Citizen Science Fact Sheet W-7

Triazines (Atrazine)

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Purpose

The final test in the kit is for a class of pesticides called triazines. This is an immunoassay technique to indicate if the level in the water is above or below the EPA safe drinking water standard of 3 parts per billion (ppb). This is the same standard used for surface water in Kansas. The triazines, including atrazine and simazine, are herbicides used on crops like corn and sorghum. Atrazine is a particular concern because it has been found above 3 ppb in several Kansas lakes, streams and rivers, especially during spring high run-off times. Atrazine has been implicated as an estrogen mimic in the environment. This means that even very low levels in water can affect the endocrine (reproductive and hormonal) systems of certain wildlife. Negative consequences include lower reproduction rates.

Tools

WaterSafe™ Test for Pesticides in Drinking water

The WaterSafe™ test is designed to detect the triazines atrazine and simazine at or above the U.S. EPA maximum contaminant level (MCL) for drinking water, which is 3 ppb for atrazine, and 4 ppb for simazine. The test uses a patented immunoassay technology and requires no filtration, extraction, and may be accurately performed on water with pH range 5-9. Applications include public water systems, private wells, and field (streams, ponds and runoff) testing.

Procedure

1. Remove the kit from the foil pouch. Keep all components clean, and place on a clean level surface. It is also a good idea to place a clean piece of paper of paper towel on the surface. You will find a small plastic test tube, small pipette (or dropper), and a test strip. There may also be a packet of desiccant that you may discard.
2. Label the test strip with the date and sample identification name or number (optional if just running one sample).
3. Using the dropper, place the water sample into the test vial. To pick up the sample, tightly squeeze the bulb at the end of the dropper and place the open end into the water sample. Release the bulb to pick up sample. Squeeze again to expel the sample into the vial. Use only one dropper full of water.
4. With the arrows pointing down, insert the test strip and leave undisturbed. Note the time or start a timer.
5. Wait 10 minutes. Do not disturb the test during this time. As the test begins to work, two blue lines will appear in the result window. Read the result exactly 10 minutes after adding the test strip. Results may change after 10 minutes.
6. Read and record the result. Results are determined by comparing the darkness of the two blue lines in the results window.

   Negative result – If line 1 is darker than line 2, the sample is negative (below 3 ppb).

   Positive result – If line 2 is darker than line 1, or if the lines are equally dark, the sample is positive (above 3 ppb). When line 1 appears to be darker than line 2, even by a very small amount, the sample is negative. A small difference in darkness does not indicate a “borderline” result. If you are not sure whether line 1 is darker than line 2, you should consider the sample positive. If no lines appear, or only one line appears, the result is not valid.

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Interpretation

Three ppb is the numeric criteria for drinking water and also has been suggested as the maximum average level allowable in rivers and streams for Kansas. However, KDHE guidelines suggest that 1 ppb is a numeric criteria for chronic effects on aquatic life, and several studies in the scientific literature show that atrazine, along with several other compounds in the environment, can have long-term effects on both aquatic and non-aquatic life in very small amounts as an estrogen mimic. These studies are controversial, however, and for test purposes only values at or above 3 ppb limit are detectable.

Summary

If triazines are detected, the next thing to determine is if this is a one-time occurrence, or if they are regularly detected in the water source you are sampling. To do this, sample again in a month or during each season of the year. Triazine herbicides are applied in the spring, usually in April and May. The highest concentrations are often found in May and June and may coincide with heavy rains and runoff. Water standards sometimes average out yearly samples, so if one sample is high in the spring and samples collected in late summer, fall, and winter are low, the stream or river may technically still be in compliance. This is because the aquatic organisms that may be harmed by the atrazine are only exposed to it for a limited part of the year. Because test kits only determine presence and absence, we aren't able to perform that averaging.

If you are a landowner or farmer using triazine herbicides on your crops and would like to limit the runoff from your fields, use best management practices. Rather than a surface application, consider incorporating the herbicide or leaving a buffer strip without herbicide (or with an alternative herbicide) close to waterways and riparian buffer strips. Weeds also can be effectively controlled through a combination of crop rotation or rotary hoeing followed by one or two passes with a cultivator. Cover crops during the non-growing season also can compete with many weeds and reduce the number of weeds going to seed. Many European countries have banned atrazine altogether.

Where to order

Silver Lake
P.O. Box 686
Monrovia, CA 91017
1-888-438-1942
www.silverlakeresearch.com
Cost when purchasing an individual kit is close to $10, but the cost goes down to around $5 per test when purchasing 50 or more. This may vary and should be negotiated with the sales representative at the time of purchase. There are several "Water-Safe" test kits now available, and some include a lead + atrazine combination, which may be appropriate if you are testing your household water and are concerned about old pipes, brass fixtures and pump impellers or other sources of lead.

Triazine Rating			
4 – Best	3 – Good	2 – Fair	1 – Poor
No detectable triazines.			Detectable triazines (more than 3 ppb).

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