

LSC in Practice

Safer Cocktail for Diethyl Ether Extract

Problem

A researcher called to request the best safer cocktail for his diethyl ether extract. This researcher wished to add either 3 mL or 6 mL of sample to 10 mL cocktail in a plastic vial. The isotope of interest was ³H. The researcher wanted to find a high ³H efficiency cocktail.

Discussion

Since ethers have only a mild quenching effect and are easily miscible with most cocktails, the choice of cocktail centered around ³H efficiency. For this evaluation, ULTIMA Gold™ (PerkinElmer part number 6013329) and ULTIMA Gold F (PerkinElmer part number 6013179) were chosen, as these two cocktails give the highest efficiencies for emulsifying and organic safer cocktails, respectively.

The conditions for this evaluation were:

1. Instrument Tri-Carb® 2550TR/AB operated at 20 °C
2. Windows 0 to 18.6 keV
3. Count Time 10 minutes per sample
4. Vials Standard 20 mL polyethylene vials
5. Activity Added as ³H-n-hexadecane
6. Samples 3.0 mL and 6.0 mL diethyl ether
7. Cocktails ULTIMA Gold and ULTIMA Gold F

The results were:

Cocktail	³ H Efficiency + 3.0 mL diethyl ether	³ H Efficiency) + 6.0 mL diethyl ether
ULTIMA Gold	54.3%	51.5%
ULTIMA Gold F	63.9%	60.5%

As can be seen from the above, ULTIMA Gold F gives the highest ³H efficiency. However the following points should be considered before making a final cocktail choice.

1. Although ULTIMA Gold F gives the highest ³H efficiency, its resistance to chemiluminescence is less than ULTIMA Gold. Since the sample is an extract, there is always a possibility that it could contain chemiluminescent species. Therefore, ULTIMA Gold would be a better cocktail choice.
2. The use of polyethylene vials is not recommended. Diethyl ether is not compatible with LDPE (low density polyethylene) and has limited compatibility with HDPE (high density polyethylene). All PerkinElmer vials are made from HDPE but there is still an element of uncertainty regarding long term compatibility. Therefore, glass vials are suggested as a better option.

Recommendations

Use ULTIMA Gold cocktail with glass vials.