

#### 4. CHEMICAL EVALUATION

- It comprises of different chemical tests and chemical assays.
- The isolation, purification and identification of active constituents are chemical methods of evaluation.
- Quantitative chemical tests such as acid value, saponification value etc., are also covered under this technique.
- Some of these chemical tests are useful in evaluation of resins (acid value), balsams (acid, saponification and ester values), volatile oils (acetyl and ester values); and gums (methoxy determination and volatile acidity).
- The preliminary phytochemical screening is a qualitative indicates spectrum of chemical constituents present in a plant drug. The successive solvent extraction of a drug is carried out with petroleum ether, benzene, solvent ether, chloroform, ethanol and water in succession.
- The conventional titrimetric estimations of alkaloids from crude drugs, ester and aldehydes contents of volatile oils, gravimetric methods etc., are the techniques of chemical assays.
- The chemical tests also help in proper identification of varieties of the crude drugs.
- The solutions of lead acetate or lead sub-acetate are used specifically for chemical identity of gums.
- The alkaloid containing drugs such as rauwolfia, belladonna, ergot, Ipecacuanha, etc, and glycoside bearing drugs like senna, digitalis, squill, strophanthus, etc., can be identified with the help of specific chemical tests.
- The different classes of natural products present as active constituents in crude drugs can be identified by performing several general and specific chemical tests.
- Halphen's test for cotton seed oil, Van Urk's reagent for ergot, Vitalis test for tropane alkaloids, Borntrager's test for anthraquinones, murexide test for purine bases are examples of such chemical tests.
- The estimation of chief constituent or group of active constituents is an integral part of chemical evaluation e.g., total sennosides in senna, morphine in opium, citral in lemon-grass oil, eugenol in clove oil, eucalyptol in eucalyptus oil, water-soluble alkaloids in

ergot, tropane alkaloids in belladonna, emetine in ipecac, reserpine and rescinnamine in is rauwolfia, quinine in cinchona etc.

## 5. BIOLOGICAL EVALUATION

- When the estimation of potency of crude drug or its preparation is done by means of its effect on living organisms like bacterial, fungal growth or animal tissue or entire animal, it is known as bioassay.
- This method is generally followed, when standardization is not adequately done by chemical or physical means.
- In other words, bioassay is the measure of sample being tested capable of producing the biological effect as that of the standard preparation. Such an activity is represented in units known as International Units (I.U.) The specific biological activity contained in each I.U. of few drugs is mentioned as follows:

Digitalis: 1 IU is contained in 76 mg of standard preparation

Vit. A: 1 IU is contained in 0.344 micrograms of standard preparation

Vit. D: 1 IU is contained in 0.025 micrograms of standard preparation

Heparin: 1 IU is contained in 7.7 micrograms of standard preparation

Biological assay methods are mainly of 3 types,

(1) toxic (ii) symptomatic and (iii) tissue methods.

- In toxic and symptomatic techniques, the animals are used, whereas in tissue method, the effect of a drug is observed on isolated organ or tissue.

Among the drugs that are subjected to bioassay are cardiac glycosides, vitamins, hormones, saponins anthracene glycosides and antibiotics (microbiological assay).