

Microbiological control agents for cooling systems in hydroelectric power plants

Authors:

**Paulo RD Marangoni¹,
Carolina Gracia Poitevin²,
Patricia R Dalzoto², Marcos
AC Berton¹ and Ida C
Pimentel².**

Institution:

1. Serviço Nacional de Aprendizagem Industrial – SENAI, Instituto Senai de Inovação em Eletroquímica, CEP 80215-090, Av. Comendador Franco 1341, Jardim Botânico, Curitiba (PR).

2. Universidade Federal do Paraná, Setor de Ciências Biológicas, Laboratório de Microbiologia e Biologia Molecular, CEP: 81530-900, Av. Cel Francisco H dos Santos s/n – Jardim das Américas, Curitiba (PR) – Brasil.

Corresponding author:

Paulo RD Marangoni

ABSTRACT:

Many hydroelectric power plants and industries use chemicals to minimize problems caused by clogging and corrosion consequence from accumulated organic material in cooling systems. The chemicals used to avoid these processes must be strictly controlled, especially those based on chlorinated compounds, potential precursors of trihalomethanes, which are carcinogenic to humans and other animals. This study compared the sensitivity of potential alternatives to the use of chlorinated compounds in cooling systems, releasing free chlorine in the riverbed downstream of hydroelectric plants, besides the evaluation of the efficiency of these compounds in the control of bacteria that are surface colonizers and potential biofilms formers. Considering microbiological aspects, the results indicated three options for replacing Calcium Hypochlorite. Such products are MXD-100[®], anolyte of water electrolysis system of Radical Waters[®], and application of NaOH for changing the pH in cooling systems. The use of efficient methods to control the adhesion of microorganisms in cooling systems assists the power plants in reducing unscheduled maintenance of equipment that are exposed to corrosion processes influenced by microorganisms and consequently suffer mechanical failures, which interferes in the duration and frequency of electricity production interruptions.

Keywords:

Antimicrobial agents, Biofilm, Water treatment, Biocides, Bio corrosion, Hydroelectric power station.