

Application Note - Digestion of Used Oil CRM

Introduction:

This study evaluated the effectiveness of the **MiniWAVE** microwave digestion system for the digestion of used oil samples.

Sample Type:

SCP SCIENCE EnviroMAT Used Oil

- Sample weight: 0.1 g
- 4 Replicates

Supplies and Reagents:

- 1) Microwave digestion system, **MiniWAVE** Model*
- 2) Quartz Vessels, 75 ml*
- 3) Fluoropolymer Caps and Safety Pressure Release Caps*
- 4) **PlasmaPURE** HNO₃ (70%), 10 ml
- 5) **PlasmaPURE**, H₂O₂ (30%), 1 ml
- 6) ICP-MS Spectrometer, ELAN 6100, Perkin-Elmer
- 7) Crossflow Nebulizer, Mini-X-Flow*
- 8) Alumina torch injector, 1.2 mm*
- 9) Cyclonic Spray Chamber, Baffled*

* Manufactured by **SCP SCIENCE**

Sample Preparation Procedure:

The samples were weighed on a 4 place analytical balance directly in the quartz vessel. After adding 10 ml of HNO₃ and 1 ml of H₂O₂ the samples were allowed to sit at room temperature for 5-10 minutes. They were placed in the rack and digested following the heating profile. After cooling down to room temperature, the samples were vented, diluted and analyzed on the ICP-MS..

Heating Program:

STAGE	RAMP TIME (MINUTES)	PRESSURE (PSI-LIMIT)	TEMPERATURE (°C)	HOLD TIME (MINUTES)
1	10	435	190	20

MiniWAVE
Microwave Digestion Made Easy

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www.scpscience.com
sales@scpscience.com

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Results:

ELEMENT	AMU	MiniWAVE (PPM)	SD (PPM)	CONSENSUS VALUES (PPM)	CONF. INTERVAL (PPM)
Ag	107	11.5	0.1	13	10-16
Al	27	11.5	0.5	14	11-17
Ba	134	9.16	0.03	9	8.5-9.5
Ca	43	77.4	1.3	72	67-77
Cd	111	16.33	0.03	15	14-16
Cr	52	17.24	0.06	15	13-17
Cu	63	3351	39	3132	2906-3358
Fe	56	62.0	0.9	59	53-65
Mg	24	12.8	1.3	11	10-12
Mn	55	17.4	0.5	18	17-19
Mo	94	11.3	0.1	11	10-12
Ni	60	44.5	1.6	45	42-48
Pb	206	19.7	0.1	20	19-21
Ti	48	10.94	0.01	9	7-11
V	51	6.9	0.1	7	6.5-7.5
Zn	66	16.0	2.3	16	14-18

Conclusion:

The **MiniWAVE** is suitable for the digestion of used oil. All results fall within the confidence interval set by the CRM.

References:

Certificate of Analysis SC9261560 from **SCP SCIENCE**
Certificate of Analysis NIST CRM 1059c
USCPSC-CH-E1001-08 method

By:
René-Viet Nguyen, Ph.D, P. Chem.
Application Chemist

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www.scpscience.com
sales@scpscience.com

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MiniWAVE

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CANADA / USA

Tel.: (800) 361-6820
Fax: (800) 253-5549

FRANCE

Tel.: +33 (0) 1 69 18 71 17
Fax: +33 (0) 1 60 92 05 67

GERMANY

+49 (0) 8342-89560-61
+49 (0) 8342-89560-69

CHINA

Tel.: +86 (10) 58032301
Fax.: +86 (10) 58032302

INTERNATIONAL

Tel.: (514) 457-0701
Fax: (514) 457-4499