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Octanol Water Partition Coefficient use in HPLC - Primer

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Understanding Log P: A Simple Guide for HPLC Beginners

When you're just getting started with HPLC, one of the most useful tools for predicting how your compound will behave on a column is something called the Octanol-Water Partition Coefficient, commonly known as Log P.

🧪 What Is Log P?

Log P is a measure of how a compound distributes itself between two liquids that don't mix: octanol (a fatty, oil-like substance) and water. It tells you whether your compound prefers to be in a hydrophobic (non-polar) environment or a hydrophilic (polar) one.

- If your compound prefers octanol, it's more hydrophobic (non-polar), and Log P is high.
- If it prefers water, it's more hydrophilic (polar), and Log P is low.

The formula is:

🔍 Why Does Log P Matter in HPLC?

In reversed-phase HPLC, which is the most common type, the stationary phase is non-polar (hydrophobic), and the mobile phase is polar (usually water with some organic solvent). So:

- Hydrophobic compounds (high Log P) tend to stick to the column longer and elute later.
- Hydrophilic compounds (low Log P) pass through more quickly and elute earlier.

Knowing the Log P of your compound helps you predict retention time and optimize your method.

🧠 Bonus Tip: Combine Log P with pI

If your compound is a protein or peptide, combining Log P with its isoelectric point (pI) gives you even more insight. The pI tells you the pH at which the molecule has no net charge, which affects how it interacts with the mobile phase and the column.

✅ Summary for Beginners

- Log P = how hydrophobic or hydrophilic your compound is.
- High Log P = more hydrophobic = longer retention in reversed-phase HPLC.
- Low Log P = more hydrophilic = shorter retention.
- Use Log P + pI to better predict and control your HPLC results.

COGENT HPLC Columns™

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