



Laboratory Methods	
3M Petrifilm	Lactic Acid Bacteria (Heterofermentative and Homofermentative)
AACC 22-90	Measurement of Urease Activity
AACC 76-11	Starch – Glucoamylase Method with Subsequent Measurement of Glucose with Glucose Oxidase
AASHTO T127	Standard Method of Test for Sampling and Amount of Testing of Hydraulic Cement
AOAC 2003.05	Crude Fat in Feeds, Cereal Grains, and Forages
AOAC 900.02	Ash of Sugars and Syrups (In Food)
AOAC 923.09	Invert Sugars in Sugars and Syrups
AOAC 941.04	Urea and Ammoniacal Nitrogen in Animal Feed
AOAC 954.02	Fat (Crude) or Ether Extract in Pet Food
AOAC 962.09	Fiber (Crude) in Animal Feed and Pet Food
AOAC 965.33	Peroxide Value of Oils & Fats (Titration Method) (In Feed)
AOAC 969.35	Moisture Sugars and Sugars Products/ Molasses (70 Degree Vacuum)
AOAC 971.09	Pepsin Digestibility of Animal Protein Feeds
AOAC 973.18	Fiber (Acid Detergent) and Lignin in Animal Feed

Document Info.	
Title:	Laboratory Methods Sheet
Page(s):	1 of 19
Date Updated:	1/25/2012
Reviewed by:	AK



Laboratory Methods	
AOAC 990.03	Protein (Crude) in Animal Feed (Combustion Method)
AOAC 920.151, 925.40, 935.56, 925.30, 925.09, 925.45, 926.07, 941.08, 926.08, 990.19, 934.06	Vacuum Oven Moisture Method
AOAC 905.02, 920.111, 952.06, 989.05, 932.06, 945.48	Alkaline Hydrolysis Fat Method (In Food)
AOAC 920.158	Iodine Absorption Number of Oils and Fats (Feeds & Foods)
AOAC 922.06	Fat in Flour (In Food)
AOAC 925.10, 941.08, 990.19, 938.06, AACC 44.15	Convection Oven Moisture Method
AOAC 930.15	Loss on Drying (Moisture) for Feeds (135 Degrees C for 2 Hours)/ Dry Matter on Oven Drying for Feeds (135 Degrees C for 2 Hours)
AOAC 932.06	Fat in Dried Milk (In Feeds)
AOAC 935.47 USDA Salt	Salt (Chloride as Sodium Chloride) in Meat
AOAC 937.02	Magnesium (Water-Soluble) in Fertilizers
AOAC 941.04	Urea, Nitrogen/Ammoniacal Nitrogen
AOAC 942.05	Ash (In Animal Feed)
AOAC 945.01	Nitrogen (Water-Insoluble) in Fertilizers
AOAC 950.01	Water (Total) In Fertilizers

Document Info.	
Title:	Laboratory Methods Sheet
Page(s):	2 of 19
Date Updated:	1/25/2012
Reviewed by:	AK

Laboratory Methods	
AOAC 950.46	Moisture in Meat (Convection Oven)
AOAC 955.03	Ash (Acid-Insoluble) in Fertilizers
AOAC 955.04	Nitrogen (Total) in Fertilizers
AOAC 957.02 ICP	Potassium, Sulfur in Fertilizers
AOAC 958.01, 957.02 ICP	Phosphorus (Total) in Fertilizers
AOAC 959.03	Urea in Fertilizers
AOAC 960.01	Phosphorus (Citrate Soluble) in Fertilizers
AOAC 960.02	Phosphorus (Available) in Fertilizers
AOAC 960.04	Biuret in Fertilizers
AOAC 965.08	Water (Free) in Fertilizers
AOAC 965.33, AOCS Cd8B-90	Peroxide Value of Oils and Fats (In Food)
AOAC 967.22, HPLC/FD	Vitamin C (Total) in Vitamin Preparations
AOAC 969.31/ ICP, 953.01	Phosphorous (Total) in Meat
AOAC 970.01	Phosphorus (Water Soluble) in Fertilizers using ICP

Document Info.	
Title:	Laboratory Methods Sheet
Page(s):	3 of 19
Date Updated:	1/25/2012
Reviewed by:	AK



