

# FULL ANALYST MEMBERS

## Mandatory Contractual Analysis Methods: Oils, Fats, Technical Tallows and Greases (except Acid Oils, Palm and Palm Kernel Oil Products traded on FOSFA Contract No 81)

The tests shown below are mandatory for all Full Analyst Members in the Oils and Fats Section.

TEST NO	DETERMINATION	METHOD OF ANALYSIS
1	Flashpoint limit test using Pensky-Martens closed cup flash tester	ISO 15267:1998
2	Determination of acid value and acidity (free fatty acids)	ISO 660:2020
3	Determination of insoluble impurities content	ISO 663:2017
4	Determination of iodine value	ISO 3961:2018
5	Determination of conventional mass per volume (litre weight in air) (Reference Method)	ISO 6883:2017
6	Determination of moisture and volatile matter content	ISO 662:2016
7	Determination of peroxide value – Iodometric (visual) endpoint determination	ISO 3960:2017
8	Determination of ash	ISO 6884:2008
9	Determination of carotene in vegetable oils	ISO 17932:2011
10	Cold Test	AOCS Cc 11-53 2017
11	Determination of sea water contamination in oils	FOSFA Method:2010
12	Determination of sediment in crude fats and oils – Centrifuge method (Reference method)	ISO 15301:2001/ Cor 1:2007
13	Determination of fatty acid composition:	ISO 12966 series
	i. Preparation of methyl esters of fatty acids	ISO 12966-2:2017 or ISO 12966-3:2016
	ii. Analysis by gas chromatography of methyl esters of fatty acids	ISO 12966-4:2015
14	Determination of phosphorus content – Part 1: Colorimetric method (Reference method)	ISO 10540-1:2003
15	Determination of refractive index	ISO 6320:2017
16	Determination of saponification value	ISO 3657:2020
17	Determination of alkalinity	ISO 10539:2002
18	Determination of ultraviolet absorbance expressed as specific UV extinction	ISO 3656:2011/ Amd 1:2017

19	Calculation of total fatty matter	BS 684-2.4:1976
20	Determination of unsaponifiable matter – Method using diethyl ether extraction (Reference method)	ISO 3596:2000
21	Determination of water content – Entrainment method	ISO 934:1980
22	Determination of water content – Karl Fischer method (pyridine free)	ISO 8534:2017
23	Determination of trace elements by inductively coupled plasma optical emission spectroscopy (ICP-OES): copper and iron (Reference method)	ISO 21033:2016

# FULL ANALYST MEMBERS

## Optional Contractual Analysis Methods: Oils, Fats, Technical Tallows and Greases (except Acid Oils, Palm and Palm Kernel Oil Products traded on FOSFA Contract No 81)

The tests shown below are optional for all Full Analyst Members in the Oils and Fats Section.

TEST NO	DETERMINATION	METHOD OF ANALYSIS
24	Determination of melting point in open capillary tubes (slip point)	ISO 6321:2002
25	Determination of copper. Colorimetric method	BS 684-2.16:1976
26	Determination of iron. Colorimetric method	BS 684-2.17:1976
27	Determination of Chlorophyll Pigments in Crude Vegetable Oils	AOCS Cc 13k -13 2017
28	Determination of Lovibond colour (Reference Method)	ISO 15305:1998
29	Determination of bleachability a. General Case	BS 684-2.27:1987
30	Determination of bleachability b. Bleach Test for Palm Oil	BS 684-2.27:1987
31	Determination of cadmium content by direct graphite furnace atomic absorption spectrometry	ISO 15774:2017
32	Determination of cloud point	BS 684-1.5:1987/ Amd:1989
33	Color - FAC Standard Color	AOCS Cc 13a-43 2017
34	Color - Wesson Method Using Color Glasses Calibrated in Accordance with the AOCS-Tintometer Color Scale	AOCS Cc 13b-45 2017
35	Color - Gardner 1963 (Glass Standards)	AOCS Td 1a-64 2017
36	Determination of copper, iron and nickel contents – Graphite furnace atomic absorption method	ISO 8294:1994
37	Specification for technical tallows and animal greases	BS 3919:1987/ Amd:1989
38	Determination of oxidized fatty acids	BS 684-2.12:1984
39	Determination of oxidative stability (accelerated oxidation test) Rancimat or equivalent	ISO 6886:2016
40	Determination of phosphorus content – Part 2: Method using graphite furnace atomic absorption spectrometry	ISO 10540-2:2003
41	Determination of phosphorus content – Part 3: Method using inductively coupled plasma (ICP) optical emission spectroscopy	ISO 10540-3:2002
42	Determination of content of polar compounds	ISO 8420:2002/ Cor 1:2004
43	Phosphoric acid test	ISO 150:2006
44	Determination of polyethylene-type polymers	ISO 6656:2002

