In industrial cooling towers, biofilm growth can cause serious problems, both contributing to the deterioration of materials and, most important, increasing the risk of harmful microbiological contaminations (e.g. Legionella). For these reasons, large amounts of chemical substances (biocides) are used to limit microbiological growth in such systems.

The manager of this cooling tower planned to automatically dose chlorine continuously (24/7) in the water; later on, he decided to install an ALVIM probe in the plant, to check the effectiveness of the treatment.

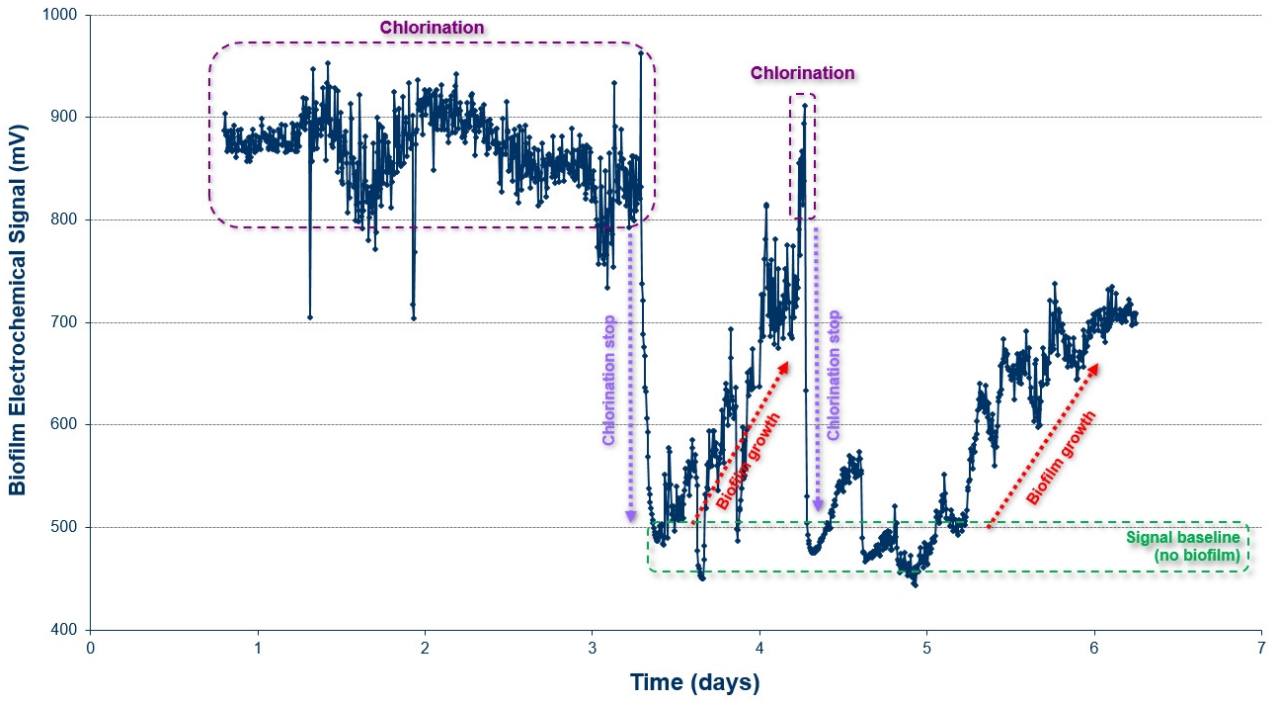

Figure 1: ALVIM signal during the installation in the water line of the cooling tower; purple dotted lines mark chlorinations, purple arrows indicate drops in chlorine concentration, red arrows mark biofilm growth.

Taking into account that ALVIM probe signalizes:

- the injection of oxidizing agents through a sharp and large increase of the signal, and
- biofilm growth through a relatively slow increase from about 500 mV (in this case; marked in figure as "Signal baseline") to about 1200 mV,

data plotted in the figure indicate that:

- the chlorination really applied in the tower was irregularly intermittent, and not continuous as planned by the plant manager (this conclusion was confirmed by ORP measurement, made by plant technical staff after ALVIM installation, see Fig.2 below);
- when chlorine concentration dropped for enough time, biofilm started to grow; this bacterial layer was disrupted later on by the following chlorination.

