Fatty acid composition	AOCS Ce 2b-11	Alkali hydrolysis	III
Fish oils	Fatty acid composition	AOCS Ce 1a-13	Capillary GLC	III
Fish oils	Fatty acid composition	AOCS Ce 2-66	Preparation of methyl esters by fatty acids	III
Fish oils	Acid value	AOCS Ca 5a-40 AOCS CD 3D-63 ISO 3960 NMKL 38	Titration	I
Fish oils	Peroxide value	AOCS Cd 8b-90 ISO 3960 NMKL 158	Titration	I
Fish oils	Peroxide value	European Pharmacopeia 2.5.5 (Part B Iso-octane as solvent)	Titration	I
Fish oils	Phospholipids	USP-FCC10 2S(Krill oil): Phospholipids, Nuclear Magnetic Resonance, Appendix IIC	NMR Spectroscopy	IV
Fish oils	P-Anisidine value	European Pharmacopoeia 2.5.36/ AOCS Cd 18-90/ ISO 6885	Spectrophotometry	I
Fish oils	Triglycerides	USP 40-NF35(Omega-3 Acid Triglycerides): Content of oligomers and partial glyceride	HPLC-RI	III
		European Pharmacopoeia 1352 (Omega3 acid triglycerides): Oligomers and partial glycerides	HPLC RI	III
		AOCS Cd 11d-96	HPLC-ELSD	III

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Fish oils	Vitamin A	European Parharmcopeia Monograph on Cod Liver Oil (Type A), monograph 01/2005:1192, with LC end-point 2.2.29	LC	III
Fish oils	Vitamin A	EN 12823-1 (Determination of vitamin A by high performance liquid chromatograph – Part 1: Measurement of all-E-retinol and 13-Z-retinol	LC	III
Fish oils	Vitamin D	EN 12821 (Determination of vitamin D by high performance liquid chromatography – Measurement of cholecalciferol (D3) or ergocalciferol (D2))	LC	III
Fish oils	Vitamin D	NMKL 167 (Cholecalciferol (vitamin D3) and Ergocalciferol (vitamin D2). Determination by HPLC in foodstuffs	LC	III
Named Animal Fats	Acidity	ISO 660; or AOCS Cd 3d-63	Titrimetry	I
Named Animal Fats	Copper and Iron	AOAC 990.05 ISO 8294; or AOCS Ca 18b-91 (Codex general method)	Atomic absorption Spectrophotometry (direct graphite furnace)	II
Named Animal Fats	GLC ranges of fatty acid composition	ISO 5508 and ISO 12966-2 or AOCS Ce 2-66 and Ce 1e-91 or Ce 1f-96	Gas chromatography of methyl esters	II
Named Animal Fats	Iodine value (IV)	ISO 3961; or AOAC 993.20; or AOCS Cd 1d-92	Wijs-Titrimetry	I
Named Animal Fats	Peroxide value	AOCS Cd 8b-90 ISO 3960	Titrimetry using *iso*-octane	I
Named Animal Fats	Relative density	ISO/AOCS method for apparent density to be inserted	Pycnometry	II
Named Animal Fats	Refractive index	ISO 6320; or AOCS Cc 7-25	Refractometry	II
Named Animal Fats	Saponification value	ISO 3657; or AOCS Cd 3-25	Titrimetry	I
Named Animal Fats	Unsaponifiable matter	ISO 3596 or ISO 18609; or AOCS Ca 6b-53	Titrimetry after extraction with diethyl ether	I

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Named Animal Fats	Titre	ISO 935; or AOCS Cc 12-59	Thermometry	I
Named Vegetable Oils	Acidity	ISO 660; or AOCS Cd 3d-63	Titrimetry	I
Named Vegetable Oils	Apparent density	ISO 6883, with the appropriate conversion factor; or AOCS Cc 10c-95	Pycnometry	I
Named Vegetable Oils	Baudouin test (modified Villavecchia or sesameseed oil test)	AOCS Cb 2-40	Colour reaction	I
Named Vegetable Oils	Carotenoids, total	BS 684 Section 2.20	Spectrophotometry	II
Named Vegetable Oils	Copper and iron	ISO 8294; or AOAC 990.05; or AOCS Ca 18b-91	AAS	II
Named Vegetable Oils	Crismer value	AOCS Cb 4-35 and AOCS Ca 5a-40	Turbidity	I
Named Vegetable Oils	GLC ranges of fatty acid composition	ISO 5508 and ISO 12966-2; or AOCS Ce 2-66 and Ce 1--62 or Ce 1h-05	Gas chromatography of methyl esters	II
Named Vegetable Oils	Halphen test	AOCS Cb 1-25	Colorimetry	I
Named Vegetable Oils	Insoluble impurities	ISO 663	Gravimetry	I
Named Vegetable Oils	Iodine value (IV)	Wijs - ISO 3961; or AOAC 993.20; or AOCS Cd 1d-92; or NMKL 39	Wijs-Titrimetry [1]	I
Named Vegetable Oils	Lead	AOAC 994.02; or ISO 12193; or AOCS Ca 18c-91	Atomic Absorption	II
Named Vegetable Oils	Moisture & volatile matter at 105°C	ISO 662	Gravimetry	I
Named Vegetable Oils	Peroxide value (PV)	AOCS Cd 8b-90 or ISO 3960	Titrimetry	I
Named Vegetable Oils	Refractive index	ISO 6320 or AOCS Cc 7-25	Refractometry	II
Named Vegetable Oils	Reichert value and Polenske value	AOCS Cd 5-40	Titrimetry	I

