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ACIDIMETRY AND ALKALIMETRY TITRATION

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ACIDIMETRY TITRATION

- **Acidimetry, essentially involves the direct or residual titrimetric analysis of alkaline substances (bases) employing an aliquot of acid and is provided usually in the analytical control of a large number of substances included in the various official compendia. Examples :**
- (a) Organic substances : urea, sodium salicylate, diphenhydramine, emetine hydrochloride, meprobamate, paramethadione, pyrazinamide**
- (b) Inorganic substances : sodium bicarbonate, milk of magnesia, ammonium chloride, calcium hydroxide, lithium carbonate, zinc oxide**



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- **The two methods, namely : direct titration method and residual titration method are briefly discussed as under :**

1. DIRECT TITRATION METHOD

- **It is an usual practice that when a solid substance is to be assayed, an aliquot quantity of the same may be weighed and dissolved in sufficient water so that the resulting solution should have more or less the same equivalent concentration as that of the acid used in the titration.**



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- **Methyl orange (pH range = 3.0 to 4.4) is the indicator of choice for obvious reasons, as phenolphthalein and most other indicators are instantly affected by the carbonic acid (H_2CO_3) generated in the reaction which ultimately cause a change in colour even before the reaction attains completion.**

2. RESIDUAL TITRATION METHOD

- **Residual titration or back titration is normally employed in the following two situations, namely :**



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Case I : when a chemical reaction proceeds rather slowly or sluggishly

Case II : when the substance under determination fails to give a sharp and distinctly visible end-point with an indicator by direct titration.

ALKALIMETRY TITRATION

Acidic substances are usually determined quantitatively by methods similar to those used for the quantitative determinations of bases.

However, two methods are generally adopted for the assay of acidic substances, namely :



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(a) Direct Titration Methods : It is accomplished by directly titrating an exact quantity of the acid, acid salt or other acidic substance with standard alkali solutions.

(b) Residual Titration Methods : It is carried out by the addition of an excess of the standard alkali solution and subsequently determining the amount in excess by residual titration with standard acid solution.

- **As a general principle, the following guidelines may be observed carefully, namely :**
- **(i) the normality of the solution obtained by dissolving the acidic substance must be approximately the same as that of the titrant,**



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- (ii) the liquid acidic substance to be titrated must be brought to room temperature (25°C) before titration, because many indicators offer different values at different temperatures, and**
- (iii) the quantity of acid to be taken should be calculated in such a manner that approximately 30 to 40 ml of the previously standardized base shall be utilized for the assay.**



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