



Task 6.6: Oxicide method review

Executive Summary

Highly oxidative environments are frequently used for disinfection treatments. Organisms are destroyed when exposed to well-known oxidants, such as hydrogen peroxide. The potential of the “Oxicide” process for the onboard treatment of ballast water has been studied. In this process hydrogen peroxide is produced in-situ where the only inputs are sea water (ballast water), oxygen (air) and electricity.

The Oxicide process has many advantages in comparison to the conventional disinfecting methods with oxidants. The Oxicide treatment is easy to control and has potentially a low maintenance. The small scale, onboard production of hydrogen peroxide will reduce the safety hazards associated with transport and storage of the oxidizing agent onboard of the ship. One of the main advantages of the use of hydrogen peroxide for the treatment of ballast water is that it decomposes into water and oxygen as harmless products within a few days.

The treated water resides in the ballast tanks for at least 24 h. The remaining hydrogen peroxide concentration will increase the corrosion risk; an appropriate coating of the tanks system is required.

The work performed in MARTOB has proven the principle of the Oxicide process. Onshore pilot experiments with seawater have shown the applicability of the Oxicide system for the in-situ production of hydrogen peroxide. The biocidal extermination of zoo and phytoplankton in ballast water has been shown in small-scale experiments and via a literature scan. A dosage of 15 mg/l proves to be very effective against a variety of organisms. Some organisms require substantial higher dosages for >95 % removal. Combined methods (hurdle techniques, e.g. Oxicide and UV) may be an interesting alternative when a wide spectrum treatment is required.