RT and RRT

RT: - Retention time

Definition: -

Retention time is the time taken by the solute to pass through the chromatography column.

It is the time taken by the sample (compound) to elute from the time of injection

The factors that influence the Retention time were

1. The flow rate of Mobile phase

   Increase in flow rate results in early elution of the analyte there by reducing the Retention time.

2. The composition of Mobile phase

   The change in Mobile phase composition when there two or more buffers to mix, the retention time of the analyte will be altered.

   In regular, increase in Organic proportion in the Mobile phase composition results in early elution of the analyte.

3. The temperature of the column

   The variation in temperature of the column in turn effects in system pressure and can results in variation in retention time of the analyte

4. Dimensions of the column

   The column length and the other dimensions, will shows effects on the retention time.

   The column with shorter length makes early elution for the analyte.

5. Column chemistry

6. Pump mode (Elution type – Isocratic or Gradient)

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We can use Pump mode and there by desirably can elute the analyte of interest.

RRT: - Relative retention time

Definition: -

Relative retention time is the ratio of the retention time of the analyte peak with the retention time of the reference sample (standard)

$$\textbf{Relative retention time} = \frac{\textbf{Retention time of Analyte}}{\textbf{Retention time of the reference (standard)}}$$

For example,

Retention time of the Analyte (a) = 2.5 minutes

Retention time of the Analyte (b) = 6.5 minutes

Retention time of the standard = 5.6 minutes

Then the Relative retention time of the analyte (a) and analyte (b) can be calculated by using the formulae

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$$\textbf{\textit{Relative retnetion time of the Analyte}}\ (\boldsymbol{a}) = \frac{\mathbf{2.5}}{\mathbf{5.6}} = 0.45$$

$$\textbf{\textit{Relative retnetion time of the Analyte}}\ (\boldsymbol{b}) = \frac{\mathbf{6.5}}{\mathbf{5.6}} = 1.16$$

By applying the above Relative retention time formulae, we can calculate RRT of any analyte.

Significance of the RRT: -

1. Relative retention time could help in identifying the impurities with respect to the standard and in Quantifying them.

2. RRT can also be an integral part as system suitability parameter and can be function as checking the column efficacy.

3. RRT can be helpful in distinguish the known impurities from the Unknown impurities in a given compound.