

25-OH-D3: Recommended for diagnosis of Vitamin D3 poisoning either from diet or from Vitamin D3 rodenticide exposure. Not suitable for 1,25 dihydroxy congeners like Dovonex. Analytical method is RIA.

Anions: Recommended for diagnosis of excess nitrate/nitrite, sulphate, chloride, and phosphate in feed and water. Analytical method is HPLC/UV.

Anticoagulants: For diagnosis of anticoagulant rodenticide poisoning. This test is only suitable for diagnosis of warfarin and second generation related rodenticides. Analytical methods are HPLC and LC/MS.

Anticoagulants plus Dicoumarol: This is a natural anticoagulant found in moldy feeds such as sweet clover. It is recommended to request this test for animals that could be exposed to this naturally occurring chemical. Analytical methods are TLC and LC/MS/MS.

Arsenic: Recommended for determination of ultra low levels of arsenic in water. Analytical method is ICP/MS.

Avitrol: This is an avicides pesticide. Ask for this test for diagnosis of pesticides that specifically target birds. Besides Avitrol, we also analyze for Starlicide on same panel only if requested. Analytical method is GC/MS.

Biopsy minerals: This is the right test for liver biopsies for diagnosis of copper and/or iron toxicosis.

Bromides: For therapeutic drug monitoring in treatment of epilepsy, for diagnosis of bromide toxicosis, or on medication to determine concentration.

Cholinesterase: For diagnosis of acetyl cholinesterase-inhibiting compounds such as organophosphorous and carbamate pesticides, some blue-green algae intoxications. Analytical method is Colorimetric UV-VIS Spectrophotometry.

Convulsants: For diagnosis of strychnine, tremorgenic mycotoxins (roquefortine, penitrem A) and bromethalin as a panel. Analytical method is TLC.

Convulsants, Extended: Only recommended in cases of limited amounts of samples as an **add-on** to the regular convulsant test above. It is a limited GC/MS test using the extract for convulsant test that came out negative. If enough sample is available we recommend asking for a full GC/MS Toxicant screen (see below). Analytical method is TLC.

Cyanide: For diagnosis of cyanide poisoning. Other suitable samples are liver, muscle, plants, bait and/or source materials. Analytical method is Colorimetric UV-VIS Spectrophotometry.

Ethylene glycol: This test can be done on bait, stomach contents, plasma, liver and urine samples. Analytical method is GC-FID.

Fat, bone marrow: Recommended for diagnosis of malnutrition/starvation. Analytical method is gravimetric.

GC/MS toxicant screen (TOXL): This is a very versatile technique used for diagnosis of poisoning from a wide variety of poisons including different classes of organic pesticides, herbicides, fungicides, pharmaceutical drugs and a wide range of industrial products. A list of commonly identified compounds using this technique is shown in the following table ([on the web](#)).

Glomerular Filtration Rate (GFR) by Iohexol clearance: This is a kidney function test by iohexol clearance. A computerized model is utilized to calculate glomerular filtration rate in cats, and dogs. This is **different from Iohexol by HPLC test** where raw data is provided to the client without calculating the GFR. Analytical method is HPLC. **Glomerular filtration rate information:**

- Can be performed canine or feline serum
- Patients should be well hydrated and food withheld for 12 hours prior to study
- **To perform test:**
 - Accurately administer a single dose of iohexol at 300 mg iodine/kg (I. V.) and record the time to nearest min.
 - Draw 3-4 ml blood sample at 2 hr, 3 hr and 4 hr after administration (record exact time)

• Allow blood to clot and transfer each serum sample (1.2 ml or greater is needed) to a plastic vial labeled with the exact sampling time, owner's name, and animal ID.

• Ship chilled or frozen gel packs in an insulated container

Omnipaque (iohexol) is available through the MSU - VTH Pharmacy. For information regarding purchasing iohexol, Contact Joseph Jehl at 517/353-1299

Heavy metal panel: For diagnosis of heavy metal poisoning in live animals using blood. Regular panel has arsenic, cadmium, lead, mercury, selenium and thallium. In deceased animals, ask for minerals, tissue or for suspected source material ask for minerals, other (**see minerals below**). Analytical method is ICP/MS.

Heavy metal panel, expanded: same as above plus antimony, beryllium, chromium, nickel, and vanadium. Analytical method is ICP/MS.

Iohexol by HPLC: Some clients prefer raw data to calculated GFRs. For this test, only raw data of iohexol in serum in ppm is provided to the client. Call lab for collection requirements.

