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Olive and Olive Oil Analysis

● Strengthen and ensure your product´s quality and authenticity with NMR based solutions

Innovation with Integrity

NMR

NMR based method for authenticity and quality analysis

Origin and authenticity of food products is gaining in popularity, with consumers demanding more information about where their olive oil comes from. Olive oil is one of the most adulterated food products worldwide. Therefore, Bruker developed the Olive Oil-Profiling 2.0 method and solution for the authenticity and quality analysis of olive oil.

This product expands Bruker's Food-Profiling solutions portfolio and is offered on two platforms:

On the well-established **FoodScreener**™ instrument and on the low field and cryogen-free **Fourier 80**™ benchtop system. These two platforms address the different requirements of the olive oil industry, private testing laboratories and government laboratories.

The FoodScreener is the ideal solution for private testing laboratories and governmental laboratories, for the analysis of different food matrices. The FoodScreener allows the incorporation of various Bruker Food-Profiling solutions in one system.

The Fourier 80 benchtop system is particularly adapted to olive oil bottlers, testing laboratories dedicated to the analysis of olive oil, as well as satellite laboratories of larger private testing laboratories.

Features Olive Oil-Profiling 2.0:

- Verification of the country of origin (Greece, Italy and Spain)
- Quantification of 15 IOC regulated olive oil parameters
- Verification of the quality grade Extra Virgin olive oil
- Detection of atypical olive oil profiles

A solution for every need

	FoodScreener	Fourier 80
Market Segments	Government laboratories, Commercial laboratories	Olive oil bottlers, Commercial laboratories** **satellite labs and olive oil testing dedicated labs
Food-Screening Applications	Olive Oil-Profiling method, Honey-Profiling method, Wine-Profiling method, Juice-Profiling method	Olive Oil-Profiling method
Versatility	Various configurations available for additional applications (e.g. SNIF-NMR analysis, other probeheads)	Accessoires available (e.g. automation)
Automation	• SampleXPress with 60 positions • Complimentary • Fully automated measurement	• CTC Automation with 60 Positions • Optional accessory • Fully automated measurement

Extra virgin olive oil sample analysis

FoodScreener pdf. report example

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Quantitative Analysis (Analysis-ID: OO1400-REG-20220302)

Parameter	Unit	Value	EVOO Reference (IOC)		Flag
			min	max	
Free acidity	%w/w as oleic acid	0.21	-	0.80	●
Peroxide value	mEq O2/kg	7.4	-	20.0	●
K270	-	0.11	-	0.22	●
K232	-	1.8	-	2.5	●
Delta K	-	0.0078	-	0.0100	●
Total polyphenols	mg/kg	170	-	-	○
Linoleic acid	%m/m methyl esters	7.9	2.5	21.0	●
Linolenic acid	%m/m methyl esters	0.80	-	1.00	●
Oleic acid	%m/m methyl esters	75.4	55.0	83.0	●
Palmitic acid	%m/m methyl esters	11.2	7.5	20.0	●
Palmitoleic acid	%m/m methyl esters	1.0	0.3	3.5	●
Stearic acid	%m/m methyl esters	2.2	0.5	5.0	●
Wax content	mg/kg	7	-	150	●
Erythrodiol + Uvaol	% total sterols	1.9	-	4.5	●
b-Sitosterol apparent	% total sterols	94.7	93.0	-	●
Total sterols	mg/kg	1321	1000	-	●
Total MUFA	% of total fatty acids	75.9	-	-	○
Total PUFA	% of total fatty acids	8.8	-	-	○
Total TFA	% of total fatty acids	0.07	-	-	○
Total SFA	% of total fatty acids	13.7	-	-	○

MUFA mono-unsaturated fatty acids
PUFA poly-unsaturated fatty acids
TFA trans unsaturated fatty acids
SFA saturated fatty acids

Fourier 80 pdf. report example

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Quantitative Analysis (Analysis-ID: OO180-REG-20220302)

Parameter	Unit	Value	EVOO Reference (IOC)		Flag
			min	max	
Free acidity	%w/w as oleic acid	0.70	-	0.80	●
Peroxide value	mEq O2/kg	7.8	-	20.0	●
K270	-	0.12	-	0.22	●
K232	-	1.5	-	2.5	●
Delta K	-	0.0041	-	0.0100	●
Total polyphenols	mg/kg	187	-	-	○
Linoleic acid	%m/m methyl esters	6.7	2.5	21.0	●
Linolenic acid	%m/m methyl esters	0.89	-	1.00	●
Oleic acid	%m/m methyl esters	75.1	55.0	83.0	●
Palmitic acid	%m/m methyl esters	10.8	7.5	20.0	●
Palmitoleic acid	%m/m methyl esters	0.9	0.3	3.5	●
Stearic acid	%m/m methyl esters	4.7	0.5	5.0	●
Wax content	mg/kg	86	-	150	●
Erythrodiol + Uvaol	% total sterols	1.6	-	4.5	●
b-Sitosterol apparent	% total sterols	94.5	93.0	-	●
Total sterols	mg/kg	1918	1000	-	●
Total MUFA	% of total fatty acids	74.6	-	-	○
Total PUFA	% of total fatty acids	8.1	-	-	○
Total TFA	% of total fatty acids	0.00	-	-	○
Total SFA	% of total fatty acids	16.0	-	-	○

MUFA mono-unsaturated fatty acids
PUFA poly-unsaturated fatty acids
TFA trans unsaturated fatty acids
SFA saturated fatty acids

Why choose NMR Olive Oil-Profiling 2.0 method in your daily routine?

