

# **ANALYTICAL SEPARATION METHODS**



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# PLAN and CONTENT

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# WHAT IS THE SEPARATION

In chemistry, separation and purification are a separation of a substance into its components and the removal of impurities.

Aim: to improve **the quality of life.**



# History of The Separation

- The extraction of metals from ores and medicines from plants is older than recorded history.
- In the Middle Ages the alchemists' search for the philosophers' stone and the elixir of life depended on separations.



# Separation in Different Industry

- In the industrial and technological revolutions, separations and purifications have assumed major importance.
- In the petroleum industry crude oil is separated into products used as fuels, lubricants, gasolines, diesel and chemical raw materials.
- In the pharmaceutical industry natural and synthetic drugs are separated and purified to meet health needs.
- The mining industry is based on the separation and purification of metals.



# Reasons for Making Separations

Two general reasons:

- The mixture may contain some substances that should be isolated from the rest of the mixture.
- The second reason for performing separations is to alter the composition of a sample so that one or more of the components can be analyzed.



## What is a Mixture?

A mixture is any physical material that is made up of various constituent substances, which haven't chemically interacted with each other.

Every constituent of a mixture retains its individual chemical properties.

The physical properties of that mixture will differ from its constituent elements.

Mixtures, **unlike chemical compounds**, can be separated into their constituent substances, using physical methods of separation.



# What are the Properties of a Mixture?

- A mixture always exhibits the characteristic properties of the substances it is made of.
- The composition of a mixture is varied by altering the proportions of its constituents.
- A mixture can be segregated into its constituents by physical or mechanical means.

A mixture is basically classified into two basic types:

Homogeneous mixtures

Heterogeneous mixtures





# Heterogeneous Mixtures

- Suspensions and emulsions are two special types of heterogeneous mixture.

**A suspension** is a mixture of solids and liquid in which the solids do not dissolve in the liquid solution.

**An emulsion** is a mixture consisting of two liquids, do not mix together. When two such liquids are kept together, they do not mix, no matter how much you try to do so by shaking or stirring.

# Homogeneous Mixtures

The prefix 'homo' means same and indicates that the two substances combined together blend well to form one uniform mixture, in which individual particles cannot be distinguished. **Solutions** are homogeneous mixtures.

**What sets these mixtures apart from heterogeneous mixtures?**

The particle size of the mixed constituents

