

# Physical and chemical assessment

Version: February 2018

## Chlorophyll *a* sample collection methods

### 1 Purpose and scope

This document describes the procedure for field collection of surface water samples for subsequent laboratory extraction and analysis for chlorophyll *a*. The aim is to collect water samples from which a known volume of water is filtered under suction onto filter paper for subsequent analysis of chlorophyll *a*.

### 2 Associated documents

*Sampling design and preparation:*

- *Permits and approvals*
- *Record keeping including taking field photographs and videos*

*Physical and chemical assessment: Manual collection of surface water samples (including field filtration)*

*Biological assessment: Sampling freshwater and marine microalgae and harmful algal blooms (HABs)*

### 3 Health and safety

Before following the methods contained in this document, a detailed risk management process (identification, assessment, control and review of the hazards and risks) must be undertaken. All work carried out must comply with the Queensland Work Health and Safety legislative obligations.

### 4 Permits and approvals

Permits and approvals may be required to conduct activities involving animals, plants and/or in protected areas (for example National Park/Regional Park, State Forest or State Marine Park). See *Permits and approvals* document for more information on requirements.

### 5 Skills, training and experience

No skills, training or experience is required to conduct the procedure within this section.

### 6 Equipment

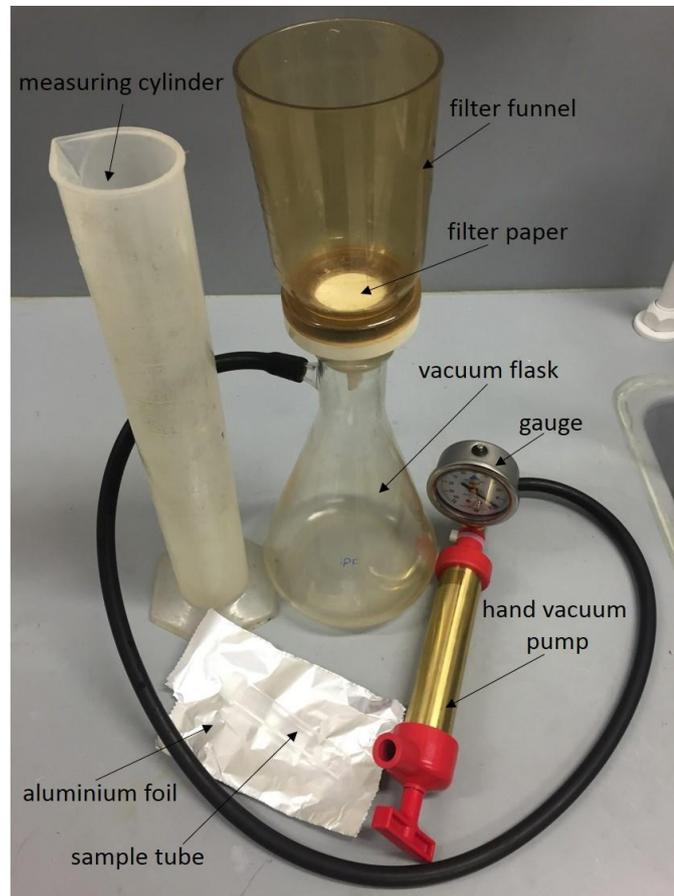
See Appendix 1 for example equipment checklist.

## 7 Procedure

### 7.1 Preparation for sampling

Prior to leaving for the field:

1. Ensure that all the field sampling equipment is in good order (Figure 1).
2. Ensure that the glass vacuum flask (Figure 1) is undamaged. Look for any signs of scoring, scratching and cracks and replace the flask if necessary.



**Figure 1: Vacuum filtration equipment**

### 7.2 Field collection of water samples for chlorophyll a analysis

1. Set up the vacuum filtration equipment.
2. Secure the filter holder to the vacuum flask and confirm that the filter paper (Figure 2) is seated correctly.



**Figure 2: Filter paper being placed into filter holder**

3. Clear any floating matter from the water surface using the underside of the collection cylinder.
4. Invert the measuring cylinder and submerge into the water upside down to a depth of 0.2m so it fills with water.
5. Discard the excess water from the top of the cylinder to the uppermost 500mL or 100mL mark.
6. Pour a quantity of the collected water into the filter funnel, being careful not to spill any.
7. Pump the hand vacuum pump to start suction through the filter paper.
8. Pump until the vacuum gauge reads 40Kpa (1/2 atmospheric pressure) (or 5.8psi).
9. Maintain the pressure at 40Kpa throughout the filtering process to avoid possible rupture of cells and release of chlorophyll.
10. Continue to add known volumes of water to the filter for as long as the water flow through the filter is steady and the filter paper remains pale.
11. Refill the measuring cylinder when it is empty. Record the number of sample refills (cumulative volume).
12. Continue to add the water sample to the filter funnel.
13. Stop filtering if the vacuum flask is nearly overflowing. Remove the filter funnel from the flask, empty the flask, then reassemble the filter.
14. Stop filtering when the water flow through the filter has almost stopped and the filter paper has a noticeable colour (Figure 3b). Record the final volume filtered.
15. Remove the funnel from the filter holder.
16. Fold the filter paper in half over itself and remove it from the support screen.
17. Fold the filter paper again to reduce its size.
18. Place the folded filter paper into the correct sample tube and screw the lid on tightly.
19. Cover the sample tube completely with aluminium foil to exclude light.
20. Place sample tube into a labelled zip lock bag and place in cooler box. The bag should be labelled with the survey name and code, the survey date and the sampler's initials.
21. Ensure the sample name, site, date and time, sampler and GPS co-ordinates are recorded.
22. Record the total volume (in millilitres) of water that has been filtered through the filter paper. This information needs to be given to the analytical laboratory in order for them to calculate the concentration.

**Note:** If sample tubes are not available, filter paper may be double wrapped in aluminium foil and frozen.



(a)

(b)

**Figure 3: (a) Algal bloom in the Caboolture River and (b) filter apparatus showing a well-covered filter paper for chlorophyll a analysis**

### **7.3 Sample storage**

After the survey, pack the zip lock bag containing all the chlorophyll samples (i.e. folded filter paper or tube, wrapped in aluminium foil) and put them in a freezer, ensuring samples are kept away from light. Recommended maximum holding time is four weeks.

When ready for analysis, remove the frozen chlorophyll samples from the freezer and transport them frozen to the analytical laboratory for analysis.

## **8 References and additional reading**

Baird, RB, Eaton, AD, Rice, EW 2017, *Standard Methods for the Examination of Water and Wastewater*, 23<sup>rd</sup> edn, American Public Health Association, Washington DC, USA.

# Appendix 1

**Table 1: Equipment checklist**

Equipment	✓
Note book or field sheet for recording data.	
500mL High Density Polyethylene (HDPE) plastic measuring cylinder	
100mL High Density Polyethylene (HDPE) plastic measuring cylinder	
1L ungraduated Buchner vacuum flask (side arm flask)	
Hand operated vacuum pump	
Vacuum gauge	
Silicon tubing to attach vacuum pump to flask	
Sample tubes (HDPE, 15mL volume, screw cap, graduated with 5 and 10mL levels), one tube per sample site	
0.4 micron glass fibre filter paper	
100mm x 100mm squares of aluminium foil	
One cooler box, two thirds filled with crushed ice to preserve samples	
Medium sized plastic zip lock bag to keep all the chlorophyll sampling tubes collected for each survey, marked with survey name, collection date and sampler's initials	
Test tube rack to hold chlorophyll sampling tubes ready for use	
Waterproof transport container for chlorophyll sampling equipment	
Powder-free disposable gloves	