AGRICULTURAL EXPERIMENT STATION ANALYTICAL LABORATORY SERVICES GUIDE

MONTANA STATE UNIVERSITY
McCall Hall, Bozeman MT 59717-3620

Phone: (406)994-3383
Fax: (406)994-4494
http://ag.montana.edu/analyticallab

February 12, 2007

ABOUT US

Mission Statement

The mission of the AES Analytical Laboratory is to provide reliable, efficient analytical services to the public on nutritional and toxic substances in forage, animal feed, fertilizer, soil and water.

What we Offer

- Comprehensive quality control and quality assurance for all laboratory procedures
- State of the art instrumentation and sound, validated methods
- Use of official AOAC, NFTA, EPA and FDA methods
- Long-term contracts at stable, reduced charges
- Consultation to ensure the client's data provides the information sought at minimum cost
- Regular participation in proficiency testing

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GENERAL INFORMATION

Request for Analysis and Interpretation of Analytical Results

- Each sample must have a unique identification and the analysis requested.
- Include a mailing address and phone number of the owner or contact person.
- If you are not sure what analysis you need or need help with your results, consult with your County Extension Agent or other resources listed on page 8.
- When shipping pesticides or other toxic material, please review the regulations of the U.S. Department of Transportation (DOT) to comply with their shipping regulations.

Confidentiality

- Analytical data is handled confidentially and is provided only to the person who submitted the sample and pays for the analytical services.
- Copies of the report of analyses may be sent to other parties as requested.

Sample Security

- Sample security is recommended for regulatory or litigation situations. A fee of $25.00 per sample will be charged.
- The laboratory must be notified in writing at the time of sample submission.
- Sample security insures strict chain-of-custody procedures will be followed and a written report will be included along with the analytical report.

Sample Disposal

- Non-perishable samples will be disposed of four weeks after reporting.
- Perishables will be disposed of two weeks after reporting.

Pricing and Discounts

- Fees exceeding $200.00 must be paid in advance before the analytical results are released. The invoice is sent by fax to the responsible party. The analytical report is released when payment is received.
- Out-of-state customers: 10% surcharge
- Sample security charge: $25.00 per sample.
- Multiple sample discounts are available. See schedule below.

Discount Schedule

To be eligible for the discount samples must be submitted at the same time for the same test.

Samples	Discount
1	No Discount
2-5	15% Discount
6-20	20% Discount
21>	Contact the laboratory

Estimated Sample Turn-Around Time

Pesticide	10-14 working days
Commercial Feed and Fertilizer and Nutrition	7-10 working days
Toxicology	3-4 working days

NOTE: Turn around time is dependent on the number of samples submitted, analyses requested and the laboratory sample backlog.

NON-PESTICIDE SAMPLE SUBMISSION

Hay and related feed material (silage)

- Sample size: approximately 1—2 pounds.

- Sampling:
  a. Walk the field in a "W" pattern and take a sample at each point of the W.
  b. Probe hay bales or stacks: Do not mix different types or cuttings of forage. Take as many cores as possible, at least twenty per stack or field, more for larger or heterogeneous lots.
  c. Cut standing plants to obtain the same portion as would be harvested (or eaten).
  d. Do not pull up plants by their roots and do not include soil in the sample.

- Shipping:
  a. Ship wet sample in a plastic bag. Ice ("blue ice") the package to prevent spoilage.
  b. Ship samples for nitrate only in a paper bag.
  c. Dry material such as baled hay can be shipped in plastic zipper bags.

Silage:

- Sample Size: approximately 1—4 pounds.
- Ship in airtight containers (well-sealed double plastic bag or plastic bottle).
- To prevent loss of components (water, ammonia, etc.) and spoilage, freeze samples and pack with blue ice. Use a container with flexible sides and do not fill completely full.

Grain

- Sample size: Approximately 1—2 pounds.
- Sampling: Use a large grain probe for sampling.
- Shipping: Ship in a plastic or paper bag.