Laboratory Methods	
AOAC 977.01	Phosphorus (Water Soluble) in Fertilizers
AOAC 979.10, 996.11	Starch (Total) in Cereal Products
AOAC 979.19, 996.06/FDA Lipids Manual, 969.33, 963.22	Fatty Acid Profile (Including Trans Fatty Acids)
AOAC 979.79, 976.26/FDA Lipids Manual, 970.51, 970.26	Cholesterol
AOAC 981.10, 976.85/Kjeldahl, 978.04, 920.15, 920.87, 930.25, 930.33, 950.48	Kjeldahl Protein Method (In Food)
AOAC 982.14, HPLC/RI-Hot Water Extraction	Sugars
AOAC 983.03	Iron (Chelated) in Iron Chelate Concentrates
AOAC 985.01, 953.01	Metals & Other Elements in Plants & Pet Foods (Minerals Ca, P, S, Cu, K, Mg, Fe)
AOAC 988.15	Tryptophan in Feed Ingredients
AOAC 990.28	Sulfites (In Food)
AOAC 991.14, 3M Petrifilm	Coliform and Escherichia Coli Counts in Foods (Enterobactor)
AOAC 991.36, 960.39, 938.06	Fat, Total (Ether Extraction) (In Food)
AOAC 991.43	Total, Soluble, and Insoluble Dietary Fiber in Foods
AOAC 992.04, 974.29/HPLC, USDA	Vitamin A

Document Info.	
Title:	Laboratory Methods Sheet
Page(s):	4 of 19
Date Updated:	1/25/2012
Reviewed by:	AK





Laboratory Methods	
AOAC 992.15	Crude Protein in Meat and Meat Products Including Pet Foods (Combustion)(In Food)
AOAC 994.12	Cystine & Methionine (Modified)
AOAC 994.12	Amino Acids in Feeds (Modified)
AOAC 994.12, Journal of Chromatography 52 (1970) pp 393-404	Lysine (Modified)
AOAC 999.12	Taurine In Pet Foods (Modified)
AOAC G 973.18	Fiber (Acid Detergent) and Lignin (Ankom) in Animal Feed
AOAC 2001.11	Nitrogen (Ammoniacal) in Fertilizers
AOAC 2001.11	Protein (Crude) in Animal Feed, Forage, (Plant Tissue), Grain, & Oilseeds
AOAC 2003.01, 3M Petrifilm	Enterobacteriaceae in Selected Foods
AOAC 2006.03	Arsenic, Cadmium, Cobalt, Chromium, Lead, Molybdenum, Nickel, & Selenium in Fertilizers (Microwave digestion and inductively coupled plasma-optical emission spectrometry)
AOAC Nat Fert & Env Research	Extraction of Available Phosphorus
AOCS Ba6a-05	Ankom Crude Fiber (Filter Bags) (In Feed)
AOCS Ca 3-46	Insoluble Matter (In Feed)
AOCS Ca5a-40	Free Fatty Acids (In Feed)

Document Info.	
Title:	Laboratory Methods Sheet
Page(s):	5 of 19
Date Updated:	1/25/2012
Reviewed by:	AK



Laboratory Methods	
AOCS Ca5a-40	Free Fatty Acids (In Food)
ASA #9	Phosphorus by Bicarbonate, Ammonia Nitrates, Textures, Bulk Density
ASA #9 LECO	Carbon (Carbonate) in Fertilizers
ASTM 2974	Moisture, Organic Matter (Walkley-Black)
ASTM 408	Adderburg Limits
ASTM 854	Specific Gravity
ASTM C25	Calcium Carbonate in Carbonate Stone
ASTM C311-90	Fly Ash
ASTM D-86	Distillation of Petroleum Products at Atmospheric Pressure
ASTM D-92	Ignitability (Solids) – Cleveland Open Cup
ASTM D-93	Ignitability (Liquids) – Penske-Martens Closed Cup
ASTM D-97	Pour Point
ASTM D-130	Corrosiveness to Copper from Petroleum Products by Copper Strip Test
ASTM D-156	Saybolt Color

Document Info.	
Title:	Laboratory Methods Sheet
Page(s):	6 of 19
Date Updated:	1/25/2012
Reviewed by:	AK