Ionophores: Initially a qualitative test is performed on the samples. Quantitation is then performed on positive samples to determine if the ionophores concentration is toxicologically significant. Panel has monensin, lasalocid A, narasin, and salinomycin. Analytical method LC/MS/MS.

Lead, blood: For diagnosis of lead poisoning in live animals, **if only lead is desired**. For diagnosis of lead poisoning in tissues ask for Minerals and check the tissue box (**see minerals below**). Also see Heavy metals panel above. Analytical method is ICP/MS.

Loss on drying: On feeds we can run this test to determine percent moisture loss on drying.

Mercury: Order this test if you ONLY want mercury alone. The heavy metal panel is the alternative test to consider. Analytical methods are Cold vapor AA or ICP/MS.

Methylxanthines: For diagnosis of chocolate and/or coffee poisoning. Determination of serum concentrations of theobromine, theophylline and/or caffeine is most useful. Analytical method is HPLC.

Minerals (Toxic elements in tissues, feeds, fluids): Any element on the periodic table can be toxic in cases of excessive exposure. Ask for this test if you want to determine whether feeds, water, soil, or any other sources, contain toxic amounts of trace minerals or heavy metals. It is also the test you want to run on tissues, urine, bile, and cerebral spinal fluid to confirm a diagnosis of heavy metal or trace mineral poisoning. This is the equivalent of a whole blood heavy metal test, but done on tissues or source materials. Analytical method is ICP/AES.

Mycotoxins: The mycotoxins panel available is a split panel. The regular panel consists of aflatoxins, zearalenone, and vomitoxin. The full panel has DAS and T-2. The price is the same. The feed matrix and history determine whether a regular or a full panel needs to be run. For an additional fee, samples that are positive on a qualitative test are subsequently quantified to determine whether the mycotoxin(s) is/are present in toxic amounts. Analytical methods are TLC, HPLC, GC-ECD, and GCMS.

Nitrates: Ask for this test to confirm a diagnosis of nitrate poisoning only. It is also the test of choice to determine if feeds have toxic amounts of nitrate. Analytical methods are Colorimetric Spot Test and HPLC.

Ochratoxins: Ochratoxins are nephrotoxic mycotoxins. They are contaminants in grain. Order this test if your patient has renal failure and you want to determine if the feed/food is contaminated by this mycotoxin. Analytical method is HPLC.

Pesticides, Chlorinated: This class of insecticides generally causes nervous system excitation, leading to convulsions. The panel consists of Alpha-BHC, Gamma-BHC, Heptachlor, Aldrin, Beta-BHC, Delta-BHC, Heptachlor epoxide, Endosulfan I, Gamma-chlordane, Alpha-chlordane, 4,4'-DDE, Dieldrin, 4,4'-DDT, Endrin, and Endosulfan sulfate. Fat is the tissue sample of choice. Brain is the second best sample, after fat, in deceased animals. Serum is the sample of choice in live animals. The test can also be done on source materials. Analytical method is GC-ECD.

pH: This is a quick test for diagnosis of urea poisoning in ruminants. Analytical method is pH meter.

Phosphine: This is the test for aluminum, magnesium and zinc phosphide. These rodenticides cause convulsions and pulmonary edema. Analytical method is GC/MS.

Plant identification: This is the test, for identification of any naturally occurring poisonous plants or mushrooms. It is recommended that good quality digital pictures of the specimens be taken and sent to Rumbeiha@msu.edu. Take special care to collect all representative parts of the specimen and ship them overnight in waxed or regular paper bags. Do NOT use plastic bags because they cause rapid deterioration of the specimens. Analytical method is by visual and microscopic observations.

Polychlorinated biphenyls (PCBs): Fat is the sample of choice, followed by brain in deceased animals. Serum is the sample of choice in live animals. Test can also be done on source materials such as feeds. Analytical method is GC-ECD.

Single element analysis: The lab has now the capability to analyze serum for presence of **individual elements** to determine a diagnosis of INTOXICATION. You get results on a single element rather than a panel with a toxicology interpretation. Analytical methods are ICP/AES and ICP/MS.

Strychnine: This is a rodenticide which causes CNS excitation. Urine is the sample of choice in live animals. Stomach contents are the sample of choice in deceased animals, but the liver is a suitable distant alternative sample. Bait is also acceptable. Analytical method is TLC.

Total dissolved solids: Ask for this to determine overall water pollution from salts. Analytical method is gravimetric.

Note: Please call the laboratory at 517-355-0281 if you have any questions or if you can not find a suitable test.

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