Commercial Feed and Fertilizer

- Sample size: Approximately 1—3 pounds.
- Sampling:
  a. Include a claim label to expedite the turn around time.
  b. Mix liquid feeds in the storage tank before sampling.

- Shipping:
  a. Ship dry samples in a plastic bag.
  b. Ship liquid samples in glass or polyethylene bottles.

Water (for non-pesticide analysis)

- Sample size: Approximately 1—2 quarts.
- Sampling: Contact the laboratory for more information.
- Shipping: use U.S. EPA guidelines. This information is available from the laboratory.

Agricultural Experiment Station Analytical Laboratory McCall Hall, Rm. 10 MSU Bozeman, MT 59717-3620 Phone: 406-994-3383 Fax: 406-994-4494	**Non-Pesticide Sample Submission Form**	Date Received: Sample Number: Invoice Number: Delivery Via:

Bill to:	Report to:
Attn:	Attn:
Address:	Address:
City: St. Zip	City St. Zip
Phone:	Phone:
Fax:	Fax:

SAMPLE DESCRIPTION: (check one or more)

☐Alfalfa hay	☐Oat hay	☐Wheat straw	☐Concentrate (need tag)
☐Alfalfa-grass hay	☐Pea hay	☐Wheatgrass hay (crested)	☐Fertilizer (need tag)
☐Barley hay	☐Pea and oat hay	☐Wheatgrass hay (Slender)	☐Water
☐Barley straw	☐Peas (whole)	☐Small grain	☐Biological
☐Grass hay	☐Timothy hay	☐Mixed grain ration	☐Other
☐Orchard grass hay	☐Wheat hay	☐Commercial feed (need tag)	

ANALYSIS REQUESTED:

FEED/FORAGE	DRUGS, VITAMINS & AMINO ACIDS	ELEMENTAL
☐Acid Detergent Fiber (ADF)	☐Amprolium	☐Arsenic
☐Acid Detergent Protein	☐Chlortetracycline	☐Cadmium
☐Ash	☐Lasalocid	☐Calcium
☐Crude Fat	☐Lysine	☐Copper
☐Crude Fiber	☐Methionine	☐Iron
☐Crude Protein	☐Monensin	☐Lead
☐Cyanide	☐Oxytetracycline	☐Magnesium
☐Moisture	☐Sulfamethazine	☐Manganese
☐Neutral Detergent Fiber (NDF)	☐Vitamin A	☐Molybdenum
☐Nitrate	**WATER**	☐Phosphorus
☐Non-protein Nitrogen (urea)	☐Alkalinity (mg $CaCO_3$/L)	☐Potassium
☐Relative Feed Value (RFV)	☐Hardness (mg $CaCO_3$/L)	☐Selenium
• ADF, NDF, Moisture included	☐Nitrate	☐Sodium
• NO CRUDE PROTEIN included	☐Nitrate/Nitrite as Nitrogen	☐Sulfur or Sulfate
☐Salt	☐pH	☐Zinc
☐TDN from ADF	☐Total Dissolved Solids (TDS)	☐Other
• ADF, Moisture included	**FERTILIZER**	
• NO CRUDE PROTEIN included	☐K_2O, Soluble	
☐TDN by Proximate analysis	☐Nitrogen, Ammoniacal	
• Ash, Crude Protein, Fat, Fiber, Moisture included	☐Nitrogen, Total	
	☐P_2O_5, available	

NON-PESTICIDE ANALYSIS FEES

FEED/FORAGE	
Acid Detergent Fiber (ADF)	$15.00
Acid Detergent Protein	$23.00
Ash	$5.00
Crude Fat	$10.00
Crude Fiber	$12.00
Crude Protein	$10.00
Cyanide	$20.00
Moisture	$5.00
Neutral-Detergent Fiber (NDF)	$15.00
Nitrate	$12.00
Non-protein Nitrogen (Urea)	$18.00
Relative Feed Value (RFV):	$39.00
• ADF, NDF, Moisture included	
• NO CRUDE PROTEIN included	
Salt	$25.00
TDN from ADF:	$22.00
• ADF, Moisture included	
• NO CRUDE PROTEIN included	
TDN by Proximate analysis	$36.00
• Ash, Crude Protein, Fat, Fiber, Moisture included	

