






Protecting Dogs from the Threat of Algal Toxins

-  ABRAXIS® Algal toxin test strip kits
-  AbraScan® test strip reader
-  Microcystins LR QC check samples

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Algal toxins and the risk to dogs and other domestic animals

Harmful algal blooms (HABs) result from an overgrowth of cyanobacteria (or blue-green algae) resulting in water that is green or blue-green in color with a foamy appearance that may resemble pea soup or spilled paint. There may also be floating cyanobacterial mats. Under the right conditions, the cyanobacteria produce toxins (a.k.a. algal toxins) that present a health risk to both people and animals.

Dogs are especially susceptible to algal toxins when they drink contaminated water, eat floating mats and groom themselves after swimming. As HAB occurrences increase, algal toxin related dog poisonings have also increased. Dog health risks depend on the toxin, dog size, concentration, volume consumed and exposure time. Untreated, cyanobacterial poisonings can often be fatal in dogs. See below for guidance from the CA DEP website.

Estimated Health Risk for a 40 lb Dog*		
	Liver Toxins	Nerve Toxins

Delayed health effects (exposure over 15% of lifetime)	20-40 ppb	2-100 ppb
Rapid health effects (appear within 24 h)	>100 ppb	>100 ppb

*Based on a 40 lb dog consuming ≤ 2 qt of lake water and ≤ 1 lb algal mat per day. Source: https://www.waterboards.ca.gov/water_issues/programs/peer_review/docs/calif_cyanotoxins/cyanotoxins053112.pdf.

Common Symptoms:

Liver toxins (e.g. Microcystins)

- Diarrhea/bloody stool
- Vomiting
- Loss of appetite

Nerve toxins (e.g. Anatoxin-a)

- Seizures/convulsions
- Excessive drooling
- Disorientation/stumbling
- Paralysis

NOTE: Do not allow your dog to swim or drink from a water body you suspect is toxic. If you think your dog was exposed to algal toxins, seek veterinary help immediately.

Testing for algal toxins

Our test strip kits are a great choice for non-scientists because they do not require prior lab experience or lab equipment and can often be run on-site for rapid, qualitative results.

Selecting your test kit: What toxins do you want to test for?

We offer separate test strip kits for Microcystins, Anatoxin-a, and Cylindrospermopsin. There is no single test kit for all toxins associated with blue-green algae (cyanobacteria). Microcystins is generally the most common algal toxin but this can vary. To minimize unnecessary testing as well as associated expense and time, you'll want to know what algal toxins are a concern for your water body. If you don't already know, here are some resources that can help:

- **Government** – Federal and local government such as EPA, USGS, State DEP, DOH, DEQ or Parks & Rec often have information about prevalent algal toxins in your area or the specific water body you're planning to test.
- **Labs offering microscopic algae identification or qPCR testing** – Microscopy and qPCR can determine toxins that **may** be present based on cyanobacteria or cyanobacterial genes in your sample. Although they can not tell you whether toxins are actually present, they can help to limit the number of toxins for which you need to test.

Why ABRAXIS® algal toxin test strip kits?

- **Answers in hours, not days** – Our test strips provide answers in <1 hour, so you can make informed decisions
- **ADDA specific** – Our microcystins test strips, like our ELISA plates, are specific to the highly conserved ADDA region of the microcystins molecule allowing detection of all 200+ toxic microcystins variants. No other kit offers ADDA specificity
- **Detect algal toxins, not cyanobacterial cells or genes** – our kits assess toxins that are present, not what might be
- **Widely adopted, proven technology** – Our kits have been used worldwide for over a decade to assess HAB threats

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The importance of sampling: Is your sample representative?

Analytical tests provide information based on the sample submitted. If a sample is not representative of what you want to test, results can be misleading. Consider the following when collecting samples and determine what sample plan best addresses the exposure risk you are most concerned about:

- **Location and activity risk:** Different activities have different risks. Waters closer to shore and beach areas might pose a greater risk for animal exposure.
- **Time of day and water depth:** Cyanobacteria migrate within the water column – near the surface in daytime for heat and light and near the bottom in the evening for nutrients. When are animals most likely to be in the water?
- **Number of samples and frequency:** The more areas you can test at the highest frequency, the more likely you are to identify a potential health risk, but the risk must be weighed against budget and time available for testing.

