

# Household Biofilms

A collection of pictures of common household surfaces for biofilm growth. Images taken by students and staff of the Montana State University Center for Biofilm Engineering.

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You almost certainly share your living space with many biofilms. Biofilms form on virtually any surface that gets exposed to water (even if only periodically) and bacteria.



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### **Kitchen drainpipe**

Here's a biofilm that you can easily see when you detach the drainpipe from your kitchen or bathroom sink. The gunk that coats the sides of the pipe is alive with firmly attached microbial slime, as well as food and debris that gets stuck in it. If you have ever tried to scrape this slime out of the pipe, you know how sticky, and tenacious biofilms can become!



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**Sink strainer**

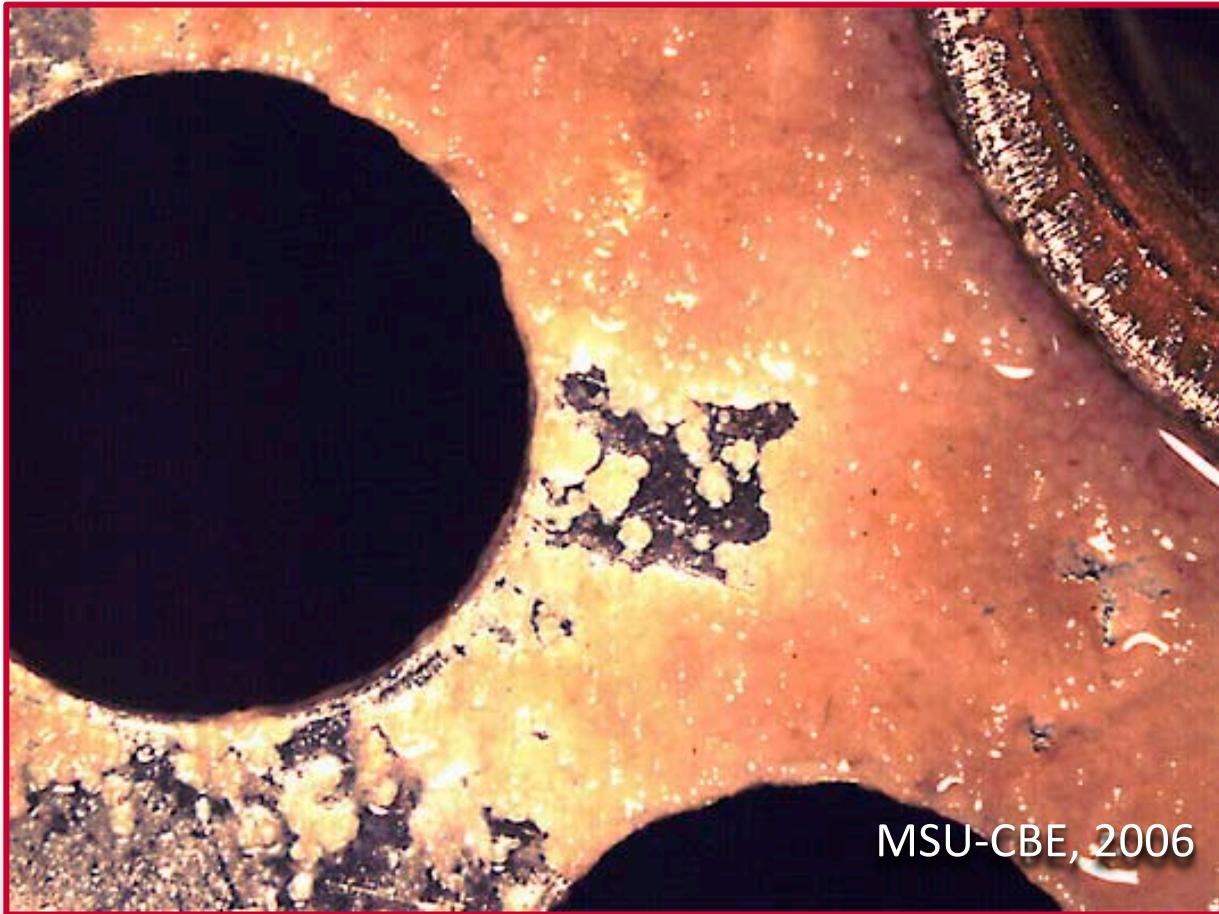
This kitchen sink strainer is obviously not brand new, but it doesn't look particularly dirty either. It's probably very much like the sink strainers in many homes.



