1. Typical Quantitative Analysis

ex : if the comple already liquid → we can avoid dissolution step.

In measurement step → measure one of physical properties

In calculation step → find the relative amount of analyte present in the samples.

In final step → evaluate the quality of results & estimate reliability

Choosing Method

↳ Selection of method → essential 1st step

↳ One of the first question in selection process :

Level of accuracy required

↳ Selected method represent compromise between accuracy required & the time & money available for analysis.

↳ Second consideration related to economic factors

↳ number of samples that will be analyted

! If there are many samples → spend significant amount of time in preliminary operations

→ ex :- assembling & calibrating instruments & equipment

- preparing standard solutions

! If only have 1 sample / few sample → select a procedure that avoids / minimizes → ex : preliminary steps

→ The complexity of comple × number of components in the sample matrix influence the choice of method to some extent

Acquiring the Sample

↳ To produce meaning full information : analyst must be performed on sample that has the same composition as the bulk of material from its taken

↳ Heterogeneous 異質的

- required to have great effort to get representative sample
- A material is constituent parts can be distinguished visually / with the aid of microscope
- Ex : coal, animal tissue & soil

↳ Assay 試驗

- perform on sample that weights alot 1 gram
- process of determining how much of given sample is the material by its indicated name
- Ex : zinc alloy is assayed for its zinc content & its assay is a particular numerical value.

↳ Sampling → process of collecting small mass of material whose composition accurately represent the bulk of material being sampled

試樣

- analyze sample × determine substance

ex : blood sample is analyzed to determine concentration of various substance such as blood gases & glucose

↳ Analyst must be cure that laboratory sample is representative of the whole before proceeding

↳ Sampling is the most difficult step in analysis & source of greatest error

↳ The final analytical result will never be any more reliable than the realibility of sampling step.

- Processing the Sample

↳ Certain circumstance, no sample processing is required prior to measurement

↳ ex : When water sample is withdrawn from a stream, lake / ocean, the pH of sample can be measured directly.

↳ First step of processing the sample → preparation of lab. sample.

↳ Step :

a.) Preparing Laboratory Sample

- Solid lab. sample is ground to decrease particle size, mixed to ensure homogeneity & stored for various lengths of time before analysis begins.
- Absorption / Desorption of water may occur depend on humidity of environment
- Moisture content of sample can determine at the time of analysis in separate analytical procedure
- Liquid samples present slightly different but related set of problem during this step → If the sample allow to stand in open containers, solvent may evaporate & change the concentration of analyte.

* [illegible] gas dissolve in liquid as our ex (blood gas) the sample container must be kept inside second sealed container

- To prevent contamination by atm ~~gas~~ gases
- To preserve integrity of comple → required extraordinary measures include sample manipulation & measurement in inert atm

- Defining Replicate Samples

↳ Replicate sample / replicates → portions of material of approximately the same size that're carried through analytical procedure at the same time & way.

複製試樣

→ masses / volumes have been determine by careful measurements with analytical balance / with precise volumetric device

↳ Replication improve quality of results & provides measure of reliability

- Preparing Solutions : Physical & Chemical Changes

↳ solvent should dissolve the entire sample, include analyte, rapidly & completely.

↳ Many Materials that must be analyze are insoluble in common solvent

↳ ex : Silicate materials, high molecular mass polymers & specimen of animal tissue

↳ Converting analyte into soluble form is most difficult & time consuming task in analytical process

↳ Sample may require heating with aqueous solution of :

- strong acid
- oxidizing agents
- combination of reagents
- strong bases
- reducing agents

↳ necessary to ignite sample in air / oxygen / to perform high temp fusion of sample in presence of various fluxes