FoodQS GmbH

food analytics & quality control

Analytical services for edible oils

status: February 2023

1. NMR- analytics

code	description	explanation
570	Olive oil [a)] specific check for foreign oils: - soy oil - sunflower oil - rape seed oil	**1. Quality parameters (Fatty acids)** • Palmitic acid (C16:0, %) • Stearic acid (18:0, %) • Oleic acid (C18:1, %) • Linoleic acid (C18:2, %) • Linolenic acid (C18:3, %) • Free fatty acids (%) **2. Quality parameters, Authenticity** • Iodine value • Peroxide value (meq O_2/ kg) • K_{232} • Phytosterol profile (qualitative) • Signs for oxidation • Indication for a mixture with foreign vegetable oils **3. Confirmation of the geographical origin** • Spain • Italy • Greece
571	Pumpkin seed oil [a)] specific check for foreign oils: - soy oil - sunflower oil - rape seed oil	**1. Quality parameters (Fatty acids)** • Palmitic acid (C16:0, %) • Stearic acid (18:0, %) • Oleic acid (C18:1, %) • Linoleic acid (C18:2, %) • Linolenic acid (C18:3, %) **2. Quality parameters, Authenticity** • Phytosterol profile (qualitative) • Signs for oxidation • Indication for a mixture with foreign vegetable oils
572	Plant oil (sunflower, rape seed, line seed, sesame, coconut, argan, hazelnut etc.) [a)]	**1. Quality parameters (Fatty acids)** • Palmitic acid (C16:0, %) • Stearic acid (18:0, %) • Oleic acid (C18:1, %) • Linoleic acid (C18:2, %) • Linolenic acid (C18:3, %) **2. Quality parameters, Authenticity** • Phytosterol profile (qualitative) • Signs for oxidation • Indication for a mixture with foreign vegetable oils

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2. Quality and authenticity

code	description	technology	LOQ
77001	K values (K_{232}, K_{270}, ΔK)	Spectrophotometry	K_{232}: 0,1 K_{270}: 0,1 ΔK: 0,01
77008	Free fatty acids Acid value, free fatty acids [FFA] (calculated as oleic, lauric and palmitic acid)	Titration	Acid value: 0,2 mg KOH/g, FFA calculated as oleic, lauric and palmitic acid: 0,1 % respectively
77011	Peroxide value	Potentiometry	0,1 meqO_2/kg
77002	Total polyphenols in olive oil (according to Folin-Ciocalteu)	Spectrophotometry	125 mg/kg
77003	Alkylic esters and wax content in olive oil **aU)** fatty acid ethyl esters FAEE (sum) fatty acid methyl esters FAME (sum), sum of FAME and FAEE, C42 esters, C44 esters, C46 esters, sum of waxes (C42 to C46)	LC-GC-FID	FAEE: 5 mg/kg fat FAME: 5 mg/kg fat C42 Ester, C44 esters, C46 esters: 12 mg/kg fat
77014	Pheophytins in olive oil **aU) 2)** Pyropheophytin A, Pheophytin a, Pheophytin a'.	LC-DAD	0,1 %
77021	Sensory analysis (panel test) of virgin olive oil (organoleptics) aU) 2)	Evaluation by IOC-recognized panel	---
77015	Stigmasta-3,5-diene in olive oil aU)	LC-DAD	0,01 mg/kg
77016	Isomeric diacylglyerols in olive oil aU) 1,2- and 1,3-diglycerols in resp. % of all diglycerols; ratio 1,2-diacylglycerols to 1,3-diacylglycerols; 1,2-diacylglycerols (sum); 1,3-diacylglycerlos (sum)	GC-FID	0,1 g/100g
77017	Triacyglycerol distribution in olive oil aU) POP, PLP, POO, PLO, OOS, OOO, OLO, LLO, LLL, misc.	GC-FID	0,1 %
77018	ECN42 Triacylglycerols in olive oil aU) ECN42 (measured), ECN42 (theoretical), ΔECN42	LC-RI	---
77022	2-Glyceryl Monopalmitate in olive oil aU)	GC-FID	---
77019	Sterol composition, sterol content and triterpene alcohol composition in olive oil aU) Total sterols (mg/kg), cholesterol, brassicasterol, 24-methylencholesterol, campesterol, campestanol, stigmasterol, Δ-7-campesterol, Δ-5,23-stigmastadienol, clerosterol, beta-sitosterol, sitostanol, Δ-5-avenasterol, Δ-5,24-Stigmastadienol, Δ-7-stigmastenol, Δ-7-avenasterol, erythrodiol/uvaol (% total sterols)	LC-GC-FID	Total sterols: 5 mg/kg, individual sterols: 0,1 % (share of total sterols)
77020	Fatty acid profile of olive oil aU) C 14:0 (myristic acid), C 16:0 (palmitic acid), C	GC-FID	C 14:0 (myristic acid) 0,01 %; C 16:0 (palmitic acid) 0,1 %; C 16:1 (palmitoleic acid) + isomers 0,1 %; C 17:0 (heptadecanoic acid) 0,01 %; C 17:1 (heptadecenoic acid) + isomers