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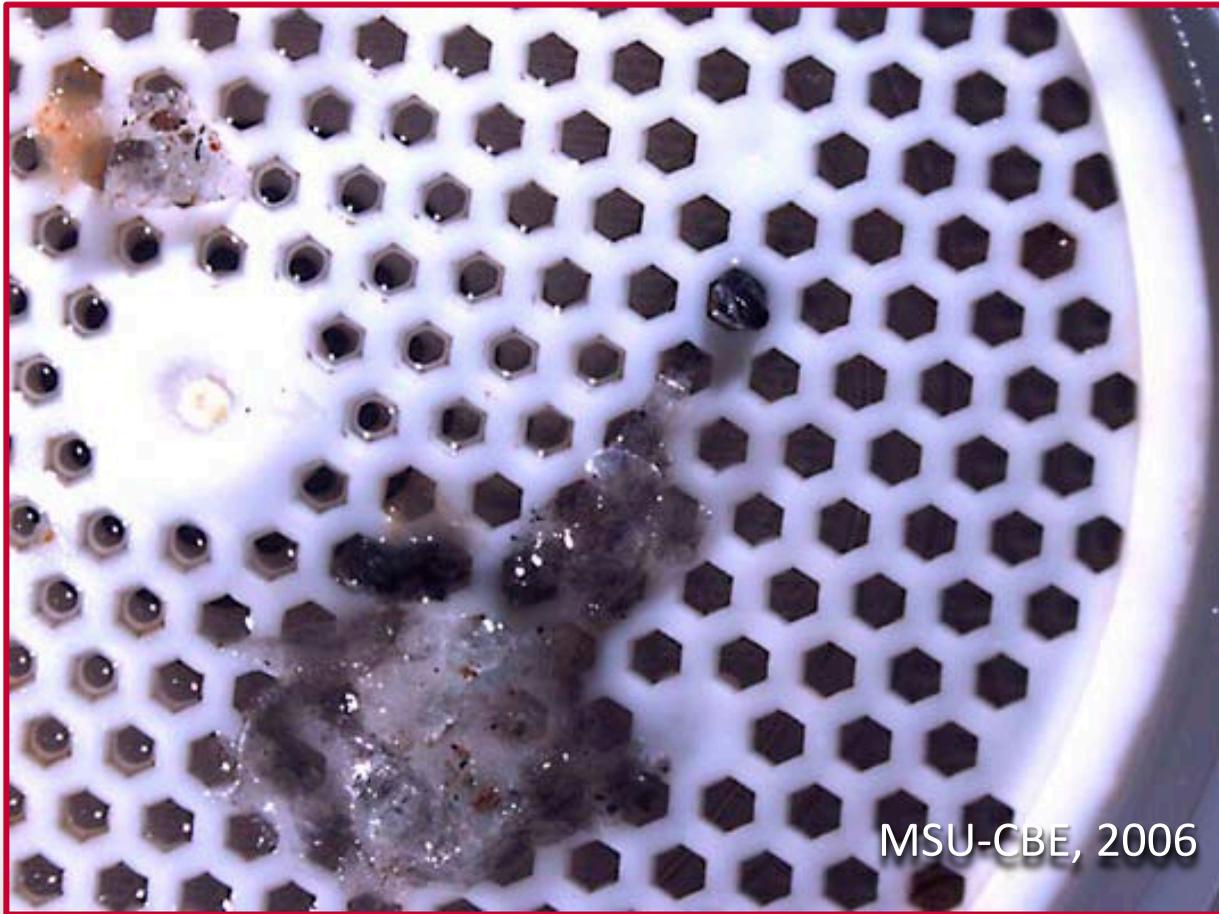
**Stereo microscope: Sink strainer**

With the help of a stereo microscope we can see that the under-surface of the strainer is not just stained; it actually has a substantial build-up on it.



**Stereo microscope: Sink strainer**

Using a stain and a little water shows how there is a layer of attached biomaterial. Bacteria can live very happily in this (to our eyes) thin coating of film.



