



FRONT MATTER

## Official Methods of Analysis: 22nd Edition (2023)

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SMPRs<sup>®</sup> AOAC SMPR<sup>®</sup> 2017.021 Quantitation of Wheat, Rye, and Barley Gluten in Oats

Revised March 2019 to provide better final calculations (wet chemical analysis vs Dumas nitrogen content method) used to determine gluten content for wheat, rye, and barley used for spiking samples

AOAC SMPR<sup>®</sup> 2018.012 Quantitation of Peanut by ELISA-Based Methods

Revised March 2019 to correct “1 ppm peanut protein” to “2 ppm peanut protein” in Annex

NEW! AOAC SMPR<sup>®</sup> 2019.001 Detection of *Aspergillus* in Cannabis and Cannabis Products

NEW! AOAC SMPR<sup>®</sup> 2019.002 Identification and Quantitation of Selected Residual Solvents in Dried Cannabis Materials

NEW! AOAC SMPR<sup>®</sup> 2019.003 Quantitation of Cannabinoids in Plant Materials of Hemp (Low THC Varieties *Cannabis* spp.)

NEW! AOAC SMPR<sup>®</sup> 2019.004 Quantitation of Furan and Alkyl Furans in Selected Matrices

NEW! AOAC SMPR<sup>®</sup> 2020.001 Determination of Heavy Metals in a Variety of Cannabis and Cannabis-Derived Products

NEW! AOAC SMPR<sup>®</sup> 2020.002 Detection of *Salmonella* species in Cannabis and Cannabis Products

NEW! AOAC SMPR<sup>®</sup> 2020.003 Determination of 2'-Fucosyllactose (2'FL) in Infant and Adult/Pediatric Nutritional Formula

NEW! AOAC SMPR<sup>®</sup> 2020.004 Determination of Lacto-N-Neotetraose (LNnT) in Infant and Adult/Pediatric Nutritional Formula

NEW! AOAC SMPR<sup>®</sup> 2020.005 Determination of Bovine Lactoferrin in Infant and Adult/Pediatric Nutritional Formula

NEW! AOAC SMPR<sup>®</sup> 2020.006 Nontargeted Testing of Ingredients for Food Authenticity/Fraud Evaluation of Honey

NEW! AOAC SMPR<sup>®</sup> 2020.007 Nontargeted Testing of Ingredients for Food Authenticity/Fraud Evaluation of Extra Virgin Olive Oil

NEW! AOAC SMPR<sup>®</sup> 2020.008 Nontargeted Testing of Ingredients for Food Authenticity/Fraud Evaluation of Pasteurized Whole Liquid Bovine Milk

NEW! AOAC SMPR<sup>®</sup> 2020.009 Targeted Testing of Barley and Malt Extract, Beet Sugar Syrup, Corn and Cane Sugar Syrup, C-4 Plant Sugar, and High-Fructose Corn Sugar for Adulteration of Floral and Acacia Honey

NEW! AOAC SMPR<sup>®</sup> 2020.010 Targeted Testing of Other Vegetable Oils and Low-Quality Olive Oils as Adulterants for Evaluation of Extra Virgin Olive Oil (EVOO)

NEW! AOAC SMPR<sup>®</sup> 2020.011 Targeted Testing of Formaline/Formaldehyde, Starch, and Soy Protein as Adulterants for Evaluation of Liquid Raw Bovine Milk

**NEW! AOAC SMPR<sup>®</sup> 2020.012** Detection of Shiga Toxin-Producing *Escherichia coli* in Cannabis and Cannabis Products

**NEW! AOAC SMPR<sup>®</sup> 2020.013** Mycotoxin Screening Technique in Cannabis Plant Material and Cannabis Derivatives

**NEW! AOAC SMPR<sup>®</sup> 2020.014** Characterization and Quantitation of Neutral Components from Glycerol Esters of Wood Rosin (GEWR)

**NEW! AOAC SMPR<sup>®</sup> 2020.015** Characterization and Quantitation of Monoesters from Glycerol Esters of Wood Rosin (GEWR)

**NEW! AOAC SMPR<sup>®</sup> 2020.016** Characterization and Quantitation of Component Fractions from Glycerol Esters of Wood Rosin (GEWR)

