

Hydrogen Sulfide and Sulfur Bacteria

Hydrogen sulfide gas can give water a “rotten egg” taste or odor. This gas can occur in wells anywhere and be:

- Naturally occurring—a result of decay and chemical reactions with soil and rocks.
- Produced by certain “sulfur bacteria” in the groundwater, well, or plumbing system.
- Produced by sulfur bacteria or chemical reactions inside of water heaters.
- From pollution (this is rare).

How to Detect

- **Bacterial slime** may be white, grey, black, or reddish brown if associated with iron bacteria (signs of sulfur bacteria).
- **Black stains** on silverware and plumbing fixtures (signs of hydrogen sulfide gas).
- **Corrosion** on pipes and metal components of the water distribution system (signs of hydrogen sulfide gas).
- **Have your water tested** at a laboratory.

May Help Other Bacteria Grow

Sulfur bacteria produce a slime and can help other bacteria grow, such as iron bacteria. The slime can clog wells, plumbing, and irrigation systems.

Gas May be Harmful

While sulfur bacteria are not harmful, hydrogen sulfide gas in the air can be harmful at high levels. It is important to remove the gas from the water, or vent the gas to the atmosphere. Venting prevents the gas from collecting in low-lying spaces (such as well pits and basements) or enclosed spaces (such as well houses). Only well professionals should enter a well pit or other enclosed space where hydrogen sulfide gas may be present.

Consider Testing Your Water

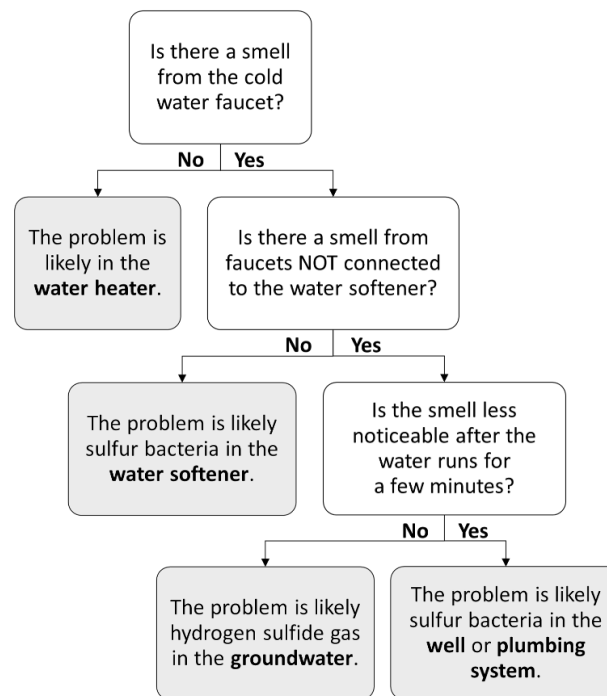
In most cases, the rotten egg smell does not relate to the sanitary quality of the water. In rare instances, the gas may be from sewage or other pollution. To be safe, test your well water for coliform bacteria and nitrate.

What You Can Do

The first step is to find out what the source of the issue is; that will let you know what treatment option is best.

How to Find the Source

After you have been away from your home for a few hours, smell the water coming out of the hot and cold water faucets. Determine which faucets have the “rotten egg” odor.



If the Problem is in the Water Heater

Unless you are very familiar with water heater operation and maintenance, have a plumber or water system professional to do the work.

- **Replace or remove the magnesium anode.** Many water heaters have a magnesium anode, which is attached to a plug located on top of the water heater. It can be removed by turning off the water, releasing the pressure from the water heater, and unscrewing the plug. Be sure to plug the hole. Removal of the anode, however, may significantly decrease the life of the water heater. You may wish to consult with a water heater dealer to determine if a replacement anode made of a different material, such as aluminum, can be installed. A replacement anode may provide corrosion protection without contributing to the production of hydrogen sulfide gas.
- **Disinfect and flush the water heater with a chlorine bleach solution.** Chlorination can kill sulfur bacteria. If all bacteria are not destroyed by chlorination, the problem may return within a few weeks.
- **Increase the water heater temperature to 160 degrees Fahrenheit (71 degrees Celsius) for several hours.** This will destroy the sulfur bacteria. Flushing to remove the dead bacteria after treatment should control the odor problem.