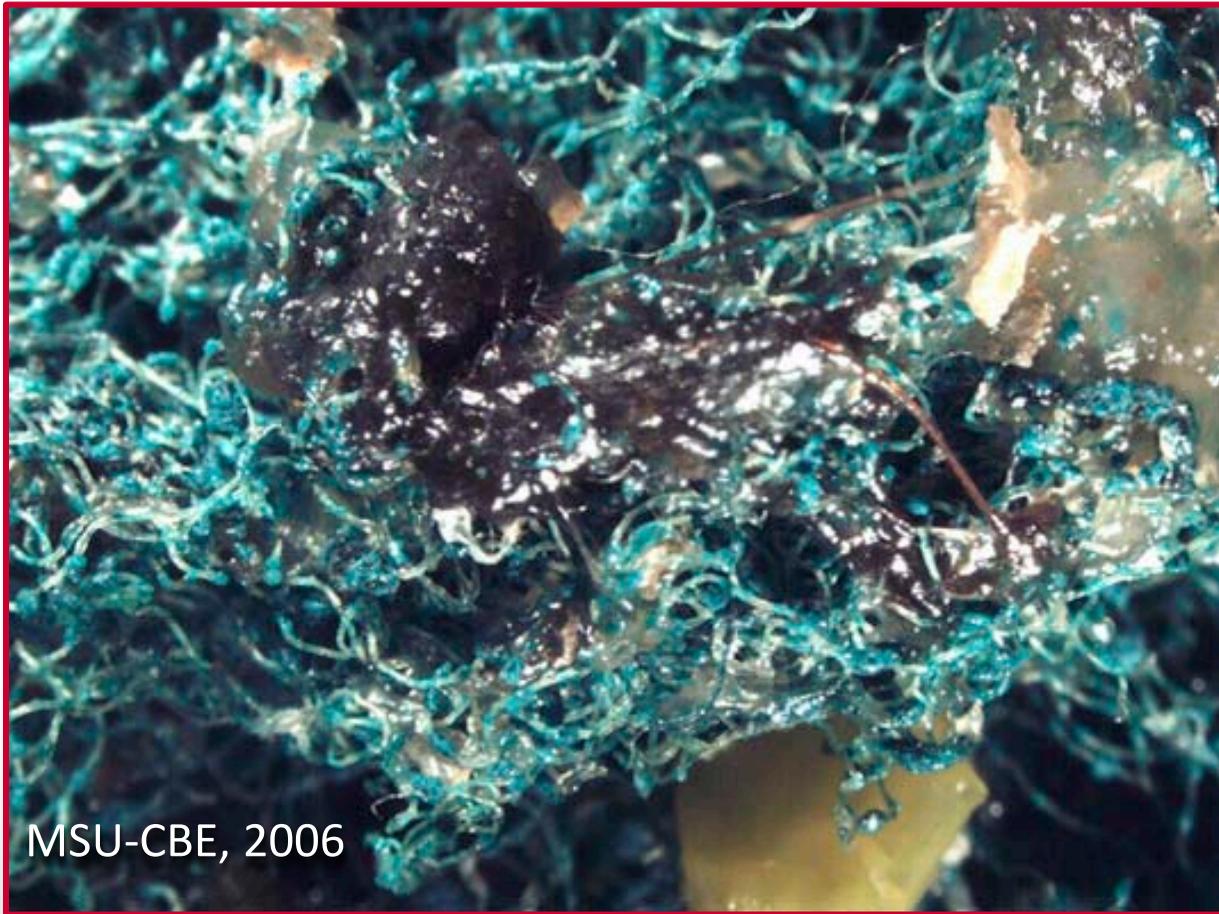
**Stereo microscope: Faucet cartridge**

When was the last time you look at the openings in your faucet cartridge?



**Kitchen sponge**

A kitchen sponge can quickly become colonized by microbes, given the combination of lots of surface area for microbial attachment, water, and plenty of organic material for a food source.



**Stereo microscope: Kitchen sponge**

The stereo microscope view of this sponge shows how material catches in the sponge and provides abundant nutrients for microbes.



**Pacifier**

On the way out of the kitchen we pick up a baby's pacifier. Again, a quick look at the pacifier seems to indicate that it is in pretty good shape.



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**Stereo microscope: Pacifier**

Under the stereo microscope we look at the junction between the mouthpiece and nipple. This area collects and retains moisture and bacteria from the baby's mouth, and the resulting biofilm is obviously thick and healthy. Tiny carpet fibers from a fall to the floor have also gotten stuck in the film.



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### **Toothbrush**

It's not just about what the baby puts in its mouth. The toothbrush you use is also exposed to bacteria, nutrients and water.



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**Stereo microscope: Toothbrush**

Any little crack or surface depression catches water, debris, and microbes better than a flat surface, so the neck attachment of this toothbrush is a good place for biofilms to grow.