DRUGS, VITAMINS AND AMINO ACIDS	
Amprolium	$70.00
Chlortetracycline	$70.00
Lasalocid	$70.00
Lysine	$150.00
Methionine	$150.00
Monensin	$70.00
Oxytetracycline	$70.00
Sulfamethazine	$70.00
Vitamin A	$70.00

ELEMENTAL	
Arsenic	$30.00
Cadmium	$25.00
Calcium	$14.00
Copper	$14.00
Iron	$14.00
Lead	$25.00
Magnesium	$14.00
Manganese	$14.00
Molybdenum	$22.00
Phosphorus	$14.00
Potassium	$14.00
Selenium	$30.00
Sodium	$14.00
Sulfur or Sulfate	$25.00
Zinc	$14.00

WATER	
Alkalinity (mg $CaCO_3$\L)	$12.00
Hardness (mg $CaCO_3$\L)	$8.00
Nitrate	$12.00
Nitrate/Nitrite as Nitrogen	$50.00
pH	$6.00
Total Dissolved Solids (TDS)	$7.00

FERTILIZER	
K_2O, Soluble (Potassium)	$20.00
Nitrogen, Ammoniacal	$13.00
Nitrogen, Total	$15.00
P_2O_5, available (Phosphorus)	$20.00

NOTE: Other analysis are available, consult with the laboratory if you need further information.

NON-PESTICIDE FEED DEFINITIONS

Feed test results are of little value unless they are understood and used. Results can be used to: (1) balance rations, (2) improve future crop management if present forage is of unsatisfactory quality, and (3) determine equitable prices for forages based on nutritive value.

ACID-DETERGENT FIBER (ADF) is the portion of fiber that is composed of cellulose and lignin. ADF is related to forage digestibility (energy) and is used to calculate forage total digestible nutrients (TDN) or net energy (NE) for hay, haylage and corn silage. Forages lower in ADF are usually higher in energy.

CRUDE PROTEIN (CP) is represented by the total amount of nitrogen present when analyzed and then multiplied by a conversion factor of 6.25. This is based on the assumption that true protein contains 16% nitrogen. The term crude protein is used because it represents all of the nitrogen that is in the form of non-protein nitrogen (NPN) such as nitrates, ammonia, urea and single amino acids, as well as the nitrogen present as true protein. As plants mature, the crude protein usually decreases.

CRUDE FAT contains fat and other compounds soluble in ether. Fat contains 2.25 times the energy found in carbohydrates and proteins. It is added to rations to boost energy concentration when intake may be limiting.

CYANIDE (Prussic acid) plants that may have high cyanide potential are sorghum, sudan grass and corn. Danger of cyanide poisoning is greatest at the immature stages of growth and decreases with maturity.

DRY MATTER BASIS (DM) feeds or nutrients listed on a dry matter basis (dry weight) refers to the quantity of feed after the water is removed, i.e. after the sample has been dried to 100% dry matter. This is used as a basis for comparing feeds and estimating intakes.

FIBER is the portion of the plant that provides the plant's structural strength and form. Generally, the vegetative parts, especially the stem, have the highest fiber content. Seed hulls and/or coats also often contain fiber. Fiber is composed of several different types of compounds and is the major constituent of plant cell walls. The components of fiber that provide the 'fiber' value are hemicellulose, cellulose and lignin. An adequate amount of digestible fiber is required in the diet of ruminants for efficient production and health. Fiber values in plants are a function of the growing conditions and maturity. As plants mature, the fiber levels increase.