CAUTION: Increasing the water heater temperature can be dangerous. Consult with the manufacturer or dealer regarding an operable pressure relief valve, and for other recommendations. Be sure to lower the thermostat setting and make certain the water temperature is reduced following treatment to prevent injury from scalding hot water and to avoid high energy costs.

If the Problem is in the Well, Plumbing System, or Water Softener

Disinfect the well and plumbing system with a strong chlorine solution. You can hire a licensed well contractor to do this or refer to the "Well Disinfection" webpage for instructions.

Sulfur bacteria can be difficult to remove once established in a well. Prework (such as scrubbing the well casing, using special treatment chemicals, and agitating the water before disinfection) may be necessary—especially if there are also iron bacteria. Contact a licensed well contractor to do this prework.

If the bacteria are in the water softener or other treatment devices, contact the installer, manufacturer, or Minnesota Department of Health for disinfection instructions.

If the Problem is in Groundwater

Installing home water treatment or drilling a new well in a different formation are both options. Below are types of home water treatment effective at removing hydrogen sulfide gas. Learn more at the "Home Water Treatment" webpage.

- **Activated carbon filters** are effective for hydrogen sulfide levels less than 1 milligram per liter (mg/L).
- The following are options are effective for levels both below and above 1 mg/L.
 - **Oxidizing media filtration** (such as a manganese greensand filter). This type of treatment is often used to treat iron problems in water.
 - **Aeration and filtration.**
 - **Continuous chlorination and filtration.**
 - **Ozonation and filtration.**

Resources

Home Water Treatment

(www.health.state.mn.us/communities/environment/water/factsheet/hometreatment.html).

Licensed Well and Boring Contractor Directory

(www.health.state.mn.us/lwcsearch).

Search for Accredited Laboratories

(www.health.state.mn.us/labsearch).

Water Quality, Well Testing, Well Disinfection

(www.health.state.mn.us/wellwater).

Well Disinfection

(www.health.state.mn.us/communities/environment/water/wells/waterquality/disinfection.html).

MDH District Offices

625 North Robert Street
P.O. Box 64975
St. Paul, Minnesota 55164-0975
651-201-4600 or 800-383-9808
health.wells@state.mn.us
www.health.state.mn.us/wells

705 Fifth Street Northwest
Bemidji, Minnesota 56601
218-308-2100

11 East Superior Street
Duluth, Minnesota 55802
218-302-6166

1505 Pebble Lake Road
Fergus Falls, Minnesota 56537
218-332-5150

3333 West Division Street
St. Cloud, Minnesota 56301
320-223-7300

1400 East Lyon Street
Marshall, Minnesota 56258
507-476-4220

18 Wood Lake Drive Southeast
Rochester, Minnesota 55904
507-206-2700

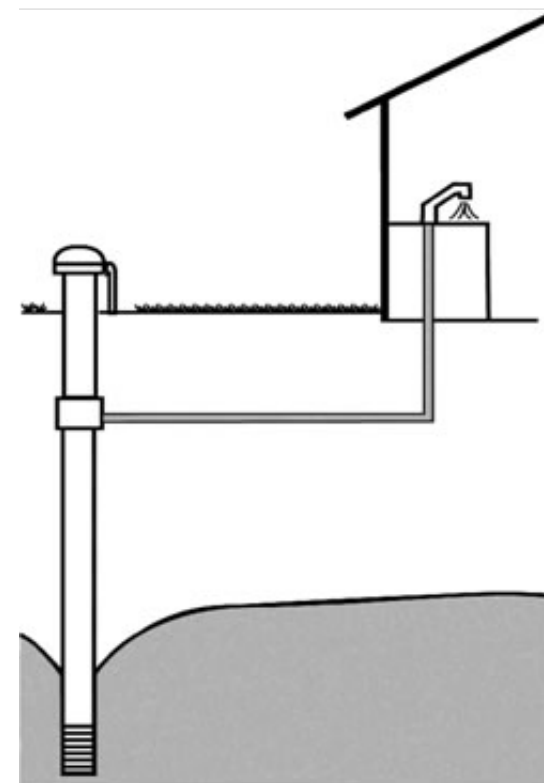
To obtain this information in a different format, call 651-201-4600.

Printed on recycled paper.

origs\Hydrosulfide Sulfur Bacteria in Well Water 08/02/2019R

Why does my water smell like rotten eggs?

Hydrogen Sulfide and Sulfur Bacteria in Well Water



mn DEPARTMENT OF HEALTH

Well Management Section
Environmental Health Division