

Iron Bacteria in Drinking Water

What are the effects of iron bacteria?

Common effects of excess iron in water are a reddish-brown color, stained laundry and poor tasting coffee. An equally common but less well understood problem is infestation of water supplies with iron bacteria. Iron bacteria are a natural part of the environment in most parts of the world. These microorganisms combine dissolved iron or manganese with oxygen and use it to form rust-colored deposits. In the process, the bacteria produce a brown slime that builds up on well screens, pipes, and plumbing fixtures.

Iron bacteria in wells do not cause health problems, but they can have the following unpleasant and possibly expensive effects:

- Cause odors
- Corrode plumbing equipment
- Reduce well yields (clog screens and pipes)
- Increase chances of sulfur bacteria infestation.

Detecting iron bacteria

There are certain indications that your well may have an iron bacteria problem. These are:

- Red, yellow, or orange color to the water
- Slime on the inner walls of the toilet tank
- A smell that may resemble fuel oil, cucumber, or sewage.
 - (This smell may be noticeable only in the morning or after other periods of non-use. If a disinfectant is used in the toilet tank, this sign of iron bacteria might not be apparent.)

If you have reason to suspect an iron bacteria problem, you may wish to try shock chlorinating the well, as described later, before having a water sample tested by a laboratory.

Preventing iron bacteria

Because it is difficult to get rid of iron bacteria once they exist in well systems, prevention is the best safeguard against accompanying problems.

For well drillers, prevention means disinfecting everything that goes into the ground with a strong chlorine solution. Iron bacteria are nourished by carbon and other organics, and it is essential that these are not introduced into any part of the well system during the

drilling process. Tools, pumps, pipe, gravel pack material, and even the water used in drilling should be disinfected. Use of a tank that circulates chlorinated water instead of digging a mud pit will help avoid contamination from soil. When the well is completed, it should be purged, shock chlorinated, and then pumped.

For owners of new wells in places where iron bacteria have been a problem, the best prevention is to be especially alert for signs of their occurrence. If the well driller and pump installer are scrupulous in keeping the new well "clean," iron bacteria even in such areas can be avoided.

For owners of wells with previous iron bacteria infestation, chlorination is the best way to prevent it from reoccurring. Owners can periodically clean wells by shock chlorination as described in the next section, except using a weaker solution 2 quarts of 5.25% chlorine bleach in 100 gallons of water.

Treating iron bacteria problems

Although there are both chemical and mechanical methods for treating iron bacteria problems, private well owners should expect to use the former until further study establishes the effectiveness of heat or other means to disinfect smaller wells. Since bacteria tend to build up again a few months after treatment, well owners should try to control rather than completely "cure" the problem.

Chemical treatment

For several reasons, routine chemical disinfectants that effectively wipe out other bacteria are only modestly successful against iron bacteria. Iron bacteria build up in thick layers forming a slime that keeps disinfectants from penetrating beyond the surface cells. In addition, miner iron dissolved in water can absorb much of the disinfectants before they reach the bacterial cells. Also, because chemical reactions are slowed at the cool temperatures common in wells, bacterial cells need a long exposure to the chemical for treatment to be effective. Even if chlorine kills all the bacterial cells in the water, those in the groundwater can be drawn in by pumping or drift back into the well.

Because of these factors, thoroughly treating an iron bacteria infestation requires more than simply dumping chlorine into the well. The following steps are recommended:

2. Prepare the chlorine solution.
 - Approximately 8 quarts of 5.25% (or 5 qts. of 10%) chlorine bleach such as Hylex, Chlorox, etc., should be mixed with 100 gals. of water. It is best to prepare an amount more than the amount of water standing in the well, and the 100-gal. measure is a safe estimate if this is not known.

Most garbage cans hold 30 gals. or more, so that filling three (clean, of course) cans with the solution is sufficient.

3. Pour or pump the solution into the well in one continuous flow. Attach a hose to a faucet and, making certain the hose itself is clean, place the other end of the hose into the well. Open the faucet and recirculate for one hour the now-chlorinated water, washing down the inside of the casing and the pump piping. Faucets in your house should be opened until you detect a chlorine smell, then close them.
4. Allow the chlorine solution to remain in the well and piping for at least 24 hours, preferably longer. The system should then be purged free of chlorine. Since it can disrupt a septic system, the chlorinated water should be run outdoors, perhaps into a ditch. It may also kill grass and shrubs, and should not be run into a lake or stream.
5. Well owners may need to repeat this process more than once. If indications of iron bacteria persist, a water sample should be analyzed by a laboratory. Collect the sample only when the system is completely free of the chlorine smell.
 - *For problem cases, a more complex process involving shock chlorination followed by introducing a strong acid and salt solution has proven effective. This process should be done only by a licensed well driller or pump installer.*