Laboratory Methods	
ASTM D-240	Calorie Content by Bomb Colorimetry
ASTM D-381	Gum Content in Fuels by Jet Evaporation
ASTM D-422	Particle Size/ Complete Grain Size
ASTM D-445	Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)
ASTM D-664	Acid Number
ASTM D-874	Sulfated Ash from Lubricating Oils and Additives
ASTM D-1160	Reduced Pressure Distillation of Petroleum Products
ASTM D1209-05	Color: Visual Comparison Method
ASTM D 1252-95	Chemical Oxygen Demand (COD) Colorimetric, Automated; Manual
ASTM D-1353	Non-Volatile Matter in Volatile Solvents
ASTM D-1613	Acidity in Volatile Solvents and Chemical Intermediates used in Paint, Varnish, Lacquer, and Related Products
ASTM D-1688	Standard Test Method for Copper in Ethanol, Copper in Ethanol
ASTM, D 2325	Field Capacity (1/3 Bar Moisture Holding Capacity), Wilting Point (15 Bar Moisture)
ASTM D-2500	Cloud Point of Petroleum Products

Document Info.	
Title:	Laboratory Methods Sheet
Page(s):	7 of 19
Date Updated:	1/25/2012
Reviewed by:	AK



Laboratory Methods	
ASTM D-4052	Specific Gravity
ASTM D-4176	Biodiesel Visual Inspection
ASTM D-4530	Determination of Carbon Residue (Micro Method)
ASTM D-4539	Low Temperature Flow Test
ASTM D-4815	Determination of MTBE, ETBE, TAME, DIPE, Tertiary-Amyl Alcohol and C1 to C4 Alcohols in Gasoline by Gas Chromatography
ASTM D-4951	Determination of Additive Elements in Lubricating Oils by Inductively Coupled Plasma Atomic Emission Spectrometry
ASTM D-5191	Vapor Pressure of Petroleum Products (Mini Method)
ASTM D-5453	Standard Test Method of Determination of Total Sulfur in light Hydrocarbons, Spark Ignition Engine Fuel, Diesel Engine Fuel, and Engine Oil by Ultraviolet Fluorescence
ASTM D-5501	Determination of Ethanol of Denatured Fuel Ethanol by Gas Chromatography
ASTM D-5580	Determination of Benzene, Toluene, Ethylbenzene, p/m-Xylene, o-Xylene, C9, and heavier Aromatics, and Total Aromatics in Finished Gasoline by Gas Chromatography
ASTM D-6371	Cold Filter Plugging Point
ASTM D-6423	Determination of pHe of Ethanol, Denatured Fuel Ethanol, and Fuel Ethanol
ASTM D-6469	Microbial Contamination in Fuels and Fuel Systems
ASTM D-6550	Determination of Olefin Content of Gasolines by SFC

Document Info.	
Title:	Laboratory Methods Sheet
Page(s):	8 of 19
Date Updated:	1/25/2012
Reviewed by:	AK



Laboratory Methods	
ASTM D-6584	Determination of Free and Total Glycerin in B-100 Biodiesel Methyl Esters by Gas
ASTM D-7319	Sulfate & Chloride in Ethanol
ASTM E-203	Water Using Volumetric Karl Fischer Titration
ASTM E-1064	Water In Organic Liquids by Coulometric Karl Fischer Titration
CDC	Legionella Membrane Filter Procedure
Chloride	Chloride, Soluble, in Animal Feed, Titrimetric Method, Soil & Plant Analysis
Decagon Devices (Manufacturer)	Water Activity (In Food)
DRO	Wisconsin Modified DRO: Method for Determining Diesel Range Organics
EN 14110	Methanol by Headspace
EN 14112	Oxidation Stability
EPA 1000/1001	Biomonitoring: 7 Day Chronic
EPA 1020	Cleveland Open Cup
EPA 1664 A	Hexane Extractable Materials
EPA 1681	Fecal Coliforms in Sewage Sludge (Biosolids) by Multiple-Tube Fermentation using A1

Document Info.	
Title:	Laboratory Methods Sheet
Page(s):	9 of 19
Date Updated:	1/25/2012
Reviewed by:	AK



