RF and RRF

RF: - Response factor

Definition: -

Response factor is the ratio of the signal produced of the analyte and the quantity of the analyte.

In simple terms, speaking analytically, Response factor is the ratio of the area of the analyte (impurity or API) and the concentration of the analyte (impurity or API)

$$\boldsymbol{Respose\ factor = \frac{Peak\ area\ of\ the\ analyte}{concentration\ of\ the\ analyte}}$$

RRF: - Relative response factor

Definition: -

Relative response factor is the ratio of the response factor of the impurity with the response factor of the API

$$\boldsymbol{Relative\ respose\ factor = \frac{Response\ factor\ of\ the\ impurity}{Response\ factor\ of\ the\ API}}$$

For example,

Peak area of the impurity = 25000

Concentration of the impurity = 5ppm

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Peak area of the API = 75000

Concentration of the API = 25ppm

Then the Response factor of the impurity can be calculated by using the formulae

$$\boldsymbol{Respose\ factor\ of\ impurity = \frac{25000}{5} = 5000}$$

Then the Response factor of the API can be calculated by using the formulae

$$\boldsymbol{Respose\ factor\ of\ API = \frac{75000}{25} = 3000}$$

Relative response factor of the impurity is calculated by using the following formulae

$$\boldsymbol{Relative\ respose\ factor\ of\ the\ impurity = \frac{5000}{3000} = 1.67}$$

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Relative response factor also calculated using the slope equation

$$\textbf{Relative respose factor} = \frac{\textbf{Slpoe of the impurity}}{\textbf{Slpoe of the API}}$$

Importance of RRF: -

RRF is used to correct the difference in detector response of the impurity with the analyte peak