

Keeping Iron Bacteria out of Your Well

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Are you one of almost 45 million Americans who get their water from a private well?¹ If so, you undoubtedly want clean, safe, and *clear* water. But if unpleasant tastes or smells are coming out of your faucets, and your sinks, tubs, and toilets are stained reddish-brown, your well and water system might be contaminated with [iron bacteria](#). This fall, one of us (RM) noticed a brownish foam in his toilet tank and a distinct iron taste to the drinking water, despite having an on-site water softener...

Iron Bacteria and Well Water

Iron bacteria are microorganisms that use iron (or manganese) as an energy source. Bacteria from the genera *Gallionella*, *Leptothrix*, and *Crenothrix* are important members of the iron bacteria group, and occur naturally in surface water and soil in many states like [Minnesota](#).

Whenever surface water or soil enters your well, these bacteria may be able to thrive in the plumbing of your home or business. Moreover, iron bacteria contamination can create a water quality environment suitable for disease-causing (pathogenic) bacteria, viruses, and other microbes. Although iron bacteria are not harmful, they can cause troublesome, persistent, and expensive well and related plumbing problems, including:

- Unpleasant taste and odors resembling fuel, sewage, or rotten vegetation
- Rusty, slime buildup in toilet tank, on filters, or the inside of the well casing
- Oily sheen on the water surface
- Reduced well production or efficiency of point-of-use treatment devices
- Premature or excessive corrosion of well and plumbing components²

The characteristic reddish-brown slime or [biofilm](#) (biofouling) associated with iron bacteria contamination is a metabolic byproduct from the oxidation of iron or manganese by the bacteria. If left unchecked, biofouling can clog pump intakes, well screens, filters, and water pipes. The sometimes dramatic effects of iron bacteria can also be seen outdoors with reddish-brown slimy masses covering stream bottoms and lakeshores and the water having an oily sheen.

Combating Iron Bacteria: Testing and Treatment

Because objectionable stains, tastes, or odors may be due to other causes—including sulfate, hydrogen sulfide, or other nuisance organisms like sulfur bacteria—proper identification of chemical substances and microorganisms in well water is the first step, and should be done by a state-certified laboratory.

¹ President's Council of Advisors on Science and Technology (2016). REPORT TO THE PRESIDENT: Science and Technology to Ensure the Safety of the Nation's Drinking Water.

https://obamawhitehouse.archives.gov/sites/default/files/pcast_drinking_water_final_executive_summary_final.pdf.

² Iron Bacteria in Wells. Michigan DEQ Fact Sheet. https://www.michigan.gov/documents/deq/odwma-eh-wcu-ironbacteriainwells_529560_7.pdf.



Iron bacteria-contaminated toilet tank
Photo credit: Thomas Scherer, North Dakota State University

Techniques to remove or reduce iron bacteria include physical removal, pasteurization (injecting steam or hot water into the well and maintaining a water temperature of 140°F/60°C for 30 minutes), and chemical treatment—most commonly [well disinfection](#) with chlorine, including [shock \(super\) chlorination](#). Such treatments have the added benefit of eliminating or reducing pathogenic microorganisms that may also be present in your drinking water.

Depending on the extent of contamination, treatments may be only partially/temporarily successful and need to be repeated. Addressing iron bacteria contamination is usually a job for a licensed well contractor or pump installer. Since iron bacteria tend to build up again a few months after treatment, well owners should strive to control rather than completely “cure” the problem. In *RM*’s home, an experienced water technician super chlorinated the well and the entire pumping and distribution system. It took a full 24 hours to do the job right, but resulted in the best well water *RM* has enjoyed in years. A repeat super chlorination is planned in another year or so as an extra precaution.

Preventing Iron Bacteria Contamination

Because iron bacteria are present in many U.S. soils, they can be introduced into a well during drilling, repair, or service, but the following “good housekeeping” practices can help prevent contamination:

- Water added to a well for drilling, repair, or service should be disinfected, and should never be taken from a lake or pond
- The well casing should be watertight, properly capped, and ideally extend a foot or more above ground (if you are in a flood zone, go higher than any anticipated flood)
- During repairs and servicing, pumps, well pipes, and equipment should never be placed directly on the ground
- The well, pump, and plumbing should be purged, super chlorinated, and pumped when installed or repaired³

As in any water distribution system, prevention is the key to safe, healthy, and great tasting water.

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³ Iron Bacteria in Well Water: Well Management Program. Minnesota Department of Health. <http://www.health.state.mn.us/divs/eh/wells/waterquality/ironbacteria.html#prev>.