MINERALS are the inorganic element of animals and plants and are determined by burning off the organic matter and weighing the residue (ASH). It is the ash that represents the minerals. Minerals can be measured in percent (%), grams (g), parts per million (ppm) or milligrams per kilogram (mg/kg).

NEUTRAL DETERGENT FIBER (NDF) is the portion of fiber that is composed of hemicellulose, cellulose and lignin. NDF is related to feed intake or bulk and can be used in ration formulation to predict forage intake and quality. Forages low in NDF are usually of high quality and have high levels of intake.

NET ENERGY FOR MAINTENANCE (NEm) is an estimate of the energy value of a feed to maintain animal tissue without gain or loss of weight. NEm is used in formulating beef and sheep rations for maintenance plus energy for pregnancy and lactation.

NET ENERGY FOR GAIN (NEg) is an estimate of the energy value of a feed used for body weight gain above that required for maintenance. It is used in ration balancing for beef and sheep when gain is desired.

NITRATE levels toxic to livestock frequently occur in forage crops, particularly in small grains grown under drought stress. In addition to forages and other feeds, drinking water can contribute to nitrate toxicity.

RELATIVE FEED VALUE (RFV) is used in feed marketing and comparisons, not in balancing a ration for animals. This term is useful for comparing forages of the same type. It is calculated as digestible dry matter divided by dry matter intake. Digestible dry matter is a function of ADF, and dry matter intake is a function of NDF. Therefore the fiber components have an integral affect on RFV. The relative feed value for grasses is usually lower than for mixed or legume forages. This is due to the higher fiber values associated with grasses, especially the NDF. For this reason it is questionable to compare the relative feed value of different species.

NON-PESTICIDE FEED DEFINITIONS

TOTAL DIGESTIBLE NUTRIENTS (TDN) is derived from animal studies by measuring the percentage of digestible carbohydrates, digestible protein and digestible fat (x 2.25). TDN values for hay, haylage and corn silage, however, can also be calculated on a dry matter basis using the forage Acid Detergent Fiber (ADF) analysis.

TDN FROM PROXIMATE ANALYSIS: was developed over 100 years ago in an attempt to use chemical determinations to describe the value of feeds for animals. The proximate factors used as components are crude fiber (CF); crude protein (CP); crude fat, often stated as ether extract, EE; nitrogen-free extract, NFE; and ash. The most widely used proximate component analysis has been for crude protein.
(3) CP (%) = % Nitrogen x 6.25.

Reference: Range Animal Nutrition J. E. Huston and W. E. Pinchak, Texas A&M University System
OMAFRA Information Sheet, unpublished, Pioneer Forage Manual, A Nutritional Guide, Pioneer Hi-Bred International Inc. Des Moines, I Iowa.
Nitrate Toxicity of Montana Forages by Dennis Cash, Rick Funston, Marc King and Dave Wichman
Cyanide Poisoning in Livestock M. Bohosiewiez

Extension Service Resource Directory of Specialists for Technical Assistance

Montana Department of Agriculture
Agricultural Sciences Division
PO Box 200201
Helena, MT 59620-0201
406-444-3144

Plant Pathology
Barry Jacobsen, uplbj@montana.edu
406-994-5161

Water Quality Specialist
Gene Surber, gsurber@montana.edu
406-994-1971

Soils, Fertilizer Specialist
Clain Jones, clainj@montana.edu
406-994-6076

Wildlife, Predator Management Specialist
Jim Knight, jknight@montana.edu
406-994-5579

Swine Specialist
Dr. Wayne Gipp, wgipp@montana.edu
406-994-3415

Sheep and Wool Specialist
Dr. Rodney Kott, rkott@montana.edu
406-994-3415

Animal Range/Grazing Specialist
Dr. Jeff Mosley, jmosley@montana.edu
406-994-5601

Water for Human Consumption: Public Health and Human Services, Laboratory Services Bureau 406-444-3444

