A Q&A

Save Time in HPLC Sample Prep

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To prepare samples for analysis with high performance liquid chromatography (HPLC) instruments, most laboratories use several different devices. This common sample prep practice can result in imprecision, forcing laboratories to lose valuable man-hours for re-analysis. To learn more about how to increase the accuracy and performance of sample preparation, *LCGC* spoke with Mark Green, R&D leader, technology leader, and principal engineer for the GE Healthcare Life Science Laboratory Filtration Division.

LCGC: You have decades of experience developing lab filtration products with Whatman Filtration, one of the oldest and most well-known filter companies. What are some of the biggest factors that determine the direction of R&D for lab-scale filtration at Whatman?

Green: We spend a lot of time looking at general trends in the market, especially in sample preparation and quite a bit of time talking to customers trying to identify trends and pain points. For example, we've seen over the last several years that chromatography, specifically HPLC, is a key focus area for many customers, and that focus drives their filtration performance requirements.

A strong message that came from the customer base is that there is a need for consistency, which is considered to be the most valuable factor in sample analysis. We've heard that customers need the confidence from consistency to know that results are sample driven and not the result of contributions from something the sample may have encountered in the filter. Typically, analytical labs are tight resource models that don't really have the flexibility to assess if a contributing factor in an unexpected outcome could be the filter itself.

When we talk about developing products to help drive positive outcomes, eliminating the filter as a contributing factor is really what we have in mind.

LCGC: Historically, customers have said that they struggle with consistency. Why is that?

Green: I think it's important to understand what we mean by consistency.

Researchers and technicians typically make decisions based on chromatograms generated from an analytical process and need confidence that the chromatogram is suitable. For example, is the API stable under the conditions used? Is it safe to release a batch of food product?

To make these decisions quickly, they need the confidence that the chromatographic results are representative of the sample alone and not resulting from another substance the sample encountered in the filter. This situation leads to two challenges for customers. First, diverse sample types with differing chemical compatibility might require a diverse range of filter types to conduct a sample preparation. In this situation, the user may be unsure if an unexpected

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result occurs because of the sample or the changes in the filter types.

The physical matrix of the sample or the method of analysis can cause additional sample analysis challenges. For example, standard syringe filters may be appropriate for method development, but an autosampler useable format is more applicable when generating large amounts of data.

If unexpected data are obtained from a large number of samples that differ from those used in the original method development, it may not be easy to determine if the differences are from the sample itself or the result of the filter change. In both cases, inconsistent filter choice could lead to uncertain analysis.

LCGC: How does your product portfolio match with customers' sample prep needs?

Green: We have worked on several key functional design areas within the Whatman portfolio.

We offer flexibility by designing the same membrane type into a range of encapsulated formats so that customers can align to a standard membrane by choosing the appropriate format. This flexibility is important because a customer's filtration needs differ from time to time. For example, we have product design formats for high-throughput applications, robotic HPLC preparation, difficult-to-filter samples where high solid content is a challenge, and applications that require certification, as well as a general syringe filter. Even though these formats differ, the membrane inside is consistent.

Another key area is the development of a broad, compatible membrane to go into these formats in the form of regenerated cellulose. These regenerated cellulose membranes have been designed into the various formats outlined previously and makes standardization easy for the user.

LCGC: Can you tell us a bit more about the regenerated cellulose membrane?

Green: Regenerated cellulose is a mechanically stable hydrophilic membrane with very good wet strength that can be sterilized. It offers broad compatibility with common aqueous and organic solvents including those commonly used in HPLC, which is important because compatibility with common solvents will minimize levels of extractables that might interfere with analytes of interest.

The membrane also offers low non-specific protein binding. Broad compatibility delivered in multiple platforms or formats is key to standardized offerings. The right filter is sometimes an individual preference, however, so if customers feel like there is more they can do to improve their filtration practices, we encourage them to please reach out to GE for product samples to try it out for themselves.