45	Refined and Bleached Color in tallow and greases intended for soap production	AOCS Cc 8d-55 2017
46	Determination of smoke point	BS 684-1.8:1976
47	Determination of solid fat content by pulsed NMR — Part 1: Direct method	ISO 8292-1:2008
48	Determination of solid fat content by pulsed NMR — Part 2: Indirect method	ISO 8292-2:2008
49	Determination of individual and total sterols contents — Gas chromatographic method. Part 1 - Animal and vegetable fats and oils. Part 2 - Olive oils and olive pomace oils	ISO 12228-1:2014 ISO 12228-2:2014
50	Determination of titre	ISO 935:1988
51	Determination of lead by direct graphite furnace atomic absorption spectroscopy	ISO 12193:2004
52	Determination of unsaponifiable matter — Method using hexane extraction (for Sheanut Oil only)	ISO 18609:2000
53	Determination of visible foots in crude fats and oils	ISO 19219:2002
54	Determination of benzo[a]pyrene — Reverse-phase high performance liquid chromatography method	ISO 15302:2017
55	Determination of the deterioration of bleachability index (DOBI)	ISO 17932:2011
56	Determination of anisidine value	ISO 6885:2016
57	Determination of the composition of fatty acids in the 2-position of the triglyceride molecules	ISO 6800:1997
58	Determination of residual technical hexane content	ISO 9832:2002
59	Determination of mineral acidity	BS 684-2.48:1998
60	Determination of water-insoluble solvents	BS 684-1.9:1976
61	Detection and identification of a volatile organic contaminant by GC/MS	ISO 15303:2001
62	Determination of stigmastadienes in vegetable oils — Part 1: Method using capillary-column gas chromatography	ISO 15788-1:1999
63	Determination of Lovibond® colour — Automatic method	ISO 27608:2010/ Amd 1:2016
64	Determination of polycyclic aromatic hydrocarbons by on-line donor-acceptor complex chromatography and HPLC with fluorescence detection	ISO 22959:2009
65	Determination of conventional mass per volume (litre weight in air) — Oscillating U-tube method	ISO 18301:2014
66	Determination of aliphatic hydrocarbons in vegetable oils	ISO 17780:2015
67	Determination of fatty-acid-bound chloropropanediols (MCPDs) and glycidol by GC/MS	ISO 18363-1: 2015 ISO 18363-2: 2018 ISO 18363-3: 2017
68	Determination of peroxide value — Potentiometric end-point determination	ISO 27107:2008

# ASSOCIATE ANALYST MEMBERS

## **Mandatory Contractual Analysis Methods: Oils, Fats, Technical Tallows and Greases** (except Acid Oils, Palm and Palm Kernel Oil Products traded on FOSFA Contract No 81)

The tests shown below are mandatory for all Associate Analyst Members in the Oils and Fats Section.

TEST NO	DETERMINATION	METHOD OF ANALYSIS
1	Flashpoint limit test using Pensky-Martens closed cup flash tester	ISO 15267:1998
2	Determination of acid value and acidity (free fatty acids)	ISO 660:2020
3	Determination of insoluble impurities content	ISO 663:2017
4	Determination of iodine value	ISO 3961:2018
5	Determination of conventional mass per volume (litre weight in air) (Reference method)	ISO 6883:2017
6	Determination of moisture and volatile matter content	ISO 662:2016
7	Determination of peroxide value – Iodometric (visual) endpoint determination	ISO 3960:2017

## **Optional Contractual Analysis Methods: Oils, Fats, Technical Tallows and Greases** (except Acid Oils, Palm and Palm Kernel Oil Products traded on FOSFA Contract No 81)

The test shown below is optional for all Associate Analyst Members in the Oils and Fats Section.