Montana Department of Livestock
Veterinary Diagnostic Laboratory
PO Box 997
Bozeman, MT 59771
406-994-4885

Beef Cattle Specialist
John Paterson, johnp@montana.edu
406-994-5562

Agronomy and Hay Specialist
Dr. Dennis Cash, dcash@montana.edu
406-994-5688

Pesticides
Reeves Petroff, rpetroff@montana.edu
406-994-3518

Plant Pathology, Small Grain
John Sherwood, sherwood@montana.edu
406-994-5171

Tillage, Coalbed methane drilling
Dr. James Bauder, jbauder@montana.edu
406-994-5685

Horses
Sandy Gagnon, gagnon@montana.edu
406-994-6623

Your local County Extension Agent
Your local veterinarian
Your local County Health Department

Gallatin County Health Department—582-3120
Poisonous Algae—Diagnostic Lab 994-4885

EQUATIONS FOR CALCULATING NUTRITIONAL VALUES

1. Total Digestible Nutrients (TDN)

   a. TDN from proximate analysis: (Moisture, ash, crude protein, fat and crude fiber)

   TDN = dig. Protein + dig. N-free extract + dig. Fiber + 2.25 (dig. Fat)

   For digestion coefficient of selected feedstuff use the following table:

Use the following table for Digestion Coefficients				
Feed	**% Crude Protein**	**% Crude Fat**	**% Crude Fiber**	**% NFE Extract**
Alfalfa Hay	71	30	45	70
Alfalfa-grass Hay	64	29	50	62
Barley Hay	55	47	50	67
Barley Straw	19	42	57	45
Grass Hay	50	47	61	62
Oat Hay	60	65	51	57
Orchard Grass Hay	52	42	62	59
Pea Hay	71	48	51	73
Pea & Oat Hay	71	52	60	62
Peas (Whole)	86	64	50	93
Timothy Hay	50	44	61	60
Wheat Hay	54	42	41	62
Wheat Straw	8	41	52	47
Wheat grass Hay (Crested)	71	43	64	54
Wheat grass Hay (Slender)	58	31	61	62

Example: Alfalfa Hay

Moisture	10%	Crude Protein	16%
Crude Fat	2%	Crude Fiber	30%
Ash	8%		

TOTAL = 66%

Nitrogen Free Extract (NFE) = 100% - 66% = 34%

%TDN = 16%(0.71) + 34%(0.70) + 30%(0.45)+2.25[2(0.30)] = 50.01%

   b. TDN from Acid Detergent Fiber (ADF) analysis: (for most hay samples)

   TDN = 96.35 - (ADF % x 1.15) ADF is on a dry weight basis

2. Digestible Dry Matter (DDM): Can be calculated from ADF analysis.
   DDM = 88.9 - (ADF% x 0.779)

3. Dry Matter Intake (DMI): Can be calculated from Neutral Detergent Fiber (NDF) analysis. $DMI = \frac{120}{NDF}$

4. Various energy equations are used from ADF analysis.

   a. Metabolized Energy (ME) = 0.0362 x TDN from ADF

   b. Net Energy Gain (NE_G) $\frac{1.42\ ME - 0.174\ ME^2 + 0.0122\ ME^3 - 1.65}{2.2}$

   c. Net Energy Maintenance (NE_M) $\frac{1.37\ ME - 0.13\ ME^2 + 0.0105\ ME^3 - 1.12}{2.2}$

5. Acid Detergent Protein (ADP):

   In order to determine ADP, ADF and then nitrogen have to be analyzed on the same sample portion.