Laboratory Methods	
EPA 1682	Salmonella in Sewage Sludge (Biosolids) by Modified Semisolid RV Medium
EPA 2000/2002	Biomonitoring: 48 Hour Acute/ 5 Dilution
EPA 3010A	Acid Digestion of Aqueous Samples and Extracts for Total Metals for Analysis by Flame Atomic Absorption Spectroscopy or Inductively Coupled Plasma Spectroscopy
EPA 325.2	Chloride (Colorimetric, Automated Ferricyanide AAll)
EPA 3504	Determination of Ammonia Nitrogen by Semi-Automated Colorimetry Revision 2.0
EPA 351.2	Determination of Total Kjeldahl Nitrogen by Semi-Automated Colorimetry
EPA 420.1	Phenolics, Total Recoverable, Spectrophotometric, Manual 4-AAP with Distillation
EPA 7.3.3.2	Test Method to Determine Hydrogen Cyanide Released from Wastes
EPA 7.3.4.1	Test Method to Determine Hydrogen Sulfide Released from Wastes
EPA 9050A	Specific Conductance
EPA Method 1010A	Test Methods for Flash Point by Pensky-Martens Closed Cup Tester
EPA Method 1020B	Standard Test Methods for Flash Point by Setaflash (small scale) closed-cup
EPA Method 1311	Toxicity Characteristic Leaching Procedure (for Metals Analysis)
EPA Method 1312	Synthetic Precipitation Leaching Procedure (for Metals Analysis)

Document Info.	
Title:	Laboratory Methods Sheet
Page(s):	10 of 19
Date Updated:	1/25/2012
Reviewed by:	AK



Laboratory Methods	
EPA Method 150.1	pH Electrometric Measurement
EPA Method 200.7	Trace Elements in Water, Solids, and Biosolids by Inductively Coupled Plasma-Atomic Emission Spectrometry
EPA Method 200.8	Determination of Trace Elements in Waters and Wastes by ICPMS
EPA Method 245.1	Determination of Mercury in Water by Cold Vapor Atomic Absorption Spectrometry
EPA Method 300.0 Revision A	Determination of Inorganic Anions by Ion Chromatography
EPA Method 3005A	Acid Digestion of Water for Total Recoverable or Dissolved Metals for Analysis by Flame Atomic Absorption Spectroscopy or ICP Spectroscopy
EPA Method 3040A	Dissolution Procedure for Oils, Greases, or Waxes
EPA Method 3050B	Acid Digestion of Sediments, Sludges, and Soils (for Metals)
EPA Method 340.2	Fluoride, Potentiometric, Ion Selective Electrode
EPA Method 9080	Cation-Exchange Capacity of Soils (Ammonium Acetate)
EPA Method 9081	Cation-Exchange Capacity of Soils (Sodium Acetate)
EPA Method 9095B	Paint Filter Liquids Test
FCC V Ed. P.937	Iodine Number
FDA V	Salmonella Identification

Document Info.	
Title:	Laboratory Methods Sheet
Page(s):	11 of 19
Date Updated:	1/25/2012
Reviewed by:	AK



Laboratory Methods	
EPA Method 3510C	Separatory Funnel Liquid-Liquid Extraction
EPA Method 3520C	Continuous Liquid-Liquid Extraction
EPA Method 353.2	Nitrate-Nitrite Nitrogen by Automated Colorimetry
EPA Method 3540	Soxhlet Extraction
EPA Method 3550B	Ultrasonic Extraction
EPA Method 5030B	Purge and Trap for Aqueous Samples
EPA Method 524.2	Measurement of Purgeable Organic Compounds in Water by Mas Spectrometry
EPA Method 6010B, 6020	ICP Atomic Emission Spectroscopy for Metals
EPA Method 608	Organochlorine Pesticides and PCBs
EPA Method 624	Volatile Organics
EPA Method 625	Base/Neutrals and Acids – Semivolatile Organics
EPA Method 7196A	Chromium, Hexavalen (Colormetric)
EPA Method 7470A	Mercury in Liquid Waste (Manual Cold-Vapor Technique)
EPA Method 7471A	Mercury in Liquid Waste (Manual Cold-Vapor Technique)

Document Info.	
Title:	Laboratory Methods Sheet
Page(s):	12 of 19
Date Updated:	1/25/2012
Reviewed by:	AK