TEST NO	DETERMINATION	METHOD OF ANALYSIS
24	Determination of melting point in open capillary tubes (slip point)	ISO 6321:2002
28	Determination of Lovibond colour (Reference method)	ISO 15305:1998

# ANALYSIS METHODS

## ACID OILS and/or FATTY ACID DISTILLATES

TEST NO	DETERMINATION	METHOD OF ANALYSIS
1	Determination of ash	ISO 6884:2008
2	Determination of insoluble impurities content	ISO 663:2017
3	Determination of iodine value	ISO 3961:2018
4	Determination of mineral acidity	BS 684-2.48:1998
5	Determination of soap content	FOSFA Method:2010
6	Determination of unsaponifiable matter – Method using diethyl ether extraction (Reference method)	ISO 3596:2000
7	Determination of water content – Entrainment method	ISO 934:1980
8	Determination of water content – Karl Fischer method (pyridine free)	ISO 8534:2017
9	Determination of acid value and acidity (free fatty acids)	ISO 660:2020
10	Determination of conventional mass per volume (litre weight in air) (Reference method)	ISO 6883:2017
11	Determination of conventional mass per volume (litre weight in air) – Oscillating U-tube method	ISO 18301:2014
12	Total saponifiable matter shall be equivalent to:  $100 - (W + I + U + S)$  where: W     is water content I     is insoluble impurities U     is unsaponifiable matter S     is soap content	Determined by the Standard Contractual Methods as per this List
13	Total fatty matter shall be equivalent to:  $100 - (W + A + I)$  where: W     is water content A     is ash I     is insoluble impurities	Determined by the Standard Contractual Methods as per this List

# FOSFA INTERNATIONAL/PORAM STANDARD CONTRACTUAL METHODS LIST

## PALM OIL AND PALM KERNEL OIL PRODUCTS IN BULK CIF FOR USE WITH FOSFA CONTRACT NO 81

DETERMINATION	METHODS OF ANALYSIS
FFA % (as Palmitic for palm oil products and as Lauric for palm kernel oil products)	ISO 660:2020 AOCS Ca 5a-40 2017 (Reference method) MPOB Method p2.5:2004
Moisture and Volatile Matter (Palm Oil/Palm Stearin/Palm Olein)	ISO 662:2016 (Reference method) AOCS Ca 2c-25 2017 MPOB Method p2.1:2004
Moisture and Volatile Matter (Processed Palm Kernel Oil products)	ISO 662:2016 (Reference method) AOCS Ca 2c-25 2017 MPOB Method k1.4:2004
Iodine Value	ISO 3961:2018 (Reference method) AOCS Cd 1d-92 2017 MPOB Method p3.2:2004
Insoluble Impurities	ISO 663:2017 (Reference method) (Warm solvent may be used) AOCS Ca 3a-46 2017 MPOB Method p2.2:2004
Colour	ISO 15305:1998 (Reference method) AOCS Cc 13e-92 2017 (Without the use of black sheath) MPOB Method p4.1:2004
Melting Point (Slip Point)	ISO 6321:2002 AOCS Cc 3-25 2017 (Reference method) MPOB Method p4.2:2004

# FOSFA INTERNATIONAL/PORAM STANDARD CONTRACTUAL METHODS LIST

## PALM ACID OIL/PFAD/FLAKED STEARIC ACID

DETERMINATION	METHODS OF ANALYSIS
Free Fatty Acid (FFA) (as Palmitic)	AOCS Te 1a-64 2017 (Reference method) MPOB Method c2.7:2004
Saponification Value	AOCS Cd 3-25 2017 MPOB Method c2.8:2004 (Reference method)
Moisture and Volatile Matter	AOCS Ca 2b-38 2017 AOCS Ca 2c-25 2017 AOCS Tb 1a-64 2017 (Reference method) MPOB Method c2.2:2004
Unsaponifiable Matter	AOCS Ca 6a-40 2017 AOCS Tk 1a-64 2017 (Reference method) MPOB Method c2.9:2004
Total Fatty Matter	$100 - (M + I) *$
Saponifiable Matter	$100 - (M + I + U) *$
Soap	FOSFA Method:2010
Impurities	AOCS Ca 3a-46 2017 ISO 663:2017 (Reference method) MPOB Method p2.2:2004

\*Where:

M is Moisture as per AOCS Ca 2b-38 2017

I is Impurities as per ISO 663:2017/MPOB Method p2.2:2004

U is Unsaponifiable Matter as per AOCS Ca 6a-40 2017



# FULL ANALYST MEMBERS

## Mandatory Contractual Analysis Methods: Oleaginous Seeds

The tests shown below are mandatory for all Full Analyst Members in the Oilseeds Section.