- Analysis of IOC regulated parameters

- Added value: with the verification of country of origin for brand protection

- Verification of the compliance with the quality grade Extra Virgin olive oil

- Timesaving: authenticity and quality results within 12 to 25 minutes

- Easy to use: Convenient and fully automated solution

- Standard Operation Procedures included

- No NMR expertise needed

- Ability to make quicker commercial and quality control decisions

- Fast return on investment

- No reagents, neither standards required, merely 0,5ml of Chloroform per sample

- No destructive technic for samples, in case any further analysis would be required

Monitor the quality of olives, olive pomace and olive paste with Time Domain Magnetic Resonance for improved yields and higher profitability

Since farmers receive payment on the basis of oil content and not total weight, the accurate measurement of oil content in olives is important for getting the right price. For the millings, a more accurate oil and moisture content measurement in olives, olive pomace and olive paste allows optimization of the oil extraction process, maximizing yields and profitability.

The Time Domain Magnetic Resonance as a technique has a long history of reliability and accuracy of results in the olive sector, backed by a track record of more than 20 years in official reference laboratories and private testing labs, including laboratories in many cooperatives.
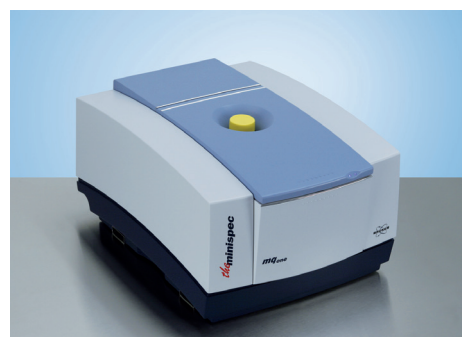
Features:
- Fast and accurate determination of oil and moisture content
- Includes SOP for sample preparation and analysis
- Benchtop systems, small footprint

minispec mq one series
50 mm diameter tubes and 100 ml volume, measure 50 gr of olive paste or olive pomace
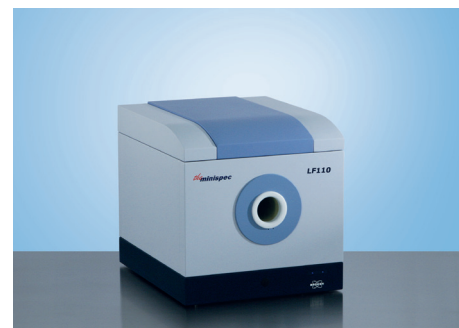
Benefits:
Why choose Time Domain NMR in your daily quality control of olive pomace and paste?

- Determination of the optimal harvest time and the right price by analyzing the oil and moisture content in whole olives with highest accuracy

- Optimization of process yield by measuring the oil content of olive paste and pomace, to guarantee quality during storage and monitor its evolution to bring certified quality to market

- Check the identity and quality of the batches purchased, to certify their labeling at the time of packaging and to know the optimal moment of consumption in the distribution and sales

minispec whole olives analyzer
90 mm diameter tubes, measure 500 gr of whole olives

Check freshness and oxidative resistance of olive oil with microESR - Electron Spin Resonance for edible oil analysis

Rancidity of edible oil is a major problem in food related industries. It occurs during storage and is caused by free radical oxidation of unsaturated fatty acids, resulting in foul odors and tastes in the final product. The goal is to protect the shelf life of products from free radical oxidation and maintain freshness throughout the shelf life.

Electron Spin Resonance (ESR) provides a testing technique that measures free radicals formed during the oxidation of olive oil.

Bruker has developed a novel easy-workflow method based on electron spin resonance spectroscopy (ESR) that measures the ability of olive oil to resist oxidation. The assay uses the microESR benchtop spectrometer and measures free radical formation in the oil during an accelerated heating incubation. The concentration of the radicals relates to the oxidative resistance of olive oil.

Benefits:
- Assure maximum shelf life for high quality olive oil
- Better guarantee olive oil status (extra virgin, virgin, lampante)
- Optimize olive oil processing and storage conditions

Features:
- Determine oxidative resistance in as little as 30 minutes
- Measures free radicals instead of end products
- Includes SOP for sample preparation and analysis
- Compact lightweight with very small footprint

microESR with automation

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