TECHNICAL DATASHEET

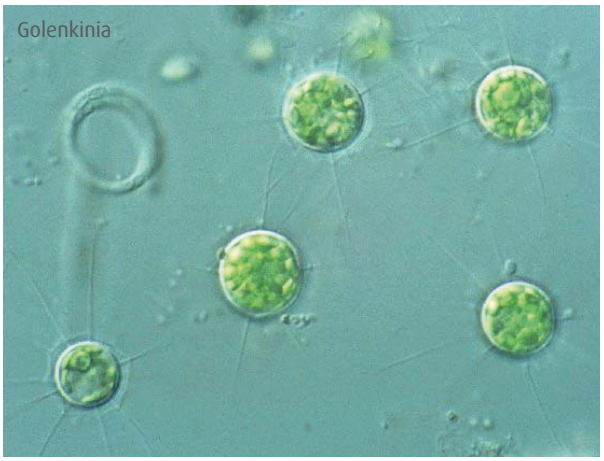
Algae analysis and Identification

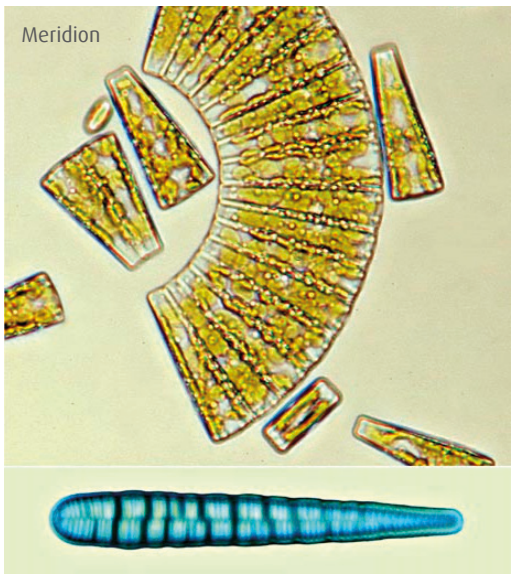
What are Algae

Algae are natural constituents of nearly all surface waters such as rivers, reservoirs and lakes; both lotic (moving water) and lentic (still water). They are microscopic plants living in water and become visible when they multiply and come together. As such they play a vital role and may be responsible for the major part of the primary production in aquatic ecosystems. When nutrients and light are plentiful for example in the summer, large growths or blooms may occur.

During a bloom in rivers or reservoirs the water will take on a bright blue-green colour. Algal blooms may also occur in sea water and these marine blooms tend to result in a red-brown colour.

ALS Coventry is able to undertake the isolation, enumeration and identification of Algae. This analysis is UKAS and DWTS accredited.


Golenkinia


Meridion

The impact of Algae – are they dangerous?

Algal blooms can give rise to water quality and engineering problems such as water discoloration, filter clogging and the generation of taste and odour problems.

Some species produce toxins, which have been associated with wildlife, especially fish mortalities. Thus knowledge of algae abundance, genus quantity and growth potential is of great importance to water treatment personnel responsible for monitoring water quality and treatment efficiency at water treatment works.

Blooms in recreational waters can lead to closure which may impact on the recreational use of the associated waters.
A blue-green colour indicates the presence of species of Cyanobacteria which release toxins that may cause serious irritations by skin contact. Deaths of animals such as dogs and sheep have been recorded when they have been allowed to eat the scum. To avoid this hazard, those responsible for water bodies such as the Environment Agency and water companies post warning notices on footpaths around rivers and reservoirs where recreational activities are permitted. These notices warn of the need to avoid direct contact with the water. At such times various water contact activities may be prohibited such as diving, sailing, kayaking and canoeing.

Do Algal blooms affect the safety of drinking water?

Poisoning due to ingestion of algal toxins is a very rare event and those that are recorded occurred in other parts of the world such as South America, Australia and the Far East. These harmful events were linked to extreme climatic conditions or unsuitable private water supplies without adequate management or treatment.

Cyanobacteria (Blue green Algae) can produce neurotoxins, cytotoxins, endotoxins, and hepatotoxins (i.e. the microcystin-producing bacteria species microcystis), and are called cyanotoxins.

Studies in the UK demonstrated that conventional water treatment is effective at removing algae and their associated toxins.

By law, water companies must identify all water sources at risk from algal blooms. These sources must have adequate treatment in place to safeguard the quality of drinking water in the event of an algal bloom. Water companies monitor river and reservoir water for the presence of algae by counting cells under a microscope and measuring the amount of chlorophyll in the water. These tests give early warning of bloom conditions. Water companies have the capability to test for common toxins such as Microcystin – LR and the World Health Organisation has set a provisional health related guideline value of 1 µg/l. Toxins are not routinely tested for in drinking water but testing can be carried out to check that water treatment is effective under bloom conditions. ALS Environmental is able to undertake Microcystin analysis at ALS Wakefield.


Dinobryon


Ankistrodesmus

Method

The ALS method for the detection and enumeration of Algae cells Is suitable for the analysis of treated and surface waters.

This method is suitable for most types of aqueous samples even those known to have very high cell concentrations, which can be counteracted by the use of a suitable working volume. The method is suitable for enumerating even the most buoyant species, like Microcystis, Anabaena and Aphanizomenon.

After the sample is taken it is fixed with Lugol's iodine solution. The sample is then pressurised and a representative portion of known volume is transferred to a sedimentation tube. After a suitable settling period, which is dependent on volume, any algae cells in the sample are directly identified and enumerated using an inverted microscope. The method is a direct enumeration method but will use a multiplication factor, based upon the volume of sample analysed, number of microscope fields of view used and the area of each field to calculate the final result.

Identification of Algae

ALS Coventry are able to undertake the enumeration and identification of Algae to both genus and species level with a full identification report being produced which details the algae type by genus, the associated count and a total algal count.

We generally classify Algae into a number of sub groups which are:

Blue Greens (the Cyanobacteria)	Implicated in producing toxins which could be harmful
Greens	This is a diverse group producing complex shapes containing chlorophyll hence the classification "greens" and includes Ankistrodesmus, Clamydomonas, Crucigenia, Pediastrum
Diatoms	Usually unicellular and may be associated in groups (ribbons, chains, stars) with silicate cell walls.
Other	Namely Algae that are not grouped into 1-3 above

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