TEST NO	DETERMINATION	METHOD OF ANALYSIS
1	Determination of oil content (Reference method) NOTE: The use of automated equipment based on the Randall technique, such as the Soxtec™ 2050 or the VELP Scientifica SER 148/6, may be used for the solvent extraction phases, but the three grindings and three extractions are still required.	ISO 659:2009
2	Determination of free fatty acids on the oil: <ul style="list-style-type: none"> <li>i. Extraction of the oil</li> <li>ii. Determination of acid value and acidity (free fatty acids)</li> </ul>	ISO 659:2009 ISO 660:2020
3	Determination of content of impurities	ISO 658:2002
4	Determination of moisture and volatile matter content (Reference method)	ISO 665:2020
5	Determination of total ash	ISO 749:1977
6	Determination of fatty acid composition on the oil: <ul style="list-style-type: none"> <li>i. Extraction of the oil</li> <li>ii. Preparation of methyl esters of fatty acids</li> <li>iii. Analysis by gas chromatography of fatty acid methyl esters</li> </ul>	ISO 659:2009 ISO 12966-2:2017 or ISO 12966-3:2016 ISO 12966-4:2015
7	Determination of nitrogen content and calculation of crude protein content — Part 1: Kjeldahl method (Reference method)	ISO 5983-1:2005/ Cor 1:2008

# FULL ANALYST MEMBERS

## Optional Contractual Analysis Methods: Oleaginous Seeds

The tests shown below are optional for all Full Analyst Members in the Oilseeds Section.

TEST NO	DETERMINATION	METHOD OF ANALYSIS
8	Crude Fiber in Oilseed By-Products	AOCS Ba 6-84 2017
9	Determination of aflatoxin B1 and the sum of aflatoxin B1, B2, G1 and G2 in hazelnuts, peanuts, pistachios, figs, and paprika powder – High performance liquid chromatographic method with post-column derivatisation and immunoaffinity column cleanup NOTE: The R-Biopharm AG Kobra® Cell or the Romer® Derivatization Unit may be used in this determination.	EN 14123:2007
10	i Determination of damaged kernels in soyabeans	USDA FGIS Grain Inspection Handbook 2020 Book 2/10.20
	ii Determination of heat-damaged kernels in soyabeans	USDA FGIS Grain Inspection Handbook 2020 Book 2/10.21
11	Rapeseed – Determination of glucosinolates content – Part 1: Method using high-performance liquid chromatography	ISO 9167:2019
12	Simultaneous determination of oil and water contents – Method using pulsed nuclear magnetic resonance spectrometry	ISO 10565:1998
13	Rapeseed – Determination of chlorophyll content – Spectrometric method	ISO 10519:2015
14	Food products – Determination of the total nitrogen content by combustion according to the Dumas principle and calculation of the crude protein content – Part 1: Oilseeds and animal feeding stuffs	ISO 16634-1:2008
15	Determination of nitrogen content and calculation of crude protein content – Part 2: Block digestion/steam distillation method	ISO 5983-2: 2009
16	Determination of count in groundnut kernels	FOSFA Method:2014

# ASSOCIATE ANALYST MEMBERS

## Mandatory Contractual Analysis Methods: Oleaginous Seeds

The tests shown below are mandatory for all Associate Analyst Members in the Oilseeds Section.

TEST NO	DETERMINATION	METHOD OF ANALYSIS
1	Determination of oil content (Reference method) NOTE: The use of automated equipment based on the Randall technique, such as the Soxtec™ 2050 or the VELP Scientifica SER 148/6, may be used for the solvent extraction phases, but the three grindings and three extractions are still required.	ISO 659:2009
2	Determination of free fatty acids on the oil:  i. Extraction of the oil  ii. Determination of acid value and acidity (free fatty acids)	ISO 659:2009  ISO 660:2020
3	Determination of content of impurities	ISO 658:2002
4	Determination of moisture and volatile matter content (Reference method)	ISO 665:2020