Q&A

12Q2: Could you show me an image of algae's presence in the sedimentation tank? How do they influence to water treatment process? (Questioner：Ms.T.T.M.T.)

A: There are two types of algae; attached algae and floating algae (plankton algae), in the sedimentation tank. In some cases, small animals live in the colony of attached algae. When the colony of attached algae grows largely, it detaches from wall or becomes a core of mud ball and causes filter clogging. Odor algae such as Anabaena emit odor substances into water. And these substances can go through the filter and get to the tap water. It gives people using this water an unpleasant feeling.

1. Attached algae

【Growing place】

When there is no pre-chlorination or few pre-chlorine, it is mainly attached algae that grow in sedimentation tank. They make some colonies on the wall or trail in the shape of string in the water. Therefore, people may mistake them as dirt such as scale.

【Influence to water supply】

This colony is not obstacle to water treatment process but one of nuisance creature. Once the colony, however, grows largely and detaches itself from the wall, it settles down on the surface of sand filter or becomes a core of mud-ball. They may make filter clogging. Small algae scattered by breakup of the colony can go through the filter and come into the treated water sometimes.

【Countermeasures】

You do not have to think of algae growing seriously. However, in case that attached algae grow too much, as a stopgap measure, you should lower the water level of sedimentation tank by about 30cm and spray water to attached algae by fire hose for scattering them. Of cause, when you try this measure, it is thought that the detached algae might cause filter dirty or clogging. Therefore, you have to discuss with operators about water volume and time for backwashing the filter.

2. Floating algae

2-1 Floating algae -1

【Growing place】

Horizontal-flow type sedimentation tank with enough surface space has plenty of detention time sometimes. In case high turbid substances consist of clay or laterite in raw water and settle down quickly at the beginning of sedimentation tank, surface of the latter half of sedimentation tank is filled by clear water. Algae live in the raw water but they cannot glow well, because sunlight is shield by high turbid substances. However, the algae glow quickly due to get a lot of sunlight in the clear water

of the rear of sedimentation tank.

【Influence to water supply】

If a lot of odor algae like Anabena glow in the water treatment plant, the biologist working in the water treatment plant must be reviled by staff. Because, floating odor algae in the settled water are killed instantly with intermediate chlorination and emit odor substances such as Geosmin into settled water.

【Countermeasures】

These odor substances cannot be captured by the filter. And these substances may come to taps, which makes users unpleasant feeling. If this problem happens, the best solution is usually granular activated carbon to remove them. However, there is no dosing space of activated carbon after filtration. We can do nothing about it. As drastic measures, there are several ways. One is to dose chlorine and activated carbon in the same time to the sedimentation tank. Others are to empty the sedimentation tank once and disinfect it by chlorine, or to shield the surface of sedimentation tank from sunlight. But all of them are not easy and make some difficulties.

2-2. Floating algae-2

【Glowing place】

Sometimes surface water in the sedimentation tank seems to be covered oil or dust. At times like this, when you put your hand into the water, green film sticks to your hand. They are green algae such as Coccomyxa and Tetraspora mostly. The size of cell is 5-15 μm. They are anti-chlorine and their multiplication speed is very high.

【Influence to Water Supply】

Most of these algae in the settled water
can go through the filter and cause increase of turbidity in the distribution water.

【Countermeasures】

When you find this problem, you should raise the water level of sedimentation tank to drain stagnant surface water in which algae are glowing. In other way, you should dose post-PAC around 0.5㎎/L in the settled water to make floc film in the surface of sand filter. The floc film can capture microscopic algae.

3. Additional information : Small animals

【Glowing place】

Attached algae make colony on the wall of sedimentation tank. The colony is a small world of living different kind of algae, bacteria and animals. I want to focus an animal here. It is Nematoda. They live in raw water. Some of them live in biological film of the algae colony and eat bacteria and remained organic matter. They glow and lay eggs there. When living density become high or reduce food, they escape from the colony. When colony detach from the wall, they also escape. After drifting in the water, they may go through the filter, and come to treated water

【Influence to water supply】

They can be killed by exposure to residual chlorine with time . But some anti-chlorine ones can survive

in the film on inside wall of pipe.

【Countermeasures】

I have never heard the report that these animals transmit infectious disease. But once you find existence of them, the condition inside of the pipe can also allow bacteria or organic matters to live. In the condition of water stagnation, chlorine consumption tends to become larger than usual. As above, sometimes bacteria and animals are living inside of pipes. We call them “Pipeline creature” generally. The mode of their life is not clear yet. If studies are carried out in many countries, we are able to have more knowledge of them, which will be useful for water quality management and maintenance of pipe network.

Reference: “Organisms of Water Supplies in Japan –Photographs and Descriptions-”, Japan Water Works Association, 2000

(Answerer: Mr. SASAKI Shinichi, Yokohama Waterworks Bureau, 2009)