

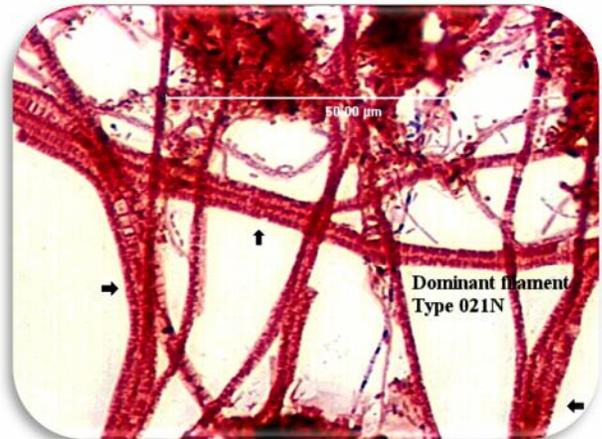
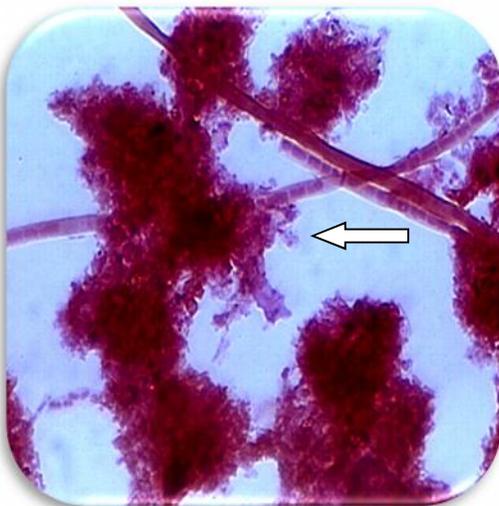
**I don't have filaments at my plant.... You might want to check your system again.**  
A common misnomer in many wastewater treatment plants is that unless they have filaments that are bridging and they can see them between the floc structures, they do not have filaments. In reality, internal bulking can cause more problems than slight bridging.

**Well what is the difference between bulking or bridging?**

**Bridging** is when the filaments are external to the normal floc structure and cause a bridge between the floc structures. These are examples of filaments that are external to the floc structures and are bridging the floc particles.

Most operators are well aware of bridging and this is usually what is thought of for filamentous problems. But you need to check again.

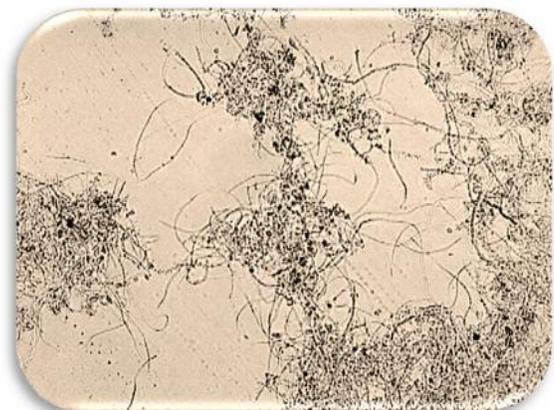
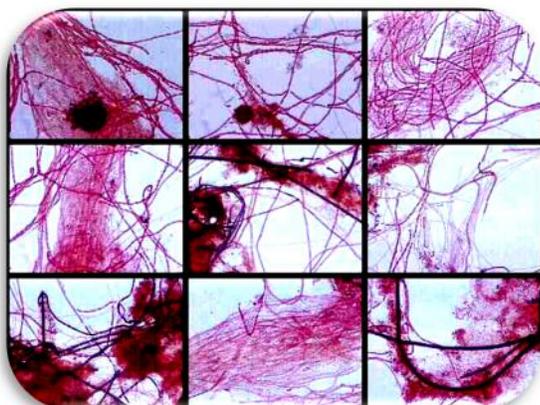
**Low levels vs. Abundant to Excessive levels**



Sometimes you need to go to a much higher level on the microscope objective.