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**Stereo microscope: Toothbrush bristles**

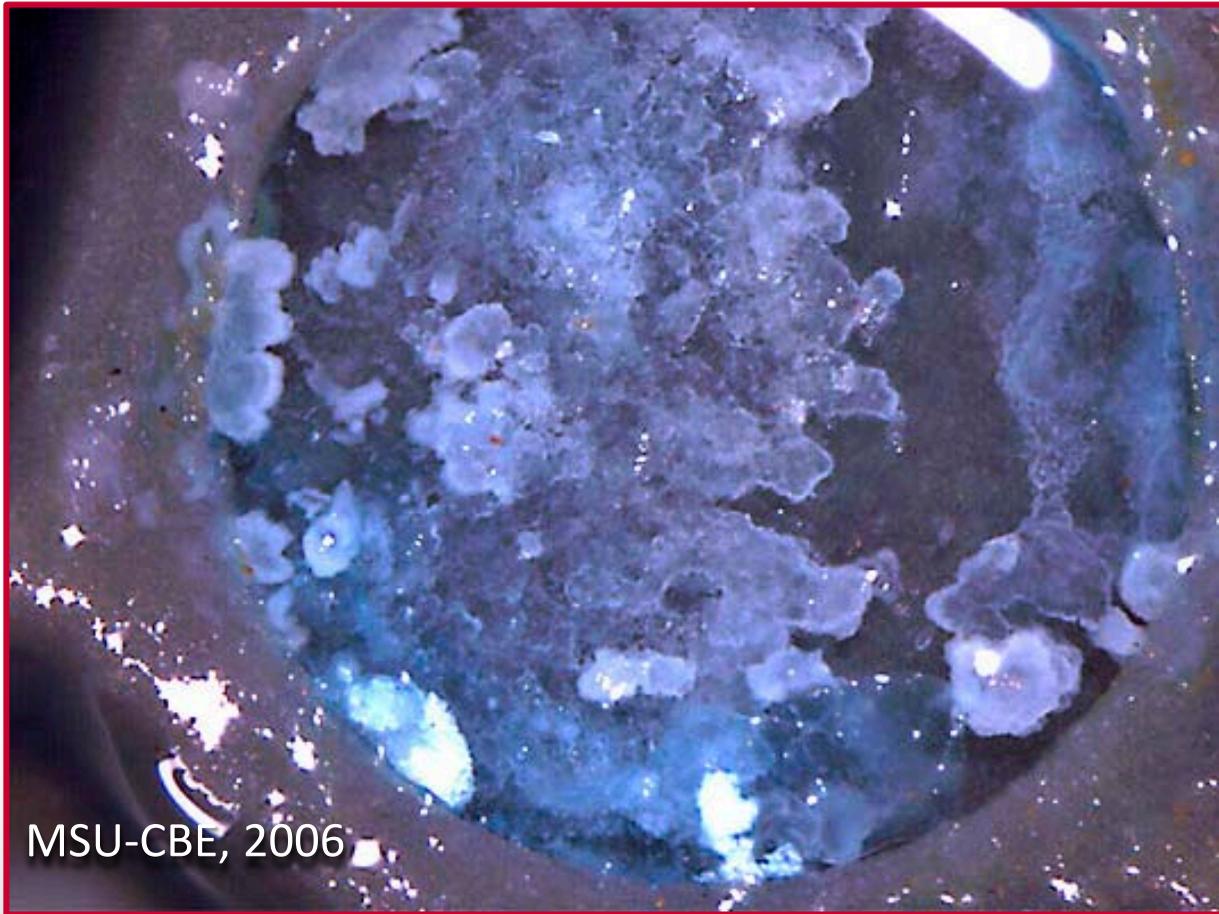
Biofilm can also grow on and around toothbrush bristles, whether you use a standard brush or a power toothbrush.



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**Showerhead**

Ever wonder what clogs up your showerhead?



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**Stereo microscope: Showerhead**

Mineral deposits can provide another surface for biofilms to form on— which can then collect more mineral deposits, and then more biofilm. . .



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**Stereo microscope: Shower curtain**

Biofilms on shower curtains have been documented by biofilm researchers. Stereo microscope examination of this clear vinyl shower curtain showed that it harbored a thriving biofilm population.



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### Toilet bowl

And, yes, biofilms form in other bathroom locations exposed to water. Volunteers consented to refrain from cleaning their toilet bowls for several weeks to allow sampling of mature biofilms. The four test strips in this bowl provide sixteen samples via removable circular 'coupons'. You can probably think of other places in your house where biofilm may thrive.