Adulteration of Drugs, Drugs Evaluation and Pharmacopoeial Standards

**Adulteration:-**
Adulteration are defined as admixture of genuine articles with spurious or harmful substances. The action of making something poorer in quality by the addition of another substance is also known as adulteration.

Example:-

- Mixture of Papaya seed with black pepper.
- Mixture of power of brick into red chilli powder.

**Methods of adulterating the drugs.**

The extent of adulteration depends upon whether the drug is obtained from other countries. An adulteration of a drug may be accidental. Adulteration is very common with drugs which are sold illegally.

*Following are the various methods used for drugs adulteration.*

A. Substitution with manufactured materials
B. Substitution with Inferior material
C. Substitution with Exhausted material.
D. Substitution with cheap natural substance.
E. Adulteration with non-plant material.
F. Excessive adventitious matter.
A. Substitution with manufactured materials :-

This is done with artificially manufactured material which resembles various drugs in form and appearance.

Example:- Paraffin wax has been coloured yellow to substitute bee wax.

B. Substitution with Inferior material:-

- Drug are sometimes adulterated and substituted with standard commercial material.
- The common example of substitution is adulteration of cloves by mother cloves.
- Saffron is adulterated with dried flowers of carthamus tinctorius (Safflower).

C. Substitution with Exhausted material.

Exhausted material the vegetable residues which remain after the original material has been use for drug preparation.

Example :-
- The substitution of Alexandrian Senna with Arabian Senna.
- Used of exhausted Clove and ginger for adulteration.
D. Substitution with cheap natural substance.

Sometimes drugs are adulterated with cheaper natural substance which have no relation to the genuine article. Example Japan wax for bees wax and sterculia gum for tragcanth.

E. Adulteration with non- plant material.

Plant material are sometime Adulteration with worthless non-plant material.

Example :- Pieces of limestone in asafoetida & lead shot in pieces of opium.

F. Excessive adventitious matter.

Adulteration involves also the presence of an excessive quantity of an adventitious material that naturally occurs with the plant.

Examples. Excessive amount of stem in the leaves of lobelia or stramonium.

**Drugs Evaluation**

- *Drug Evaluation* is defined as the confirmation of its identity and determination of its quality and purity.
- If adulterated, it also includes the detection of the Nature of adulteration in the crude drug.
Methods of drug Evaluation.

The method of drug evaluation are classified as:

1. **Organoleptic evaluation**
2. **Microscopic evaluation**
3. **Physical evaluation**
4. **Chemical evaluation**
5. **Biological evaluation**

1. **Organoleptic evaluation:**
   - The evaluation of drugs by colour, odour, taste, size, shape etc. Visual examination of morphological characters.
   - The study of from of a crude drug is Morphology, while description of the form is morphography.

1. **Microscopic evaluation:**
   - This method allows more detailed examination of a drug.
   - It can be used to identify organised drugs by their known histological characters.
   - Histological studies are made from very thin sections of the drugs. The characteristics of cell wall, cell contents, trichomes, etc.

1. **Physical evaluation:**
   - Physical standard are to be determined for drugs, they may help in evaluation.
   - The following are some physical constants which are use drug evaluations. specific gravity, density, optical rotation, viscosity and solubility in different sovents.

1. **Chemical evaluation**
• It is determination of active constituents in a drug by chemical methods. The following are various methods of chemicals evaluations.

1. **Instrumental methods:** They make use of a variety of instruments for evaluations. **Examples:** Colorimetry for Alkaloida of solanaceae.

2. **Chemical constants** in this method used identifying particular drug. **Example:** Acid value, Iodine value, Easter value

3. **Individual Chemical test:** used for identifying particular drug **Example:** Halphen’s test, Copper acetate test.

4. **Micro chemical test:** Example: euginal in clove oil is precipitated as potassium euginate crystals by adding potassium hydroxide.

1. **Biological evaluation**
   In this methods the response produce by the rest drug on a living system in compared with that of the standard

**Example:** Cardiac glycosides like digitalis.