

# General Notes on Primary Productivity Experiments, Sample Handling and Lab Safety

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Experiments with radioisotopes ( $^{14}\text{C}$ ) are carried out to measure primary production, or carbon incorporation, into marine phytoplankton. The procedure involves inoculating a seawater sample with the radioisotope and counting the incorporation of  $^{14}\text{C}$  into organic carbon after a predetermined period of time.

Two types of  $^{14}\text{C}$  experiments are typically run:

- A. Simulated in situ primary production, where 100ml of seawater is placed in a polycarbonate bottle and inoculated with  $5\mu\text{Ci}$  of  $^{14}\text{C}$  bicarbonate, for a total of 24 bottles per experiment. Bottles are incubated for 24 h in an incubator with running seawater located on deck. At the end of the experiment, each sample is filtered onto a glass-fiber filter, the filter acidified with HCl under a hood, and placed in a scintillation vial with 5 ml cocktail to be counted in a LSC.
- B. Simulated in situ primary production experiments, with a range of sizes of filters. Protocol identical to #1 above, but with a total of 48 bottles incubated at each station for 24 hours.

$^{14}\text{C}$  bicarbonate is not volatile. Aerosolization should not occur under the procedure described above.

Sample handling is done only in designated radioisotope labs or vans. Incubations on deck are done in special incubators with running seawater. Stock isotope is stored in spill proof containers in stable refrigerators in the lab or van.

Radiation exposure is minimized by an efficient delivery of the radioisotope while doing the inoculations. During filtration the exposure is minimum and the seawater with excess isotope is introduced under vacuum on glass carboys. Laboratory personnel wear gloves at all times while handling isotopes; all acidification is done in a working fume hood.

“Daily” swipes (five areas around laboratory/van/incubators) are done on any day that stock isotope is handled. Also, “weekly” swipes (ten to twelve areas) are done once weekly in work areas throughout duration of season or cruise. All swipes are done with a 25mm Whatman GF/F filter dipped in 5% Count-Off solution and counted in with Universol scintillation cocktail in LSC immediately following the swipe