

Iron Bacteria

There is much misunderstanding about what is commonly called "iron bacteria" in well water.

Iron bacteria are bacteria that derive their energy from oxidizing iron commonly found in groundwater.

These bacteria present no threat to health, but they can cause severe staining and damage to fixtures and water treatment devices. They are also an aesthetic nuisance and often result in taste and odour issues.

The most common sign of iron bacteria in the water supply is a reddish-brown or yellowish gelatinous slime in water tanks, faucets, toilet tanks, and plumbing. These nuisance bacteria may cause corrosion to treatment equipment, clog screens and pipes, and have a foul odour.

It can also be difficult to get rid of.

The phenomenon commonly called "iron bacteria" actually includes a variety of conditions that exist in water wells. As the following description from Wellowner.org website implies, a better name for the condition might be "iron biofouling."

"Better described as iron biofouling, the problem popularly known as "iron bacteria" is both complex and widespread. Iron and other biofouling consists of biofilms which include living and dead bacteria, their sheaths, stalks, secretions and other leavings, and embedded metal hydroxide particles. 'Iron bacteria' is one type of biofouling among several, including the characteristic white sulfur slime of sulfur springs.

"Manganese and even aluminum biofouling is also found in ground water systems. These biofilms are natural and usually harmless. Natural iron biofouling often acts as a preliminary iron filter in wells and therefore can serve a positive function as well.

"Biofouling can be a nuisance, however. Generally, iron biofouling is the cause of iron build up in wells and pipes. Bacterial iron may build up quickly compared to mineral encrustation. In addition to causing problems in wells, the bacteria may colonize tanks and water treatment devices, as well as spring outfalls.

"Iron biofouling generally causes side effects such slight and intermittent sulfide odour, and breakthroughs of red water. It may also cause pitting-type corrosion of steel and iron.

"Features of water systems may aggravate certain symptoms. These

include inappropriate well, filter, or plumbing design or material choice; construction; poor choices in water treatment; and well use patterns.

"Bacteria, oxidized iron and manganese, sulfur, and other slimy products are slow killers of resin beds and many iron/manganese removal and filtration devices. Biofilms overwhelm and defeat carbon filters—even "bacteriostatic" types and bactericidal resins. They also attack or plug reverse osmosis membranes and cartridge filters.

"Aeration-type or redox-media, backwashable, iron filters tolerate biofouling pretty well and make good screening filters for most water systems, small or large. They have to be designed and maintained well, taking the biofouling in consideration including making sure the backwash is effective in removing most of the accumulated iron debris in the filter bed periodically.

"The best time, obviously, is as early as possible before real damage occurs and treatment methods are most effective. This is usually long before noticeable plugging, loss of efficiency, and other gross symptoms become noticeable. The key to catching a growth before it causes problems is preventive monitoring, starting when the well is new, or at any favorable point. This advice also applies to private water and monitoring wells."

Treatment: Although such radical treatments as well pasteurization can be used, by far the most common approach to iron bacteria control is chlorination. Although sometimes shock chlorination of the well can completely fix the problem, this is rare. **Usually, regular, repeated chlorine treatments or constant chlorination are the best solution.**

Table 1. Amount of chlorine required to obtain a chlorine concentration of 200 ppm 4,5

		Volume of water needed Water needed per 1 ft. (30cm) of water in the casing		5.25% domestic chlorine bleach1		
				litres	litres	litres
				12% industrial sodium hypochlorite		*70% high test
				needed per 1 ft. (30cm) of water		Dry weight2per
Casing diameter inches	millimetres	gallons	litres	litres	litres	grams
4	(100)	1.1	5	0.019	0.008	1.44
6	(150)	2.4	10.9	0.042	0.018	3.12
8	(200)	4.2	19.1	0.072	0.032	5.46
24	(600)3	extra 200 gal.	extra 1,000 L	0.34	0.148	25.4
36	(900)3	extra 200 gal.	extra 1,000 L			