Laboratory Methods	
EPA Method 8015B	Non-Halogenated Organics using GC/FID
EPA Method 8081A	Organochlorine Pesticides by Gas Chromatography
EPA Method 8082	Polychlorinated Biphenyl (PCBs) by Gas Chromatography
EPA Method 8141	Organophosphorus Pesticides (Capillary Column)
EPA Method 8151A	Chlorinated Herbicides by GC; Methylation or Pentafluorobenzoylation Deactivation
EPA Method 8260B	Volatile Organic Compounds by GC/MS
EPA Method 8270C	Semivolatile Organic Compounds by GC/MS
EPA Method 9010C	Total and Amenable Cyanide Distillation (Colormetric, Manual)
EPA Method 9020B	Total Organic Halicides (TOX)
EPA Method 9023	Total Extractable Organic Halides (EOX) in Solids
EPA Method 9030B	Acid-Soluble and Acid-Insoluble Sulfides: Distillation
EPA Method 9040C	pH Electronic Measurement
EPA Method 9045D	Soil and Waste pH
EPA Method 9056	Determination of Inorganic Anions by Ion Chromatography

Document Info.	
Title:	Laboratory Methods Sheet
Page(s):	13 of 19
Date Updated:	1/25/2012
Reviewed by:	AK



Laboratory Methods

Laboratory Methods	
FDA VI	Shigella
FDA/BAM III	Aerobic Plate Count/ Heterotrophic
FDA/BAM XII	Staphylococcus aureus
FDA/BAM XVI	Clostridium Perfringens
FDA/BAM XVIII	Yeast & Molds/ Mold Identification
GRO	Wisconsin Modified GRO: Method for Determining Gasoline Range Organics
HA4/JC	Humic Acid
HPLC-RI	Total Glycerine
IA-OA-1	Determination of Volatile Petroleum Hydrocarbons (Gasoline)
IA-OA-2	Extractable Petroleum Products (and Related Low Volatility Organic Compounds)
J Food Science	Thibarbituric Acid (TBA)
Journal Food Science Vol 48, 1983, 742	Sugar Alcohols (Modified)
LCMS	T-2 Toxin, Zearalenone, Vomitoxin (DON), Aflatoxin, Fumonisin, Ochratoxin
LC-MS	Virginiamycin, Melamine, Cyanuric Acid, Ammeline, Ammelide

Document Info.

Title:	Laboratory Methods Sheet
Page(s):	14 of 19
Date Updated:	1/25/2012
Reviewed by:	AK



Laboratory Methods	
LECO Combustion	Nitrogen (Total) in Fertilizers
MDA-AEP	Minnesota Department of Agriculture List 2 – Acid Extractable Pesticides
MDA-NEP	Minnesota Department of Agriculture List 1 – Neutral Extractable Pesticides
MEF IV	Anaerobic Plate Count
EPA Method 9060A	Total Organic Carbon
EPA Method 9065B	Phenolics (Spectrophotometric, Manual 4-AAP with Distillation)
MEF-IV	Microaerophilic Plate Count
MEF-IX	Lactobacillus
MEF-XIV	Psychotropic Plate Count
MEF-XVIII	Bacillus Cereus
NCR 221	Phosphorus Weak/Strong Bray, Chlorides, Loss on Ignition, pH, Excess Lime, Soluble Salts, Saturated Paste, Cations, Trace Elements, Sulfates, Organic Matter, SMP Buffer
NCR P30	Organic Matter
NFTA 2.22.5	DDG Moisture (Feed) 3 Hrs. @ 105 Degrees Celcius
NFTA 5.1	Neutral Detergent Fiber (Ankom) (In Feed)

Document Info.	
Title:	Laboratory Methods Sheet
Page(s):	15 of 19
Date Updated:	1/25/2012
Reviewed by:	AK



