LSC in Practice

Cocktail Selection for Tetrabutylammonium Hydrogen Sulfate and Acetonitrile Gradients

Problem

A researcher was counting 1 mL fractions and wished to add a maximum of 2 mL of a "safer" cocktail to help comply with local regulations. The sample is a gradient run from 100% to 45% of solution A, the remainder is solution B.

Solution A = 3.5 mM tetrabutylammonium hydrogen sulfate, 35 mM KH_2PO_4, 0.125 mM EDTA (adjusted to pH 6)

Solution B = 50% of Solution A and 50% acetonitrile.

Discussion

We evaluated several safer cocktails, namely ULTIMA Gold™ XR (part number 6013119), ULTIMA Gold AB (part number 6013309) and ULTIMA-Flo™ AP (part number 6013599) using this gradient system and tabulated the results below. The gradient was evaluated by preparing the mixtures indicated in the table and for each mixture, 1 mL was added to 2 mL of cocktail. Since no operating temperature was specified, we checked the stability at 18 °C and 20 °C only.

Gradient Ratio A:B	ULTIMA Gold XR at 20 °C	ULTIMA Gold XR at 18 °C	ULTIMA Gold AB at 20 °C	ULTIMA Gold AB at 18 °C	ULTIMA-Flo AP at 20 °C	ULTIMA-Flo AP at 18 °C
100:00	Clear	Clear	Clear	Clear	Clear	Clear
90:10	Clear	Clear	Clear	Clear	Clear	Clear
80:20	Clear	Clear	Clear	Clear	Clear	Clear
70:30	Clear	Clear	Clear	Clear	Clear	Clear
60:40	Clear	Clear	Clear	Clear	Clear	Clear
50:50	Clear	Clear	Clear	Clear	Hazy	Clear
45:55	Clear	Clear	Clear	Clear	Hazy	Clear

Recommendation:

From the table, it can be seen that both ULTIMA Gold XR and ULTIMA AB are suitable for this application if used between 18 °C and 20 °C. If tritium is the nuclide of interest, we recommend the use of ULTIMA Gold AB since it will give the highest counting efficiency in this system.

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