   Acid Detergent N x 6.25 = ADP

6. Relative Feed Value (RFV): Calculated by performing both ADF and NDF analyses. DDM and DDI also need to be calculated in order to utilize the equation for RFV. RFV is used when buying or selling forages.

$$RFV = \frac{DDM \times DMI}{1.29}$$

RELATIVE FEED VALUE (RFV) TABLE	
AFGC Quality Standards	RFV
Prime	>151
1	125 - 150
2	103 - 124
3	87 - 102
4	75 - 86
5	<75

PESTICIDE SAMPLE SUBMISSION

Sample Submission:

- The laboratory **MUST** be notified of sample submission **PRIOR** to shipment or personal delivery. **Contact the laboratory at 406-994-3383.**
- Complete the Pesticide Sample Submission Form. Please provide **all** information requested.
- Secure samples in such a way to avoid sample contamination during shipping. We recommend double bagging.

Sample Size:

- Vegetation: Approximately 3/4 of a pound in a secure container.
- Soil: Approximately 1/2 to 3/4 pound in a secure container.
- Water: Approximately two one-quart glass bottles 2/3 full.
- Other: Contact the laboratory for instructions.

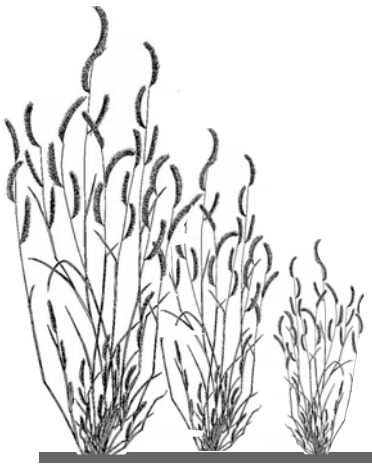
Shipping:

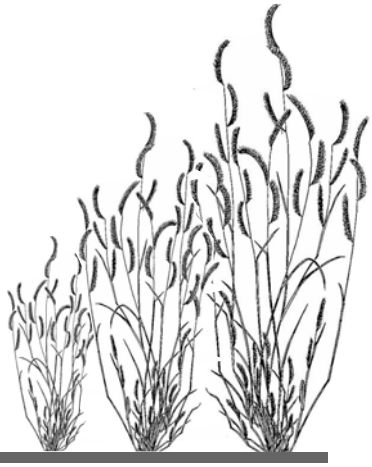
- Freeze soil and vegetation samples and refrigerate water prior to shipping.
- PLEASE ship OVERNIGHT on ice or blue ice in a cooler so samples remain refrigerated during shipping. Ship on Monday-Thursday so that the sample arrives on a weekday.
- **Do not ship on Friday or during a holiday**.

PESTICIDE ANALYSIS FEES

PRICES Effective 2/12/2007		
Matrix	**Individual**	**Multi-Residue**
Water	$175.00	$225.00
Soil:	$200.00	$250.00
Vegetation	$250.00	$300.00

NOTE: Multi residue screens are available upon request





PESTICIDE SAMPLE SUBMISSION FORM

Shipping and mailing Address: **Agricultural Experiment Station** **Analytical Laboratory** **McCall Hall, Rm. 10** **Montana State University** **Bozeman, MT 59717-3620** **Phone: (406)994-3383** **Fax: (406)994-4494**	Date Received: Invoice Number: Delivery Via: Sample Security: YES NO
Bill to: Attn: Address: City St. Zip Phone: Fax:	Report to: Attn: Address: City St Zip Phone: Fax:

Lab Use Only Laboratory Sample Number	Customer Sample ID	Sample Type	Analysis Requested	Pieces Received

PESTICIDE REFERENCE LIST

NOTE: Not every pesticide and/or metabolite is available for testing in every matrix. Only common pesticides are listed. If needed call the laboratory for consulting services.