Laboratory Methods	
Oxoid	Pseudomonas
Qualicon-BAX	PCR Technology – Listeria, Salmonella, E.coliO157:H7
RMST; p.87	Water Soluble Cations
SDI (Rapid)	Salmonella
SM 2150B	Odor: Threshold Odor Test
SM 2310B	Acidity: Titration Method
SM 2320B	Alkalinity: Titration Method
SM 2340B	Hardness: Hardness by Calculation
SM 2510B	Conductivity: Laboratory Methods
SM 2540B	Solids: Total Solids Dried at 103-105 Degrees Celcius
SM 2540C	Solids: Total Dissolved Solids Dried at 180 Degrees Celcius
SM 2540D	Solids: Total Suspended Solids Dried at 103-105 Degrees Celcius
SM 2540E	Solids: Fixed and Volatile Solids Ignited at 550 Degrees Celcius
SM 2540F	Solids: Settleable Solids

Document Info.	
Title:	Laboratory Methods Sheet
Page(s):	16 of 19
Date Updated:	1/25/2012
Reviewed by:	AK



Laboratory Methods	
SM 2540G	Solids: Total, Fixed, and Volatile Solids in Solid and Semisolid Samples
SM 2550B	Temperature: Laboratory and Field Methods
SM 2580B	Oxidation Reduction Potential Measurement in Clean Water
SM 2710B	Tests on Sludges: Oxygen Consumption Rate
SM 2710F	Tests on Sludges: Specific Gravity
SM 4500 Cl D	Chlorine, Total Residual, Titrimetric, DPD-FAS
SM 4500 Cl D	Chlorine, Residual, Amperometric Titration Method
SM 4500 ² S F	Sulfide, Iodometric Method
SM 4500-Cl-/G	Chlorine (Residual): DPD Colormetric Method
SM 4500-CN-/C	Cyanide: Total Cyanide after Distillation
SM 4500-CN-/E	Cyanide: Colormetric Method
SM 4500-No ² -/B	Nitrogen (Nitrite): Colormetric Method
SM 4500-H+/B	pH Value: Electrometric Method
SM 4500-N ^{org} -C	Nitrogen (Organic): Semi-micro Kjeldahl Method

Document Info.	
Title:	Laboratory Methods Sheet
Page(s):	17 of 19
Date Updated:	1/25/2012
Reviewed by:	AK



Laboratory Methods	
SM 4500-P-F	Phosphorus: Automated Ascorbic Acid Reduction Method
SM 4500-P-F	Automated Orthophosphate
SM 4500-S ² -F	Sulfide: Iodometric Method
SM 5210B	Biochemical Oxygen Demand (BOD): 5-Day BOD Test
SM 5310B	Total Organic Carbon (TOC): High Temperature Combustion Method
SM 5560C	Organic and Volatile Acids by Distillation Method
SM 5710B	Formation of Trihalomethanes and Other Disinfection By-Products: THMFP
SM 9213E	Pseudomonas Membrane Filter Procedure
SM 9215B	Heterotrophic Plate Count: Pour Plate Method
SM 9215D	Heterotrophic Plate Count: Membrane Filter Method
SM 9221A	Coliform Bacteria by MPN using LST and EC Broth
SM 9221E	Coliform Bacteria by MPN using LST and EC Broth: Fecal Coliform Procedure
SM 9222D	Fecal Membrane Filter Procedure
SM 9230C	Fecal Streptococcus and Enterococcus Groups: Membrane Filter Techniques

Document Info.	
Title:	Laboratory Methods Sheet
Page(s):	18 of 19
Date Updated:	1/25/2012
Reviewed by:	AK



Laboratory Methods	
SM 9240B	Iron Bacteria
SM 9240C	Sulfur Bacteria
Sniffen & Chase 1978	Soluble Protein (In Feed)
Soil Sci 45:501-506	Potassium Release
Soil Sci 59:39-45	Phosphorus by Kewlona
Soil Sci 64:1083-1089	Soil Amino Sugars
Soil Sci 66:299-305	Calcium Carbonate
Soil Sci(15)12:1417-1422	Humic Matter
Soil Sci(15)12:1409-1416	Mehlich 3
USDA	Listeria Identification
USDA NTI1, NTI2, AOAC 973.31	Nitrites in Meats
USP 28	Ascorbic Acid
USP 841	Specific Gravity
Wrigley Method 9020.004	Moisture in Gum
WREP 125	Nitrate

Document Info.	
Title:	Laboratory Methods Sheet
Page(s):	19 of 19
Date Updated:	1/25/2012
Reviewed by:	AK