

Scintillation Counter Use (Beckman LS 6000)

Overview:

This instrument is used for scintillation counting ^{32}P , ^{35}S , ^{14}C and ^3H . It is located in the 8th Floor common room. Basically, a scintillation fluid is added to a radioactive sample. This fluid contains a mixture of fluorophores that absorb the radioactivity from the sample and convert that energy to light which is detected by the counter. For more on the principles of counting check the Cooper Biochemistry book on the lab shelves.

Materials:

Scintillation vials: usually 7 ml, although 20 ml vials are available in the Biochemistry stockroom.

Scintillation fluid: kept in a dispenser bottle in the chemical fume hood or in the cabinet below the hood. (Remember this is usually nasty, so use gloves and keep it in the hood!)

1. Place your sample(s) in scintillation vials.
2. Add appropriate scintillation fluid to each vial in a ratio of at least 10:1 (fluid:sample), cap the vial tightly and vigorously shake it.

Note: If your sample contains organics, you might need to increase the fluid:sample ratio, or you will get “quenching”. A hint is that your solution will remain cloudy (can be caused by having organics or not enough scintillation fluid), so that the scintillation will be “quenched” and the observed value lower than it should be. A ratio of >10:1 rarely causes a problem, although some solvents do quench highly (e.g. chloroform); such samples should be dried down before counting.

3. Place your samples in a rack for this counter (on the shelves across from the counter in the 8th floor common room—the blue racks hold the 7ml tubes). Each rack has a slot for a card that gives instructions to the machine. Put an appropriate program card (see below) in the slot on the front of your first rack (at right, in front of positions 10-12 on the blue rack). Put all your racks in the counter, making sure that the rack you want counted first is farthest forward (away from you) and that the tongue of each rack lies within the groove of the counter rail. After your racks place the red rack that has a STOP card to end the counting series.

4. To choose a program, select Menu on the controls panel of the machine, and move the cursor to ‘Review User Programs’. Choose ‘Enter’ on the front panel, then scroll down and find an appropriate program for your application (the right isotope for the correct length of time). Note the number of the program and find that card in the slide-out tray under the instrument. (For counts of ^3H or ^{14}C for 1min/sample, our lab has a program card (Card No. 12).) Place the program card in the slot on the front of the rack as mentioned above.

5. Make sure all the racks are well aligned and slide them away from you towards the back of the machine to line up straight. Make sure the printer is on and the online button is lit. Choose ‘Menu’ and move the cursor to ‘AUTOMATIC COUNTING’, then press the ‘Start Counting’ button on the front panel. You should hear the counter moving the rack into place and pushing the first sample up into the machine, and the printer should

print the heading part of the first run. The active counts of the first sample should then come up on the screen.

6. When your run is done, remove the vials, replace the card into the holder below the instrument and take your printout. Be sure not to leave vials in the machine that are done, and to dispose of them appropriately.

Note: For very long counts (e.g. several racks of 5 min counts) it is considerate to leave them counting when you leave for the day so they go overnight. In some cases you can do short counts (e.g. 0.5 – 1 min) to see if the experiment worked, then count longer afterwards.