1,2,4-Triazole
2,4,5-T
2,4-D
2,4-DP
3-OH carbofuran
AMPA
Acetochlor
Acetochlor ESA
Acetochlor OA
Alachlor
Alachlor ESA
Alachlor OA
Aldicarb
Aldicarb sulfone
Aldicarb sulfoxide
Aldrin
Alpha Chlordane
Alpha-BHC
Aminopyralid
Atrazine
Azinphos Methyl
Azinphos methyl oxon
Azoxystrobin
Bensulfuron methyl
Bentazon
Beta-BHC
Bifenthrin
Bromacil
Bromoxynil
Bromuconazole-46
Bromuconazole-47
Butachlor
Butylate
Carbaryl
Carbofuran
Carboxin
Chlorfenvinphos
Chlorimuron ethyl
Chlorothalonil
Chlorpyrifos
Chlorpyrifos-methyl
Chlorsulfuron
Clopyralid
Cloransulam methyl
Cyanazine
Cycloate
Cyfluthrin
Cyhalothrin, Total
Cypermethrin
Cyphenothrin
Cyproconazole
Deethyl atrazine
Deisopropyl atrazine
Deltamethrin
Diazinon
Dicamba
Dichlobenil
Dichlorprop
Dichlorvos
Dieldrin
Difenoconazole
Dimethenamid
Dimethenamid OA
Dimethoate
Dinoseb
Disulfoton
Disulfoton sulfone
Disulfoton sulfoxide
Diuron
EPTC
Endrin
Epoxiconazole
Esfenvalerate
Ethametsulfuron methyl
Ethion
Ethoprop
Ethyl Parathion
Fenamiphos
Fenbuconazole
Fenitrothion
Fenpropathrin
Fenthion
Fenvalerate
Flufenacet OA
Flumetsulam
Fluometuron
Fluroxypryr
Fluvalinate
Gamma Chlordane
Glutaric acid
Glyphosate
H. Epoxide
HCB
Halosulfuron methyl
Heptachlor
Hexaconazole
Hexazinone
Hydroxy atrazine
Imazalil
Imazamethabenz acid
Imazamethabenz methyl ester
Imazamox
Imazapic
Imazapic alcohol
Imazapic glucoside
Imazapyr
Imazaquin
Imazethapyr
Imazethapyr alcohol
Imazethapyr glucoside
Imidacloprid
Imine
Isoxazole
Lindane
Linuron
MCPA
MCPB
MCPP
Malathion
Metalaxyl
Methidathion
Methomyl
Methoxychlor
Methyl Parathion
Metolachlor
Metolachlor ESA
Metolachlor OA
Metribuzin
Metribuzin DA
Metribuzin DADK
Metribuzin DK
Metsulfuron methyl
Mevinphos
Mirex
Myclobutanil

PESTICIDE REFERENCE LIST

NOA 407854
NOA 447204
Neburon
Nicosulfuron
Omethoate
Oxazole
Oxychlordane
PCP
Parathion ethyl
Parathion methyl
Parathion methyl oxon
Pendimethalin
Phenothrin
Phorate
Phosmet
Picloram
Pinoxaden
Prallethrin
Primisulfuron methyl
Prometon
Prometryn
Pronamide
Propachlor
Propachlor OA
Propanil
Propazine
Propiconazole
Prosulfuron
Resmethrin
Rimsulfuron
Rotenone
Rotenone plus enantiomers
SYN-505164
Siduron
Simazine
Strychnine
Sulfometuron methyl
Sulfosulfuron
Sulprofos
Tebuconazole
Tebuthiuron
Tefluthrin
Terbacil
Terbufos
Terbutryn
Tetrachlorvinphos
Tetraconazole
Tetradifon
Tetramethrin
Thifensulfuron
Thifensulfuron methyl
Thiobencarb
Toxaphene
Tralkoxydim
Tralkoxydim acid
Triadimefon
Triadimenol
Triallate
Triasulfuron
Triazole acetic acid
Triazole alanine
Tribenuron methyl
Triclopyr
Triflusulfuron methyl
Trione
Triticonazole
cis-permethrin
p,p'-DDD
p,p'-DDE
p,p'-DDT
trans-permethrin
zeta-Cypermethrin

Analytical Services in Support of Montana Agriculture