**1000x Gram Stains**

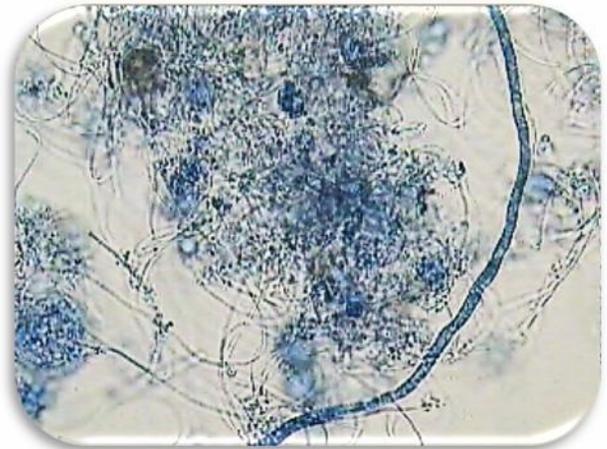
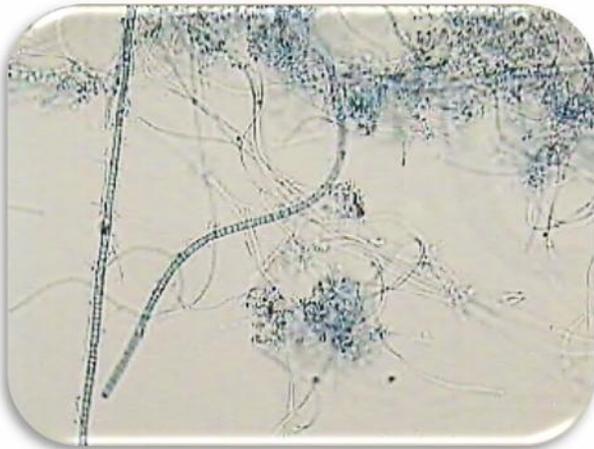
**400x Bright Field- bridging apparent**



Staining the sample helps, but some skill is required. A quick and easy way to help bring out some of the fine details on the sample without having to go to all the trouble of drying a slide and going through all the difficulties of staining is to use Lactophenol Cotton Blue stain. It can be purchased at VWR, USA Bluebook, Fisher, Scientific or any of your favorite supply chains. Use the stain along with one drop of wastewater on the slide. The stain will help bring out any fine details, internal filaments, and characteristics such as sheath, cell walls or shape and size.

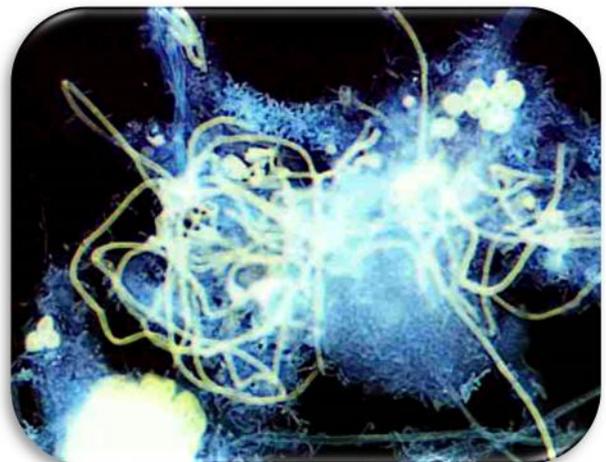
**\*\*\*Note-** if you use this stain, all the higher life forms will slow down and die. Do not worry, that is supposed to happen. Just keep it in mind if doing a wastewater biomass analyses and make sure to use a normal sample when checking higher life forms for count and identification. This stain will make it easier to spot higher life forms and to photograph them since it does slow them down.

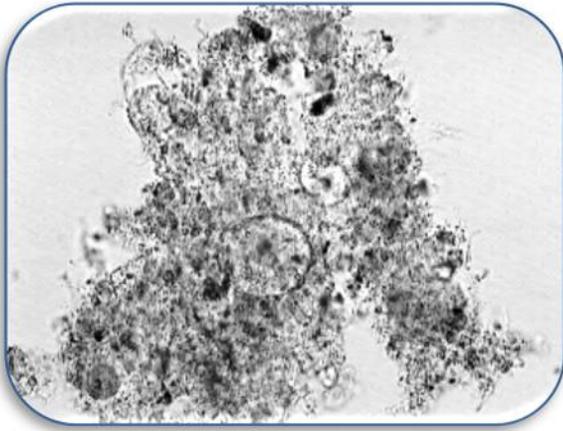
**Internal bulking** is when the filaments are inside the floc structure and make up a backbone for the floc. In a small amount, internal filaments are a great plus. They help keep the floc together, help avoid shear and give stability to the floc. In large amounts, they can create a floc that is more like a sponge. It is very hard to dewater and compress. It can take large amounts of polymer to get the floc to settle in the clarifier. Solids can build up. Carryover or washout can occur quite easily. Polymer consumption on a belt press can increase. Solids dewatering is



harder to achieve. Dryer cake solids are harder to achieve. With solids handling costs on the rise and a big part of a budget at any wastewater treatment plant, filaments can add a significant chunk to any budget.