[1] It is possible to calculate the Iodine Value from fatty acid composition data obtained by gas chromatography e.g. using AOCS Cd 1b-87

A.1.1. Fats and Oils and Related Products

Named Vegetable Oils	Relative density	IUPAC 2.101 with the appropriate conversion factor See comment above (Named Animal Fats) [2]	Pycnometry	I
Named Vegetable Oils	Saponification value (SV)	ISO 3657 or AOCS Cd 3-25	Titrimetry	I
Named Vegetable Oils	Slip point	ISO 6321 for all oils; AOCS Cc 3b-92 for all oils except palm oils; AOCS Cc 3-25 for palm oils only	Open ended capillary tube	I
Named Vegetable Oils	Soap content	BS 684 Section 2.5; or AOCS Cc 17-95	Gravimetry	I
Named Vegetable Oils	Sterol content	ISO 12228; or AOCS Ch 6-91	Gas chromatography	II
Named Vegetable Oils	Tocopherol content	ISO 9936 or AOCS Ce 8-89	HPLC	II
Named Vegetable Oils	Unsaponifiable matter	ISO 3596; or ISO 18609; or AOCS Ca 6b-53	Gravimetry	I
Olive Oils and Olive Pomace Oils	Absorbency in ultra-violet	COI/T.20/Doc. No. 19 or ISO 3656 or AOCS Ch 5-91	Absorption in ultra violet	II
Olive Oils and Olive Pomace Oils	Acidity, free (acid value)	ISO 660 or AOCS Cd 3d-63	Titrimetry	I
Olive Oils and Olive Pomace Oils	Alpha-tocopherol	ISO 9936	HPLC	II
Olive Oils and Olive Pomace Oils	Difference between the actual and theoretical ECN 42 triglyceride content	COI/T.20/Doc. no. 20 or AOCS Ce 5b-89	Analysis of triglycerides of HPLC and calculation	I
Olive Oils and Olive Pomace Oils	Erythrodiol + uvaol	COI/T.20/Doc.no. 30	Gas chromatography	II
Olive Oils and Olive Pomace Oils	Halogenated solvents, traces	COI/T.20/Doc. no. 8	Gas chromatography	II
Olive Oils and Olive Pomace Oils	Insoluble impurities in light petroleum	ISO 663	Gravimetry	I
Olive Oils and Olive Pomace Oils	Iodine value	ISO 3961 or AOAC 993.20 or AOCS Cd 1d-92 or NMKL 39	Wijs-Titrimetry	I
Olive Oils and Olive Pomace Oils	Iron and copper	ISO 8294 or AOAC 990.05	AAS	II
Olive Oils and Olive Pomace Oils	Lead	AOAC 994.02 or ISO 12193 or AOCS Ca 18c-91	AAS	II

[2] The method is no longer available.

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Olive Oils and Olive Pomace Oils	Moisture and volatile matter	ISO 662	Gravimetry	I
Olive Oils and Olive Pomace Oils	Organoleptic characteristics	COI/T.20/Doc. no. 15	Panel test	I
Olive Oils and Olive Pomace Oils	Peroxide value	ISO 3960 or AOCS Cd 8b-90	Titrimetry	I
Olive Oils and Olive Pomace Oils	Relative density	IUPAC 2.101, with the appropriate conversion factor. See comment above	Pycnometry	I
Olive Oils and Olive Pomace Oils	Refractive index	ISO 6320 or AOCS Cc 7-25	Refractometry	II
Olive Oils and Olive Pomace Oils	Saponification value	ISO 3657 or AOCS Cd 3-25	Titrimetry	I
Olive Oils and Olive Pomace Oils	Sterol composition and total sterols	COI/T.20/Doc. no. 30 | ISO 12228-2 or AOCS Ch 6-91	Gas chromatography	II
Olive Oils and Olive Pomace Oils	Stigmastadienes	COl/T.20/Doc. no. 11 or ISO 15788-1 or AOCS Cd 26-96	Gas chromatography	II
Olive Oils and Olive Pomace Oils	Stigmastadienes	ISO 15788-2	HPLC	III
Olive Oils and Olive Pomace Oils	*Trans* fatty acids content	COI/T.20/Doc no. 17 or ISO 15304 or AOCS Ch 2a-94	Gas chromatography of methyl esters	II
Olive Oils and Olive Pomace Oils	Unsaponifiable matter	ISO 3596 or ISO 18609 or AOCS Ca 6b-53	Gravimetry	I
Olive Oils and Olive Pomace Oils	Wax content	COI/T.20/Doc. no. 18 or AOCS Ch 8-02	Gas chromatography	II