	16:1 (palmitoleic acid) + isomers, C 17:0 (heptadecanoic acid), C 17:1 (heptadecenoic acid) + isomers, C 18:0 (stearic acid), C 18:1-9 (oleic acid), C 18:1-11 (cis-vaccenic acid), C 18:1-13 (13-octadecenoic acid), C 18:1 (trans) isomers, C 18:2 (linoleic acid), C 18:2 (cis/trans) isomers, C 18:2 (trans/cis) isomers, C 18:2 (trans/trans) isomers, C 18:3 (alpha-linolenic acid), C 18:3 (gamma-linolenic acid), C 18:3 (cis/cis/trans) isomers, C 18:3 (cis/trans/cis) isomers, C 18:3 (trans/cis/cis) isomers, C 18:3 (trans/cis/trans) isomers, C 20:0 (arachidic acid), C 20:1 (eicosenoic acid) + isomers, C 22:0 (behenic acid), C 24:0 (lignoceric acid), saturated fatty acids, mono unsaturated fatty acids, poly unsaturated fatty acids total, sum of trans isomers oleic acid, sum trans-isomers linoleic and linolenic acid, further fatty acids		0,01 %; C 18:0 (stearic acid) 0,1 %; C 18:1-9 (oleic acid) 0,1 %; C 18:1-11 (cis-vaccenic acid) 0,1 %; C 18:1-13 (13-octadecenoic acid) 0,1 %; C 18:1 (trans) isomers 0,01 %, C 18:2 (linoleic acid) 0,1 %; C 18:2 (cis/trans) isomers 0,01 %; C 18:2 (trans/cis) isomers 0,01 %; C 18:2 (trans/trans) isomers 0,01 %, C 18:3 (alpha-linolenic acid) 0,01 %; C 18:3 (gamma-linolenic acid) 0,01 %; C 18:3 (cis/cis/trans) isomers 0,01 %; C 18:3 (cis/trans/cis) isomers 0,01 %; C 18:3 (trans/cis/cis) isomers 0,01 %; C 18:3 (trans/cis/trans) isomers 0,01 %; C 20:0 (arachidic acid) 0,1 %; C 20:1 (eicosenoic acid) + isomers 0,1 %; C 22:0 (behenic acid) 0,1 %; C 24:0 (lignoceric acid) 0,1 %; saturated fatty acids 0,1 %; mono unsaturated fatty acids 0,1 %; poly unsaturated fatty acids total 0,1 %; sum trans-isomers oleic acid 0,01 %; sum trans-isomers linoleic and linolenic acid, further fatty acids 0,1 %

3. residues

code	description	technology	LOQ
500	Pesticides XXL(>700 substances) aU) 3)	GC-MS/MS, LC-MS/MS	0,01mg/kg
41800	Polychlorinated biphenyls (PCBs) (6 substances) PCB 28,52,101,138,153,180	GC-MS/MS	1,0 µg/kg
46030	Polycyclic aromatic hydrocarbons (PAHs) aU) (16 substances, EPA-method) Acenaphthalene, Acenaphthylene, Anthracene, Benz(a)anthracene, Benzo(a)pyrene, Chrysene, Benzo(b)fluoranthene, Benzo(g,h,i)perylene, Benzo(k)fluoranthene, Dibenz(a,h)anthracene, Fluoranthene, Fluorene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene, Pyrene	GC-MS	0,1µg/kg; 0,3µg/kg Naphthalene
77004	Mineral oil residues (MOSH/POSH/MOAH) aU) MOAH Total calculated (C10-C50); MOAH Total integrated (C10-C50); MOAH n-C10 to n-C16; MOAH n-C17 to n-C25; MOAH n-C26 to n-C35; MOAH n-C36 to n-C50 MOSH/POSH Total calculated; MOSH/POSH Total integrated; MOSH/POSH n-C10 to n-C16; MOSH/POSH n-C17 to n-C20; MOSH/POSH n-C21 to n-C25; MOSH/POSH n-C26 to n-C35; MOSH/POSH n-C36 to n-C40; MOSH/POSH n-C41 to n-C50	HPLC-GC-FID	0,5 mg/kg

4. metals / elements

code	description	technology	LOQ
50000	sample preparation 1)	acid hydrolysis	---
code	**description**	**technology**	**LOQ**
715	3 metals/elements (incl. Code 50000)	ICP-MS	0,01 mg/kg

716	5 metals/elements (incl. Code 50000)	ICP-MS	0,02 mg/kg
717	7 metals/elements (incl. Code 50000)	ICP-MS	0,02 mg/kg
718	9 metals/elements (incl. Code 50000)	ICP-MS	0,005 mg/kg
	packages	**description**	
701	Heavy metals 1 (code: 50300, 50400, 50600, 50000)	lead, cadmium, mercury incl. sample preparation	

Further metals/ elements on request

5. olive oil packages

code	description	explanation
620	Olive oil Basic	Code 570 + Code 77001+ Code 77003 [aU)]
621	Olive oil Basic+	Code 570 + Code 77001 + Code 77003 [aU)] + sensory panel evaluation [aU) 2)]
622	Olive oil Health	Code 570 + Code 77001 + Code 77003 [aU)]+ Code 77002
623	Olive oil Health+	Code 570 + Code 77001 + Code 77003 [aU)] + Code 77002 + sensory panel evaluation [aU) 2)]

6. Additional Services

code	description	explanation
625	Labelling check	Conformity check with regard to current declaration regulations for the marketing of the product

[a)] accredited method [aU)] accredited method by sub-order lab

[1)] for metal analysis, it is important to make the sample preparation first. Afterwards it is possible to analyze up to 10 different metals per sample.

[2)] a separate, sealed original sample (minimum 500 ml/optimum 750 ml) is required for the sensory analysis.

[3)] a complete list of all substances tested is available on request.

Further analyses on request

All prices in EURO excluding VAT

Conditions of payment: 14 days from date of invoice

Sample amount: minimum of 200g per sample, increases by 200 g for each additional parameter (Exceptions are possible after consultation)

Processing time: - normally 2-3 days for NMR, metals
- normally up to 14 days for other analyses

Storage: - samples will be stored for 6 months at room temperature