Questions & Answers

Maria Blanes, technical coordinator of the BIOMOMI Project, gives insights into the new technology developed and benefits for the industrial end-user.

BIOMOMI aims to validate and demonstrate a new technology which allows the real-time monitoring and optimization of microorganisms in the water of hydraulic systems. Could you briefly explain the idea and the concept behind the project?

One of the most important environmental challenges is the lack of control in cooling tower and air-conditioning systems when it comes to microbiological contamination. Users of these installations apply biocides, such as chlorine, in order to inhibit the growth of microorganisms, bio films and algae. For the time being, these systems are disinfected using inaccurate dosages. Too high amounts of chlorine can be harmful for the people working in the facilities and the environment. Very low quantities of chlorine in the water increase the risk of microbiological contamination.

Moreover, the equipment and systems lifetime is highly reduced because of the biocide excess, causing several environmental issues like extra energetic costs, inefficiency of the industrial processes, continual spare parts substitution or increase of the produced waste residues.

Within the BIOMOMI project, a team of experts developed a prototype, controlling automatically the dosage of biocides and chlorine as well as preventing the release of harmful substances.

What are the benefits for the users applying this new technology?

At present, users of hydraulic installations have to undertake a lot of periodical analytics to control the adequate level of biocide in the water, to regulate the microbiological contamination and thus to maintain the good operation conditions. All in all, the technology improves significantly the disinfection management in hydraulic systems and makes the process more efficient. This new method will optimize and customize the biocide amounts to be dosed at any given moment. Moreover, the process will become cheaper and more environmentally-friendly.

In the case of air-conditioning systems, the advantages are even greater. As the humidified air circulated in the interior of buildings comes into direct contact with operatives, the most recommended type of biocide treatment on these installations is chlorine. Chlorine regulation must remain within strict margins, between 0.6 and 0.8 ppm, which is fairly complicated and even impossible to achieve with existing methods. Thus, chlorine concentrations below or above these safe points are frequently detected.

This method will be valid for the disinfection of any type of hydraulic system, independent of the industrial process being performed and allows the user to implement European legislation.

Could you briefly present the different steps of the project?

The project can be divided in three general stages. In a first phase, laboratory-scale bioefficiency tests were carried out. The use of biocides in high-risk installations has often been demonstrated to be of limited efficiency, owing to the repeated presence of a high concentration of microorganisms and the persistence of certain types of bacteria. Previous experience in the management of these types of installations demonstrates the difficulties encountered when trying to find the correct type of biocide treatment, either because the bacteria develop resistance to non-oxidizing biocides, or because they remain protected and isolated in points within the system where the treatment cannot reach. During the first phase of the project, laboratory-scale bio efficiency tests were required on both the oxidizing and non-oxidizing biocides, in accordance with the water intake and the microbiological contamination within the cooling towers being tested. These tests included a stability study, the kinetic reaction and the synergetic effects between the oxidizing and non-oxidizing biocides.

Taking these findings into account, an expert team started designing an automatic control prototype assembly, monitoring and dosing the biocide treatment. This second phase comprises the integration and optimization of the real time microorganism measuring technology (control unit) and the design and adaptation of the integrated intelligent biocide dosing system (dosing unit). Both units will be in constant communication with a computer programme which will synchronize both units: the detection of the concentration of microorganisms, the selection of the adequate biocide and its correct dosing.

In a third phase the prototype will be tested in two pilot companies in the textile sector in order to carry out industrial-scale tests with real water samples: a cooling tower of a finishing company and the air-conditioning system of a weaving company. Once the sample has been taken automatically at the critical points within the hydraulic system, it will be analyzed, identified and classified by the control unit. Then, the software will determine the correct quantity and type of biocide that should be injected into the system to eradicate the microbiological contamination in the most effective manner.

For more information, please visit www.biomomi.eu

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