National Diagnostics

Innovation In Scintillation Counting

national diagnostics

History

- **25 years of innovation, in novel, low hazard, low environmental impact products.**
- **The first to use solvents derived from sustainable crops (1978) Opti-Clear and HistoClear.**
- **The first company to introduce a stabilized form of acrylamide in solution (1983).**
- **The first 'safer' cocktail (Liquiscint, 1984) based on Para-Xylene and our first range of flow cocktails.**
- **The first ever biodegradable cocktail (ecoscint,1987),low flammability (150^{0}C), high aqueous capacity, non gelling.**
- **2004 we introduce a completely new formulation with low viscosity, ultra-high capacity (1:1) and of course low toxicity, flammability and biodegradable (Ecoscint flow).**

Fundamental Principles and Applications of Liquid Scintillation Counting - National Diagnostics

A resource for education and orientation

1.1 RADIOACTIVE EMISSIONS

1.2 MEASUREMENT OF RADIATION AND ISOTOPE QUANTITATION

1.3 MECHANISM OF LIQUID SCINTILLATION COUNTING

1.4 LIQUID SCINTILLATION SIGNAL INTERPRETATION

1.5 THE COMPLETE SCINTILLATION COCKTAIL

1.6 CHEMILUMINESCENCE AND STATIC ELECTRICITY

1.7 WASTE DISPOSAL ISSUES

2.1 COUNTING DISCRETE SAMPLES

2.2 SPECIAL SAMPLE PREPARATION PROTOCOLS

2.3 FLOW LIQUID SCINTILLATION

2.4 LIQUID SCINTILLATION AND RADIATION SAFETY

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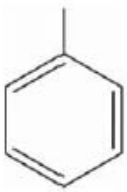
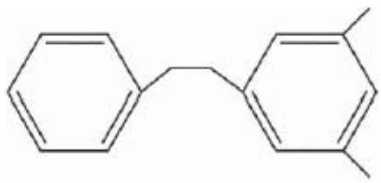
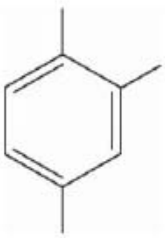
Solvents



Toluene



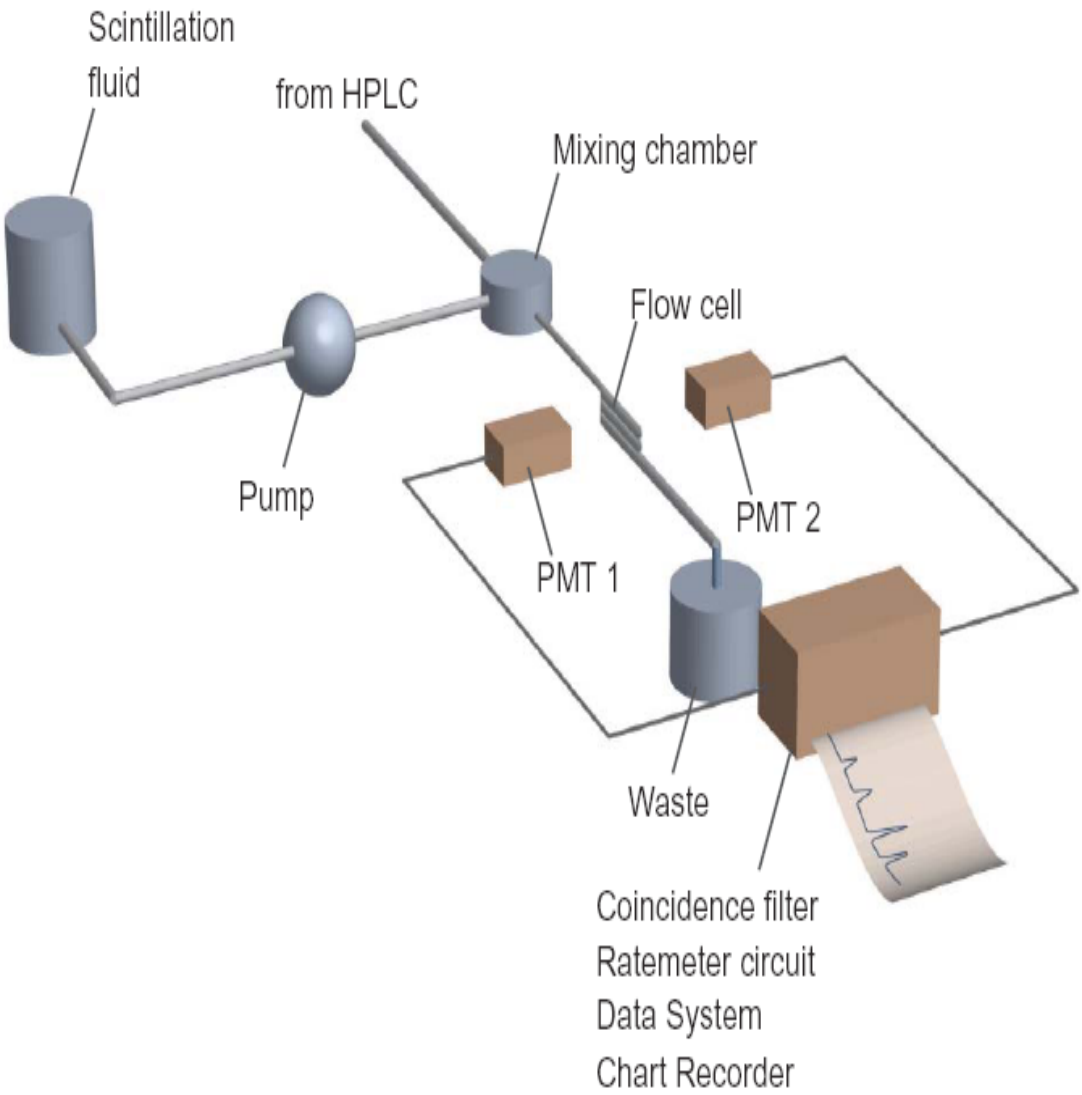
PXE (phenyl xylylethane)