**NEW! AOAC SMPR<sup>®</sup> 2020.017** Characterization and Quantitation of Residual Resin Acids from Glycerol Esters of Wood Rosin (GEWR)

**NEW! AOAC SMPR<sup>®</sup> 2021.001** Determination of Chlorate and Perchlorate in Baby Foods, Infant/Adult Formulas, and Their Ingredients

**NEW! AOAC SMPR<sup>®</sup> 2021.002** Determination of Vitamin C (L-Ascorbic Acid) in All Forms of Infant Formula, Follow-Up Formula, Baby Foods, Adult/Pediatric Formula, Complementary Food Supplements, Nutritional Supplements for Pregnant Women and Nursing Mothers, and Sports Nutrition Food

**NEW! AOAC SMPR<sup>®</sup> 2021.003** Determination of 3'-Sialyllactose (3'-SL) in Infant and Adult/Pediatric Nutritional Formula

**NEW! AOAC SMPR<sup>®</sup> 2021.004** Determination of 3-Fucosyllactose (3-FL) in Infant and Adult/Pediatric Nutritional Formula

**NEW! AOAC SMPR<sup>®</sup> 2021.005** Determination of 6'-Sialyllactose (6'-SL) in Infant and Adult/Pediatric Nutritional Formula

**NEW! AOAC SMPR<sup>®</sup> 2021.006** Determination of Difucosyllactose (DFL) in Infant and Adult/Pediatric Nutritional Formula

**NEW! AOAC SMPR<sup>®</sup> 2021.007** Determination of Lacto-N-Tetraose (LNT) in Infant and Adult/Pediatric Nutritional Formula

**NEW! AOAC SMPR<sup>®</sup> 2021.008** Glyphosate, Its Metabolites, and Trimesium in Fruits and Vegetables, Cereals, Food of Animal Origin, Pet food and Baby Food

**NEW! AOAC SMPR<sup>®</sup> 2021.009** Viable Yeast and Mold Count Enumeration in Cannabis and Cannabis Products

Chapter 4 **NEW! 2018.07 (4.7.08)** Fructan (Inulin, FOS, Levan, and Branched Fructan) in Animal Food (Animal Feed, Pet Food, and Ingredients)

Chapter 9 **2016.04 (9.2.43)** Arsenic Speciation in Fruit Juice Final Action 2019

Chapter 17 **2015.13 (17.2.12)** Enumeration of Aerobic Bacteria in Food

**D(11): Deleted** "Average the counts between the replicate plates" for clarity

**NEW! 2018.02 (17.2.13)** Enumeration of Yeast and Mold in Select Foods

**NEW! 2019.02 (17.2.14)** Enumeration of Total Aerobic Count in Select Foods

**NEW! 2018.05 (17.3.11)** Enumeration of *Enterobacteriaceae* in Select Foods and Environmental Surfaces

Final Action 2021

**NEW! 2018.13 (17.4.11)** Enumeration of *Escherichia coli* and Coliform in a Broad Range of Foods and Select Environmental Surfaces

Final Action 2021

**NEW! 2019.03** (17.4.12) *Escherichia coli* O157:H7 in Select Foods

**NEW! 2020.06** (17.4.13) Enterohemorrhagic *E. coli* in Select Foods

**993.06** (17.5.04) Staphylococcal Enterotoxins in Selected Foods

Repealed 2019: Method uses 3M TECRA products that have been discontinued

**989.14** (17.9.13) *Salmonella* in Foods

Repealed 2019: Method uses 3M TECRA products that have been discontinued

**998.09** (17.9.24) *Salmonella* in Foods

Repealed 2019: Method uses 3M TECRA products that have been discontinued

**2016.01** (17.9.41) *Salmonella* spp. in Select Foods and Environmental Surfaces

Final Action 2019

**2017.09** (17.9.42) Confirmation and Identification of *Salmonella* species, *Cronobacter* species, *Campylobacter* species, and Other Gram-Negative Organisms

