DHI SOLUTION

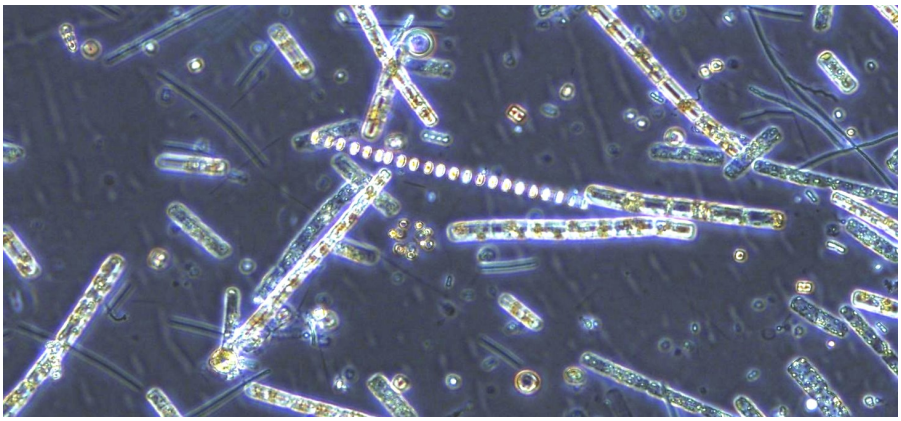
DHI ENVIRONMENTAL LABORATORY

Biological Testing and Analysis

Our biological laboratory services deal with plankton. These are tiny organisms that float or drift in water bodies such as lakes, rivers and oceans and play a crucial role in the aquatic food web. Planktons comprise a very diverse community, ranging from viruses and bacteria to microscopic plants (phytoplankton) and animals (zooplankton). With a long tradition of field work, we have extensive expertise in plankton analysis and testing.

PLANKTON ABUNDANCE AND DISTRIBUTION

Our expertise in plankton identification and enumeration allows a thorough assessment of the biological quality of water samples. This is necessary to describe biodiversity and understand the diverse roles of planktonic organisms in a given water body. Describing and understanding plankton communities offers immense knowledge about the quality of a system. Moreover, it supports better environmental management. These capacities can be applied to virtually any water body (such as freshwater reservoirs, marine water and aquaculture ponds), where monitoring of biological parameters is important.



Phytoplankton organisms seen through an optical microscope. Algal communities can indicate the quality of water and the surrounding environment.

BALLAST WATER MANAGEMENT SYSTEM

To reduce the risk of spreading harmful aquatic organisms and pathogens through ballast water, the International Maritime Organization (IMO) has adopted an international convention that requires all ships to install a Ballast Water

SUMMARY

CLIENT

- Government agencies
- Aquaculture industry
- Port authorities
- Consultants and contractors
- Researchers
- Chemical manufacturers

CHALLENGE

- High quality standards to meet even at very low detection limits and in a difficult matrix such as seawater
- Cost-inefficiency
- Need to stay up-to-date with the newest techniques
- Difficulty in applying standard techniques to tropical environments

SOLUTION

Following of strict and accredited protocols Using modern analytical instruments to ensure reliable results even in difficult measuring conditions.

VALUE

- High-quality reliable data even in difficult measuring conditions
- ISO-accredited plankton sampling
- Quick and appropriate response to threats such as Harmful Algal Blooms (HABs)
- Optimised testing protocols
- Standard and non-standard experimental designs

Since the introduction of steel hulled vessels more than a century ago, water has been used to stabilise ships at sea. Photo: iStock © Phil Augustavo

Management System (BWMS) to treat the water before releasing it into the environment.

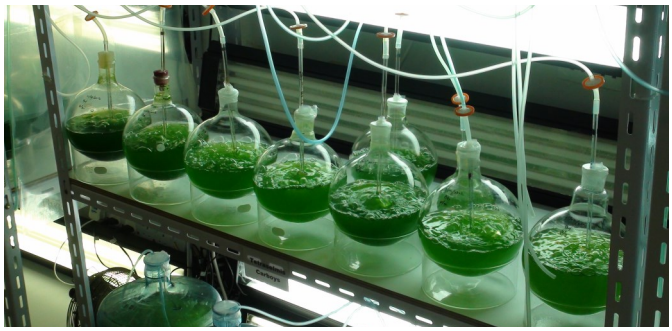
We offer a one-stop-shop for BWMS developers, including onshore testing of ballast water treatment systems as per IMO requirements.