Looking at Fig.2, it can be easily noted that **ALVIM probe can detect both biofilm growth and changes in chlorine concentration**. On the contrary, an ORP sensor can detect only changes in the concentration of oxidizing agents, while it cannot monitor biofilm growth.

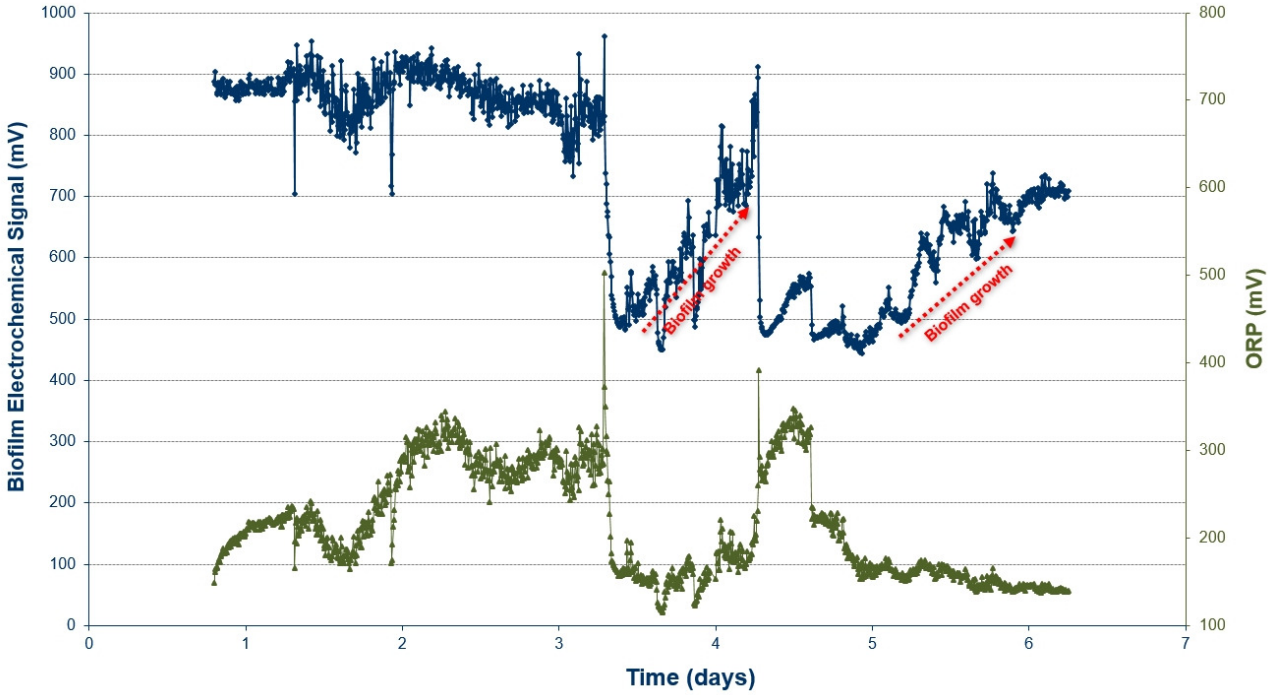

Figure 2: ALVIM signal (in blue) and ORP (in green) in the water line of the cooling tower.

Do you have a similar problem with biofilm? Contact our experts and ask for a free custom-tailored consultancy, you will receive further information about ALVIM products and services.

The ALVIM Biofilm Monitoring System is a reliable tool for the early detection of bacterial growth on surfaces, on-line and in real time, in industrial production lines, cooling water systems, etc.

The ALVIM Technology has been developed in collaboration with the Italian National Research Council, Institute of Marine Sciences, and it is currently used worldwide in many different application fields.

Contact: Dr. Giovanni Pavanello | Phone: +39 0108566345 | Email: giovanni.pavanello@alvim.it | Web: www.alvim.it