Final Action 2020

Minor modification 2020

Included Revised First Action J. AOAC *Int.* reference

**2018.01** (17.9.44) *Cronobacter* species in Select Foods and Environmental Surfaces

Final Action 2021

Included J. AOAC *Int.* reference

**NEW! 2019.01** (17.9.45) *Cronobacter* species in Select Foods and Environmental Samples

**NEW! 2020.02** (17.9.46) *Salmonella* species in a Broad Range of Foods and Select Environmental Samples

**NEW! 2020.03** (17.9.47) *Salmonella* species in Select Foods

**NEW! 2021.02** (17.9.48) Detection of *Salmonella* species in Broad Range of Foods and Selected Environmental Surfaces

**995.22** (17.10.06) *Listeria* in Foods

Repealed 2019: Method uses 3M TECRA products that have been discontinued

**2002.09** (17.10.06A) *Listeria* in Foods

Repealed 2019: Method uses 3M TECRA products that have been discontinued

**2016.07** (17.10.18) *Listeria* species in Select Foods and Environmental Surfaces

Final Action 2019

**2016.08** (17.10.19) *Listeria monocytogenes* in a Variety of Foods and Select Environmental Surfaces

Final Action 2019

**2017.10** (17.10.20) Confirmation and Identification of *Listeria monocytogenes*, *Listeria* species, and Other Gram-Positive Organisms

Final Action 2020

Minor modification 2020

**NEW! 2019.10** (17.10.21) *Listeria* species in a Variety of Foods and Select Environmental Samples

**NEW! 2019.11** (17.10.22) *Listeria monocytogenes* in a Variety of Foods and Select Environmental Samples

Chapter 22 **NEW! 2018.10** (22.1.12) Cannabinoids in *Cannabis sativa* Dried Flowers and Oils

**NEW! 2018.11** (22.1.13) Quantitation of Cannabinoids in Cannabis Dried Plant Materials, Concentrates, and Oils

Revised First Action 2020: Modified for extension to hemp and to include procedure for sample dry-weight determination

Chapter 23 **2013.07** (23.1.21) Determination and Identification of Nicarbazin in Chicken Tissues

Final Action 2021: Method applicability changed from “confirmation” to “identification” and representative chromatogram was added, among other changes

**NEW! 2020.04** (23.1.22) Screening of 154 Veterinary Drug Residues in Animal Source Foods

Chapter 29 **2017.15** (29.1.30) Bisphenol A (BPA) in Commercially Packaged Ready-to-Consumed Carbonated and Noncarbonated Water and Nonalcoholic Beverages

Included *J. AOAC Int.* reference

**NEW! 2019.07** (29.1.31) Free Bisphenol A (BPA) in Commercially Packaged, Ready-to-Consumed, Carbonated/Noncarbonated Water and Nonalcoholic Beverages

Chapter 30 **NEW! 2019.04** (30.1.38) Ethanol in Kombucha Tea Products

**NEW! 2019.08** (30.1.39) Ethanol Concentration in Kombucha Beverages

Chapter 31 **NEW! 2020.05** (31.5.17) Flavanol and Procyanidin (by Degree of Polymerization 1–7) of Cocoa-Based Products

Chapter 32 **2012.01** (32.1.44) Gliadin as a Measure of Gluten in Food

Modification to include matrix extension

**2015.05** (32.2.11) Partially Hydrolyzed Gluten in Fermented Cereal-Based Products

Final Action 2018: Revised applicability statement to include “and may not measure or detect all fermented and/or hydrolyzed forms of gluten”

**NEW! 2017.17** (32.2.13) Detection and Quantitation of Selected Food Allergens

**NEW! 2018.15** (32.2.14) Gluten from Wheat, Rye, and Barley in Oats and Oat Products

Chapter 33 **NEW! 2020.01** (33.2.69) Lactose in Low-Lactose and Lactose-Free Milk, Milk Products, and Products Containing Dairy Ingredients

**NEW! 2020.08** (33.2.70) Lactose Concentration in Low-Lactose and Lactose-Free Milk, Milk Products, and Products Containing Dairy Ingredients

Final Action 2021

**NEW! 2020.09** (33.2.71) Lactose in Free or Low-Lactose Dairy Products

Chapter 35 **2014.08** (35.1.46) Polycyclic Aromatic Hydrocarbons (PAHs) in Seafood

Final Action 2018

Chapter 44 **NEW! 2018.16** (44.1.31) Sugar Profile in Food, Dietary Supplements, Pet Food, and Animal Feeds

