

一、 Normalization method

This method can be used when all components have peaks. The formula is as

$$c_i \% = \frac{m_i}{m_1 + m_2 + \dots + m_n} \times 100 = \frac{f'_i \cdot A_i}{\sum_{i=1}^n (f'_i \cdot A_i)} \times 100$$

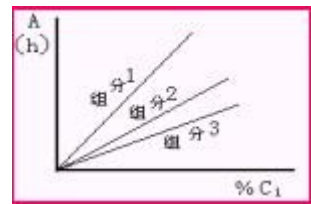
follows:

If component properties are close or the requirement for accuracy is not high, the corrected factor can be ignored. This time it can be named area normalization method.

**Characteristic and requirement:** (1) Simple and accurate. (2) The accuracy of injection amount and condition has little influence for the final result.. The material used to indicate the end point because of the color change near the stoichiometric point. (3) only be the same with this situation that all components have peaks.

二、 External standard method

It is also named calibration curve method, i.e. to confect a series of standard solution with different concentration and to inject under the same condition.



To determined peak area respectively under same injection amount. Peak heights or areas are plotted as a function of concentration to obtain a working curve. Quantitative analyses are based on this plot.

**Characteristic and requirement:** (1) Do not need correction factor, very accurate. (2) Operation conditions have bigger influence for result. (3) The amount of sample injection must be accurate. It holds true to volume-analysis of sample.

三、 Internal standard method This method is to select a suitable component (internal standard), then to add it into sample, at last to be quantified

according to peak area between the test component and the added component A carefully measured quantity of an internal standard is introduced into the

sample, and is injected after enough mixing. 1. Requirement for internal standard

(1) Do not contain this component in sample. (2) Similar nature with sample.

(3) Do not react with sample. (4) Peak is close to that of sample. 2. Sample

preparation To get accurately amount sample  $W$ , then to add amount internal

standard component  $m_s$ . 3. Formula  $\frac{m_i}{m_s} = \frac{f'_i A_i}{f'_s A_s}; \quad m_i = m_s \frac{f'_i A_i}{f'_s A_s}$

$$c_i \% = \frac{m_i}{W} \times 100 = \frac{m_s \frac{f'_i A_i}{f'_s A_s}}{W} \times 100 = \frac{m_s}{W} \cdot \frac{f'_i A_i}{f'_s A_s} \times 100$$

4. Characteristic (1) High accuracy,

operation condition and injection amount have little effect. (2) The analysis of every sample must determine twice mass at least, do not be used in analysis of

$$c_i \% = \frac{A_i}{A_s} \times \text{常数}$$

large amount of sample. (3) If  $m_s$  and  $W$  is fixed, then:

The

calibration curve can be done. To adopt internal standard calibration curve.

Please pay attention to the limited condition of these methods when you select quantitative methods. If some component has no peak, the normalization method can't be used. Outline of this page: Master all quantitative methods, characteristics and limited conditions of every method, selective method of internal standard .

Thinking subject of this page: Which quantitative method is not influenced by the little difference of injection amount ?

Thinking subject of next page: How to increase column efficiency by improving chromatograph column?