

Ambrose Furey ¹, Mike Griew ² and Ronan Browne ³

¹ Mass Spectrometry Group, Department Physical Sciences, Munster Technological University (MTU), Rossa Avenue, Bishopstown, Cork, T12 P928 Co. Cork, Ireland. (ambrose.furey@mtu.ie)

² HALPIN Centre for Research & Innovation, National Maritime College of Ireland (NMCI), MTU, Ringaskiddy, P43 XV65 Co. Cork. (mike.griew@mtu.ie)

³ STREAM project co-ordinator, Southeast Technological University (SETU), Cork Road, Waterford, X91 K0EK Co. Waterford. (Ronan.Browne@setu.ie)

Introduction:

Harmful algal blooms (HABs) occur when algae, simple photosynthetic organisms that live in the sea and freshwater, grow out of control while producing toxins or producing other harmful effects on people, fish, shellfish, marine mammals, and birds. Of specific interest to the STREAM project are HABs, caused by various algal groups (e.g. DSP, AZP, ASP, PSP) with different toxins (Okadaic acid, Azaspiracid, Domoic acid, and Saxitoxin respectively).



Figure #1: Phytoplankton net ²

Phytoplankton (Harmful Algal Blooms, – HABs) populations can increase and bloom rapidly and are sometimes referred to as “Red Tides” due to the discoloration of the water that they produce. Though not all “Red Tides” contain toxic phytoplankton. Also HABs are not always visible on the water surface but may reside in the thermocline region of the water column¹. Phytoplankton generally proliferate in the Spring bloom, Summer and Autumn when the water is calmer and warmer. A conical phytoplankton net with various mesh sizes (45 µm, 20 µm, 10 µm, etc.) is typically used to sample or collect phytoplankton samples by vertical or by a horizontal haul (Figure #1-3). But more discreet samples, where the exact volume of water is collected.

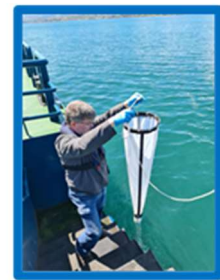


Figure #2: Raising a deploy Phytoplankton net



Figure #3: Washing down captured phytoplankton into the sample cup ²

Phytoplankton (Harmful Algal Blooms, – HABs) populations can increase and bloom rapidly and are sometimes referred to as “Red Tides” due to the discoloration of the water that they produce. Though not all “Red Tides” contain toxic phytoplankton. Also HABs are not always visible on the water surface but may reside in the thermocline region of the water column¹. Phytoplankton generally proliferate in the Spring bloom, Summer and Autumn when the water is calmer and warmer. A conical phytoplankton net with various mesh sizes (45 µm, 20 µm, 10 µm, etc.) is typically used to sample or collect phytoplankton samples by vertical or by a horizontal haul (Figure #1-3). But more discreet samples, where the exact volume of water is collected.

Procedure:

1. Phytoplankton can be collected by a grab sample (van Dorn bottle) or with a plankton net (Figure #1) with 10, 30, 50, 75 or 100 µm mesh.
2. A removable sample bottle is connected to the end of a phytoplankton net.
3. Using an itemized line with meter depth indicators, deploy phytoplankton net to the chosen depth (e.g., 5, 10, 15 or 20+ metre depth).
4. Once the depth is reached, slowly put up the phytoplankton net (Figure #2).
5. At the surface, rinse the net and let the phytoplankton drain into the sample bottle (Figure #3). Which then can be unscrewed.
6. Pour the sample contents into a clean 20 or 50 ml plastic bottle and label it with details such as Date, Time, Sample Location, Mesh Size Used, Depth and Sampler Name.
7. For LC-MS analysis, place the bottle in the dark, cool and chill it before freezing it at -20 ° C.

8. From a second vertical haul sample, add several drops of Lugol iodine to colour (weak tea) and preserve the phytoplankton for examination under a microscope.
9. Clean the phytoplankton net with warm water after use and air dry.

STREAM is part funded by the ERDF through the Ireland Wales Cooperation Program

References:

1. Gentien, P., Donaghay, P., Yamazaki, H., Raine, R., Reguera, B. and Osborn, T. Harmful Algal Blooms in Stratified Environments. [Oceanography](#) Vol.18, No.2, June 2005.
2. Website: [Google images](#), accessed 2023.