Chapter 45 **2017.16** (45.4.18) Total Dietary Fiber in Foods Final Action 2020

Included *J. AOAC Int.* reference

Chapter 50 **2011.06** (50.1.29) Total Folate in Infant Formula and Adult Nutritionals

Final Action 2018

Codex Type II 2019

Included *J. AOAC Int.* Final Action reference

**2011.14** (50.1.37) Minerals and Trace Elements in Milk and Milk Products, Infant Formula, and Adult Nutritionals

Final Action 2018 (for infant formula and adult nutritionals only; matrix extension to infant formula)

**2015.09** (50.2.08) *trans and Total (cis+trans)* Vitamin K<sub>1</sub> in Infant, Pediatric, and Adult Nutritionals

Final Action 2018

Codex Type II, AOAC-ISO Method 2019

Included Final Action *J. AOAC Int.* reference

**2015.14** (50.2.09) Simultaneous Determination of Total Vitamins B1, B2, B3, and B6 in Infant Formula and Related Nutritionals

Final Action 2019

AOAC-ISO Method

Included Revised First Action *J. AOAC Int.* reference

**2015.10** (50.6.05) Free and Total Choline and Carnitine in Infant Formula and Adult/Pediatric Nutritional Formula

Final Action 2019

AOAC-ISO Method

**2015.06** (50.10.01) Minerals and Trace Elements in Milk, Milk Products, Infant Formula, and Adult/Pediatric Nutritional Formula

Codex Type II, AOAC-ISO/IDF Method 2019

**2016.03** (50.11.03) Chloride in Milk, Milk Powder, Whey Powder, Infant Formula, and Adult Nutritionals

Codex Type II, AOAC-ISO/IDF Method

Included Final Action *J. AOAC Int.* reference

**2016.14** (50.13.02) Fructans in Infant Formula and Adult Nutritionals

Final Action 2020

AOAC-ISO/IDF Method

**2016.13** (50.14.01) Lutein,  $\beta$ -Carotene, and Lycopene in Infant Formula and Adult Nutritionals

Final Action 2019 (for  $\beta$ -carotene and lycopene only)

AOAC-ISO Method

**2017.03** (50.15.01) Total Tryptophan in Infant Formula and Adult/Pediatric Nutritional Formula

Final Action 2019

**NEW! 2018.06** (50.15.02) Total Amino Acids in Infant Formulas and Adult Nutritionals

**NEW! 2019.09** (50.15.03) Total Proteinogenic Amino Acids and Taurine in Infant Formula and Adult/Pediatric Formula

**NEW! 2018.03** (50.16.01) 2- and 3-MCPD, 2- and 3-MCPD Esters, and Glycidyl Esters (GE) in Infant and Adult/Pediatric Nutritional Formula

**NEW! 2018.12** (50.16.02) 2-Monochloropropanediol (2-MCPD), 3-Monochloropropanediol (3-MCPD), and Glycidol in Infant and Adult/Pediatric Nutritional Formula

**NEW! 2021.01** (50.17.01)  $\beta$ -Galactooligosaccharides in Infant Formula and Adult Nutritionals

Chapter 51 **NEW! 2018.14** (51.13.02) Quantitation of Aloe Vera Polysaccharides **NEW! 2018.04** (51.21.01) Select Nonvolatile Ginger Constituents in Dietary Ingredients and Finished Dosage Forms

**NEW! 2019.05** (51.22.01) A-Type Proanthocyanidins in Cranberry-Based Foods and Dietary Supplements

**NEW! 2019.06** (51.22.02) Soluble Proanthocyanidins in Cranberry Foods and Dietary Supplements

Appendix P **NEW!** *Guidance for Soil Collection, Characterization, and Application for Biothreat Agent Detection Methods and Site Evaluations*

Appendix Q **NEW!** *Recommendations for Developing Molecular Assays for Microbial Pathogen Detection Using Modern In Silico Approaches*

Appendix R **NEW!** *Guidelines for Verifying and Documenting the Relationships Between Microbial Cultures*

**If you have any questions of a technical nature or suggestions for editorial changes, please e-mail us at [editoma@aoac.org](mailto:editoma@aoac.org).**