# Chromatography Document 01

In chromatography, elution volume—the amount of eluent required to elute a material from a column—is essential for substance identification and separation. It helps determine the order in which components elute, providing insights into their interactions with the stationary phase. This information is vital for understanding and controlling separation processes, optimizing downstream applications, and even identifying unknown substances.
Here's a more detailed breakdown of elution volume importance:

1. Identification of Substances:

- Under controlled conditions, substances elute at specific elution volumes. This allows researchers to identify unknown substances by comparing their elution volumes to known standards.

2. Separation Control:

- Elution volume is key to understanding and controlling the separation process in column chromatography.
- By knowing the elution volume of different substances, researchers can predict and control the order in which they will elute from the column.

3. Optimization of Downstream Applications:

- In some applications, like DNA extraction, a larger elution volume is needed to ensure a higher yield of the target molecule.
- Conversely, in other applications, a smaller elution volume might be preferred to concentrate the sample for further analysis.

4. Understanding Interactions:

- Elution volume provides information about the interactions between the substance and the stationary phase. For example, in ion-exchange chromatography, the ionic strength of the eluent influences the elution volume of ions.

Here, they have been summarized elution volumes of saccharides using different Shodex columns that we use them in our ISS sugar analysers. A brief description of how our sugar analyser works is gathered in Application-2310A sugar analyser.

| Substance | Elution volume (mL) | | | | | | |
|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G |
| Arabinose | 10.42 | 8.91 | 8.21 | 5.11 | 5.56 | 6.18 | 5.65 |
| D-Arabitol | 15.86 | 11.33 | 7.63 | 7.27 | 8.16 | 6.29 | 6.05 |
| Dulcitol | 20.18 | 12.76 | 7.40 | 9.46 | 11.28 | 7.45 | N/A |
| *meso*-Erythritol | 12.70 | 10.09 | 7.86 | 5.73 | 6.27 | 5.43 | 5.10 |
| D(-)-Fructose | 11.05 | 8.85 | 7.71 | 5.37 | 5.90 | 6.75 | 6.19 |
| D(+)-Fucose | 10.48 | 8.84 | 8.09 | 4.50 | 4.96 | 5.43 | 5.06 |
| D(+)-Galactose | 9.74 | 7.98 | 7.58 | 6.46 | 4.98 | 8.10 | 7.37 |
| Gentiobiose | 7.22 | 6.08 | 5.75 | 10.50 | ★ | 16.36 | 14.52 |
| Glucose | 8.63 | 7.30 | 7.17 | 5.87 | 4.76 | 8.61 | 7.47 |
| *myo*-Inositol | 12.77 | 8.86 | 7.99 | 12.63 | 7.87 | 9.96 | 11.68 |
| Isomaltose | 7.68 | 6.26 | 5.95 | 10.57 | ★ | 15.18 | 14.41 |
| Isomaltotriose | 7.09 | 5.75 | 5.34 | 21.17 | ★ | 27.55 | N/A |
| 1-Kestose | 6.79 | 5.75 | 5.26 | 13.09 | ★ | 20.11 | N/A |
| Kojibiose | 7.56 | 6.21 | 5.88 | 9.65 | ★ | 14.82 | N/A |
| Lactitol | 13.27 | 8.09 | 6.13 | 16.35 | 6.67 | 11.82 | 13.28 |
| Lactose | 8.05 | 6.51 | 5.99 | 10.12 | 4.07 | 13.27 | 12.46 |
| Lactulose | 9.13 | 6.99 | 6.19 | 9.16 | 4.65 | 10.72 | 10.52 |
| Maltitol | 12.23 | 8.26 | 6.03 | 13.04 | 6.77 | 11.82 | 12.37 |
| Maltose | 7.85 | 6.34 | 5.94 | 8.67 | ★ | 14.24 | 12.71 |
| Maltotriose | 7.48 | 5.89 | 5.38 | 13.79 | ★ | 24.96 | N/A |
| Mannitol | 15.80 | 11.10 | 7.23 | 8.75 | 9.03 | 7.39 | 7.35 |
| D-Mannose | 10.72 | 8.17 | 7.64 | 5.83 | 5.01 | 7.84 | 6.95 |
| Melibiose | 8.16 | 6.45 | 5.98 | 11.69 | 4.23 | 14.70 | 15.07 |
| Nystose | 6.38 | 5.45 | 4.93 | 20.05 | ★ | 31.90 | N/A |
| Palatinit | 2 peaks | 2 peaks | 5.90 | 2 peaks | 2 peaks | 12.73 | 14.23 |
| Palatinose | 7.84 | 6.45 | 5.89 | 8.08 | 3.99 | 12.12 | 11.26 |
| Panose | 7.14 | 5.78 | 5.32 | 16.87 | ★ | 25.60 | N/A |
| D(+)-Raffinose | 7.14 | 5.78 | 5.29 | 16.36 | ★ | 20.25 | N/A |
| Rhamnose | 9.77 | 8.23 | 7.37 | 3.93 | 4.43 | 5.52 | 4.87 |
| D(-)-Ribose | 19.35 | 13.66 | 9.04 | 4.82 | 8.64 | 5.45 | 4.93 |
| D(-)-Sorbitol | 21.61 | 13.31 | 7.42 | 9.79 | 11.88 | 7.09 | 7.18 |
| Sorbose | 9.67 | 8.03 | 7.38 | 5.12 | 4.92 | 7.35 | 6.79 |
| Stachyose | 6.82 | 5.57 | 4.97 | – | ★ | 36.22 | N/A |
| Sucrose | 7.54 | 6.29 | 5.87 | 7.91 | ★ | 11.87 | 10.69 |
| α-D-Talose | 21.33 | 12.59 | 8.76 | 5.69 | 8.51 | 6.47 | 5.75 |
| Trehalose | 7.62 | 6.27 | 5.78 | 10.85 | ★ | 13.25 | 14.36 |
| Trehalulose | 8.92 | 6.95 | 6.10 | 9.54 | 4.78 | 11.68 | 11.92 |
| Xylitol | 19.87 | 13.14 | 7.94 | 7.77 | 10.16 | 6.10 | 6.04 |
| Xylobiose | 8.16 | 6.68 | 6.40 | 5.65 | ★ | 9.05 | 7.83 |
| D(+)-Xylose | 9.21 | 7.90 | 7.71 | 4.55 | 4.48 | 6.58 | 5.78 |
| D-Xylulose | 10.64 | 9.02 | 8.04 | 4.06 | 5.07 | 5.41 | N/A |

N/A: Data not available (–): Not detected (★): Overlap with solvent peak