



Carbon-14 Information and Safety Sheet

C-14 is an internal hazard to the body. External hazards are minimal when using mCi amounts due to the inability of the weak beta to penetrate the dead layer of skin. Common internal routes of entry are inhalation, ingestion, skin absorption, and puncture wounds to the skin.

¹⁴C Information

Beta (max): 0.156 MeV

Beta (avg): 0.049 MeV

Maximum beta range in air: 10 inches

Half-life: 5730 years

Biological half-life (whole body): 10 days

Critical organ: Fat tissue

Skin contamination dose rate: 1 $\mu\text{Ci}/\text{cm}^2$ results in ~1100 mRem/hr

SHIELDING:

Shielding is generally not necessary when using mCi amounts. If shielding is used it should be plexiglass, acrylic, lucite.



DETECTORS:

A Geiger-Mueller (GM) detector will detect C-14 only at a 3-5% efficiency. Liquid scintillation counters will detect C-14 at ~90% efficiency.



SAFE HANDLING:

All personnel using radioactive materials must be trained by Radiation Safety. By following the principles of ALARA and donning appropriate personal protective equipment (PPE) the hazards of using C-14 can be greatly minimized. Frequent surveys of work area and body are needed due to high dose rate to skin. Surveys must be slow and deliberate to assure GM detects the C-14.

When using C-14 be sure to use:

Lab coat

Gloves

GM Detector



Good work habits include clean work stations, working on bench paper or spill trays, labeling all equipment that is (or could be) contaminated, keeping licensed material secure, clear and up-to-date inventories, and no hand-to-mouth activity such as eating, drinking, or mouth pipetting.

In case of spills call 978-934-3373 or 978-934-3372

In case of emergency call 978-934-4911 (x4-4911 on campus)