March 20, 1995

Preventing Gaseous Release With Sodium Bicarbonate Samples

Problem:
A researcher contacted us to learn how to "bind" a 100 µL $NaH^{14}CO_3$ (sodium bicarbonate) and sea water sample to prevent loss of activity due to gaseous release during sample preparation.

Discussion:
From our experience, there are three possible cocktails that would be best suited for this application. These cocktails are Hionic-Fluor™ (part number 6013319), Opti-Fluor® (part number 6013199) and Emulsifier-Safe™/Poly-Fluor™ (part number 6013389)

We tested the three cocktails with mid-ocean sea water by adding 100 µL to 5.0 mL of cocktail. (The presence of the 2 mM sodium bicarbonate in sea water will not affect the overall sample acceptance characteristics of the cocktails.)

After adding the sample, we added 0.2 mL (200 µL) of 0.1 N sodium hydroxide to ensure that the pH was greater than eight which would prevent "gassing." With Hionic-Fluor, a clear stable mixture was formed at 20 °C. With Poly-Fluor, a slightly opalescent mixture was formed at 20 °C. With Opti-Fluor, a slightly hazy mixture formed at first but on standing for 15 minutes at 20 °C, a clear mixture resulted.

Recommendation:
From the obtained test results, Hionic-Fluor or Opti-Fluor would be best for the researcher's system.

Because ^{14}C, a high energy beta emitter, is the isotope of interest and the sample is relatively small, there will be virtually no difference in counting efficiency between the two cocktails. The use of either of these two cocktails with the added 0.1 N sodium hydroxide ensures against the potential problem of "gassing." However, we do recommend the use of Opti-Fluor since it is a safer cocktail.

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