Pseudocumene

Figure 1.3.1a *Solvents employed in liquid scintillation cocktails, such as toluene, pseudocumene, or PXE, possess aromatic rings to absorb the energy of incident radiation.*

Flow Liquid Scintillation counting



THE PROPERTIES OF AN HPLC FLOW COCKTAIL

Low Viscosity - Scintillation fluids that form a viscous emulsion or a gel upon mixture with the sample solution are not candidates for use in HPLC counting due to excessive back pressure from the solvent

High Sample Hold - HPLC flow counting consumes large volumes of expensive scintillation cocktail. Therefore the close you can get to a 1:1 ratio The less the consumption of scintillation cocktail.

Generous optimization parameters - With a wide range of combination parameters. Researchers can determine the best balance of operating cost and performance.

Inexpensive Disposal – High volumes of scintillate can cause disposal problems unless the scintillator solution is biodegradable, hazardous waste disposal costs can approach and even exceed the cost of the original solution.

Robust Compatibility - Nearly all HPLC systems in operation are designed to assay biological material. To be broadly useful in HPLC counting, a LSC cocktail must be compatible with the wide array of chemical gradients and elution buffers utilized in chromatographic separation techniques.

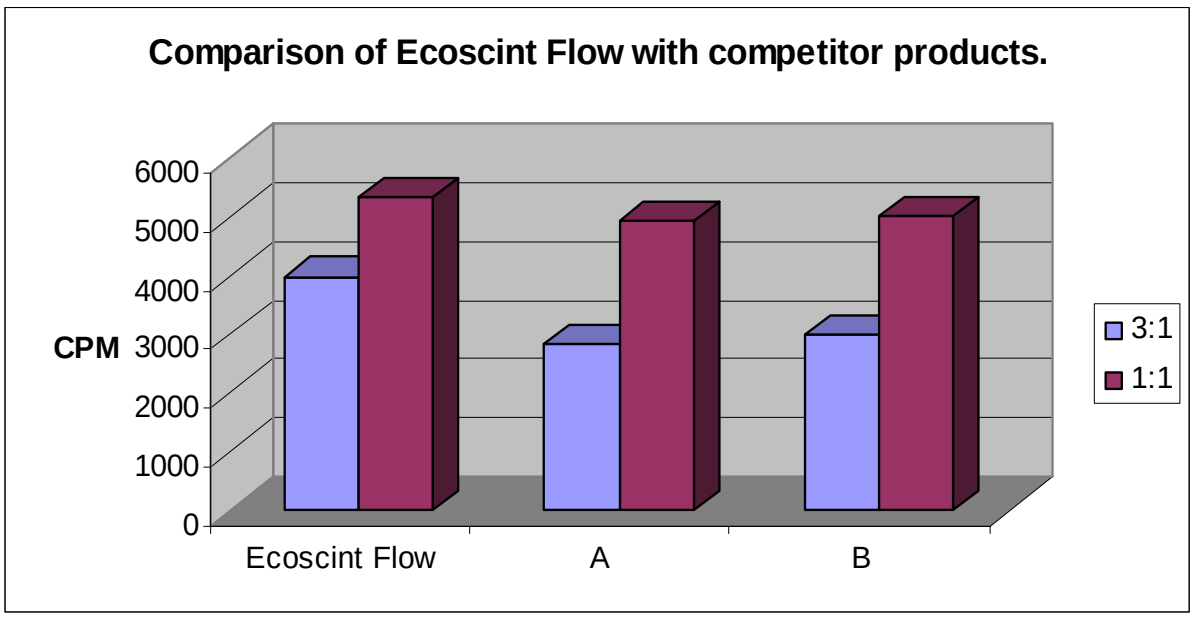
Applications of National Diagnostics Flow Scintillation Cocktails

Cocktail	Sample Capacity (ml /10ml cocktail)	Biode-gradable	Applications
Ecoscint Flow Order #LS-288	10	☒	All purpose scintillation fluid for a wide range of sample types. Ultra-high sample hold.
Monoflow 1 Order #LS-281	N/A	☐	Organic effluents. Lipid and steroid separations.
Monoflow 2 Order #LS-282	3	☐	Routine low salt aqueous effluents (<200mM salt)
Monoflow 3 Order #LS-283	5	☐	Routine low salt aqueous effluents. Higher sample holding capacity than Monoflow 2
Monoflow 4 Order #LS-284	3	☐	High salt aqueous samples. Can accommodate 2M salt gradients.
Monoflow 5 Order #LS-285	3	☒	Biodegradable cocktail for routine low salt aqueous samples (<200mM salt)
Uniscint BD Order #LS-276	3	☒	Biodegradable cocktail for high salt aqueous samples. Can accommodate up to 2M salt gradients.

Comparison of Ecoscint Flow with competitor products.

All experiments used a Lablogic Beta RAM model 3 radio-HPLC detector, with a 100ul liquid flow cell.

	Scint/ Eluate Ratio	
Cocktail	3:1	1:1
Ecoscint Flow	3994	5350
A	2828	4943
B	3001	5035



Ecoscint Flow Sample Hold

mL Sample per 10mL of Ecoscint Flow (25°)