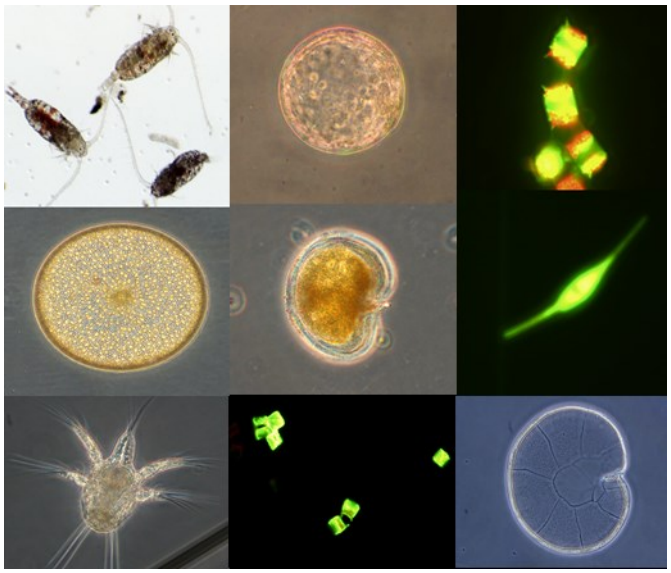
Therefore, our laboratories perform daily analyses of ballast water samples to identify viable plankton forms in the water and sediments. Viability markers are used to differentiate between living cells and non-viable cells following the discharge standards and guidelines set by IMO.

POTENTIALLY HARMFUL ORGANISMS, CYSTS AND INVASIVE SPECIES

A number of phytoplankton species are toxic. These toxins can accumulate through the food chain, ultimately affecting foods such as bivalves and large predators. Other planktonic organisms are known to bloom under certain environmental conditions and deplete the water from oxygen, thereby causing mass fish mortality. Both such events are referred to as Harmful Algae Blooms (HABs).

The life cycle of many harmful planktonic organisms includes a resting stage to survive harsh environmental conditions in the sediments (resting eggs and cysts). We can assess the environmental risks associated with the presence and abundance of planktonic organisms as well as resting eggs and cysts in the water column and in the sediment. This allows us to evaluate and rank the risks of HABs in certain areas, as well as the risk of alien species introductions.





Monitoring the waters for potentially harmful species can mitigate the threats of HABs to public health and coastal resources.

ECOTOXICOLOGICAL TESTING

Our Environmental Laboratory conducts chronic and acute standard and non-standard ecotoxicological tests for compliance with chemical or environmental regulations (such as ballast water, sediment assessment, REACH, GHS, or OSPAR). These tests are conducted on algae, crustaceans and fish, following international methods. Furthermore, we develop new testing methods specifically designed for tropical species (algae, fish and crustaceans). These methods include:

- algal growth inhibition: according to ISO 10253, on *Tetraselmis suecica*
- crustaceans: according to ISO 14669 and ISO 16778, *Acartia tonsa*
- fish: according to OECD 203 and OECD 212, 210 on *Chanos chanos* and *Cyprinodon variegatus*

RESEARCH AND DEVELOPMENT

Our laboratories are also used for R&D purposes. In order to optimally support our client needs, we provide on-demand R&D, in close cooperation with our experts from the research

ACCREDITED QUALITY— ISO 17025

Our laboratories and plankton sampling protocols are accredited by the well-established Laboratory Quality Management System **ISO17025.**

Modern analytical instruments, appropriate and approved test methods, stringent quality control and our experienced staff ensure that we supply you with the highest quality services.

Contact: info@dhigroup.com
For more information, visit: www.dhi.com.sg