When should you consider sending your sample to a lab?

While our kits often save both money and time, they have a shelf life of ~6-9 months and are only sold in packs of 5 or 20 tests. If you only plan to test a sample or two per season, it may be more economical to send sample(s) to a lab for ELISA analysis instead.

Algal toxin test strip kits

Perfect for quick algal toxin assessment

ABRAXIS® lateral flow test strip kits are simple. They don't require trained laboratory personnel or expensive equipment and they provide fast results (<1 h). This makes them ideal for screening and remote algal toxin monitoring. Test strips can be read visually for qualitative results or you can couple them with our hand-held AbraScan® test strip reader for semi-quantitative test results. Cost per test is ~\$25-\$45 depending on the pack size.

*The upper range of detection can be extended by further sample dilution prior to analysis. Application for additional sample matrices are also available. Contact support.abraxis@us.goldstandarddiagnostics.com for assistance.



NOTE: Kits include materials and reagents for sample analysis. Additional materials may be required for sample prep and collection. Consult user's guide.

Toxin	Kit range	LOD	5-test kit	20-test kit
Anatoxin-a	0 – 2.5 ppb*	0.4 ppb	520042	520043
Cylindrospermopsin	0 – 10.0 ppb*	0.5 ppb	520029	520030
Microcystins Finished Drinking Water	0 – 5.0 ppb*	1.0 ppb	520016	520017
Microcystins Finished Drinking Water 0.3	0 – 3.0 ppb*	0.3 ppb	N/A	520046
Microcystins Source Drinking Water	0 – 5.0 ppb*	1.0 ppb	520019	520020
Microcystins Recreational Water	0 – 10.0 ppb*	2.5 ppb	520023	520022

Deciding between Microcystins kit options: What is your sample?



Raw freshwater source or recreational water: For raw, untreated water samples, cyanobacterial cells need to be lysed prior to testing to obtain a total toxin concentration (both intracellular and extracellular toxins). Our Microcystins source and recreational water kits include our proprietary QuikLyse® reagent. The two kits offer slightly different test ranges.



Brackish water: QuikLyse® reagent is not compatible with brackish or seawater so we recommend use our Microcystins finished drinking water kits, which do not contain QuikLyse, with brackish samples. Samples should be lysed by completely freezing and thawing three times prior to analysis to assess the total toxin concentration.

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AbraScan® test strip reader

Removes subjectivity, provides traceability

The hand-held AbraScan Test Strip Reader is compatible with ABRAXIS® lateral flow test strips. The easy-to-use reader offers a great option to visual interpretation as it eliminates the need for subjective visual comparison of control and test line intensities and maintains a digital photographic record of all test strip results.

- Pre-programmed for ABRAXIS® Algal toxin test strip kits
- Objectively analyzes a test strip in 5-10 seconds
- Rugged, requires minimal maintenance
- Intuitive user interface and color touchscreen display



Part #	Description
475025B	AbraScan® Dipstick Reader III, handheld reader with supplemental software

ABRAXIS® Microcystins-LR QC check samples

The ABRAXIS Microcystin-LR Check Sample Set can be used with all ABRAXIS® Microcystins Test Strip Kits to conveniently check the accuracy of your test performance. It contains 3 vials of premeasured and lyophilized Microcystin-LR. (0, 2 and 20 ppb). Follow directions to reconstitute with 5 mL deionized or distilled water before using as your sample in the test kit.



Part #	Description
422011	ABRAXIS® Microcystins LR Check Samples, set of 3 (0,2 and 20 ppb)

Other considerations

What if I get a positive result?

Dogs should not be allowed to swim or drink water that you suspect is toxic or that tests positive for algal toxins. If you suspect your dog was exposed to algal toxins, seek veterinary help immediately. Regardless of the test method, it is always good practice to confirm positive test results by an alternative technology. While awaiting the outcome of confirmatory test results, signs or other communications should be considered to reduce the risk of additional human and animal exposure to the potential toxin threat.



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