Internal filaments are very common, often overlooked and ignored and yet many operators or supervisors of wastewater plants cannot figure out why they have too many solids, overloading or problems and high costs with solids handling.





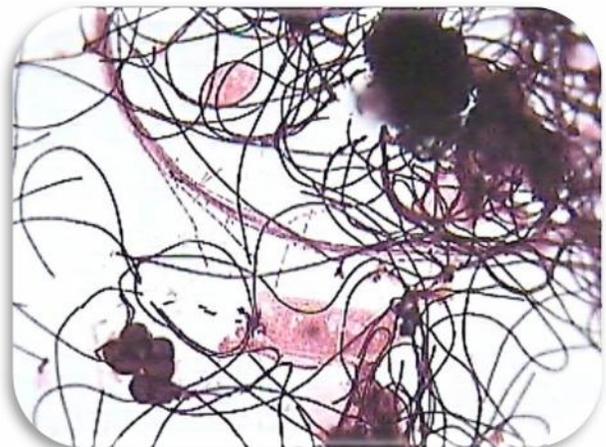
**Examples of floc with low levels, medium levels or excessive levels of filaments**

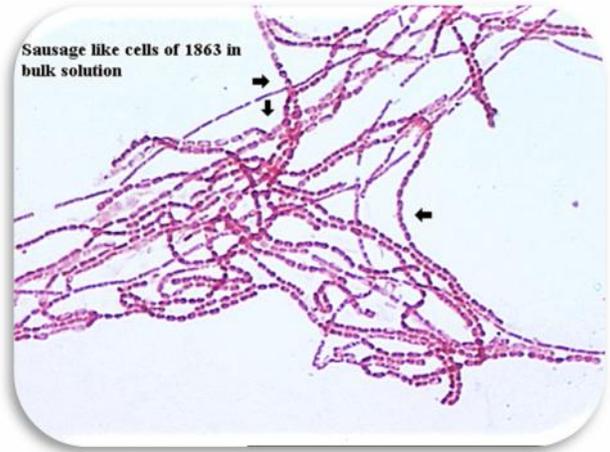
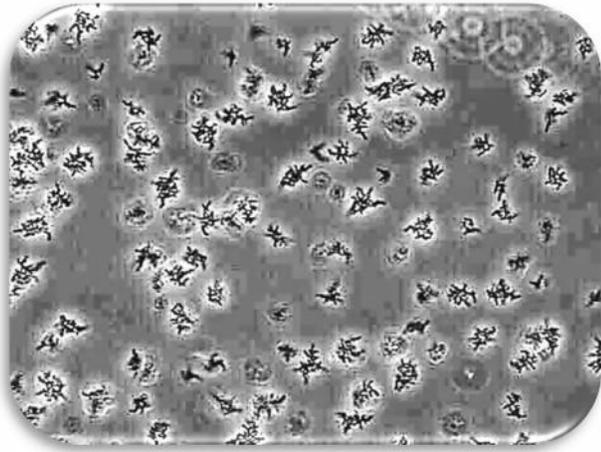
Look closer, use stains or call your local lab to help you with an identification or training.

*Environmental Leverage can help with the Filamentous ID training of your personal. We also carry Filamentous ID training CD's / Flash Drive - jammed packed with self taught training or you can send in a Biomass sample for a Microscopic Analysis with Filamentous Identification*

Call or contact us at [Elfenvironmental@aol.com](mailto:Elfenvironmental@aol.com) or call 630-906-9791.

When there are excessive levels of filaments, chlorination or peroxide will take forever to burn off these filaments. It is actually better to find out the cause, make a process change, slowly waste alongside chlorination and reseed with a commercial product if necessary. Otherwise, it could take 6 months to a year to make these filaments go away. A process change is always necessary, even if heavy chlorination is used. If the condition that caused the filaments to grow does not change, the filaments will always come back. They are good BOD degraders, they just cause too many solids, dewatering problems and bulking in the clarifier.





Wait; there also can be **Free floating filaments**. These can cause TSS problems. They can cause floating sludge and make it easier to violate a permit.

**Filaments can also cause foaming.** Foaming can be caused by Nocardia and Microthrix to a point that controlling the plant becomes very difficult. Contact Environmental Leverage about a Filamentous Identification.

