

Biological screening of herbal drugs

Introduction and Need for Phyto-Pharmacological Screening

Introduction

- **Phyto-pharmacological screening** is the scientific evaluation of herbal drugs and plant extracts to determine their biological and pharmacological activities.
- It helps identify the therapeutic potential of medicinal plants and their active constituents.
- Biological screening is an important part of herbal drug development and validation.
- In Advanced Pharmacognosy, it provides scientific evidence for traditional medicinal claims.

Objectives of Phyto-Pharmacological Screening

1. Identification of Biological Activity

- Screening helps determine the pharmacological effects of medicinal plants.

2. Discovery of New Drugs

- Screening assists in identifying novel bioactive compounds for drug development.

3. Validation of Traditional Uses

- Traditional medicinal claims can be scientifically verified.

4. Safety Assessment

- Screening helps evaluate the safety profile of herbal drugs.

Need for Phyto-Pharmacological Screening

1. Scientific Validation of Herbal Medicines

- Traditional use alone is not sufficient proof of efficacy.
- Scientific studies are necessary to confirm therapeutic claims.

2. Development of Standardized Herbal Products

- Screening helps identify active constituents required for standardization.

3. Quality Control

- Biological evaluation contributes to maintaining product quality.

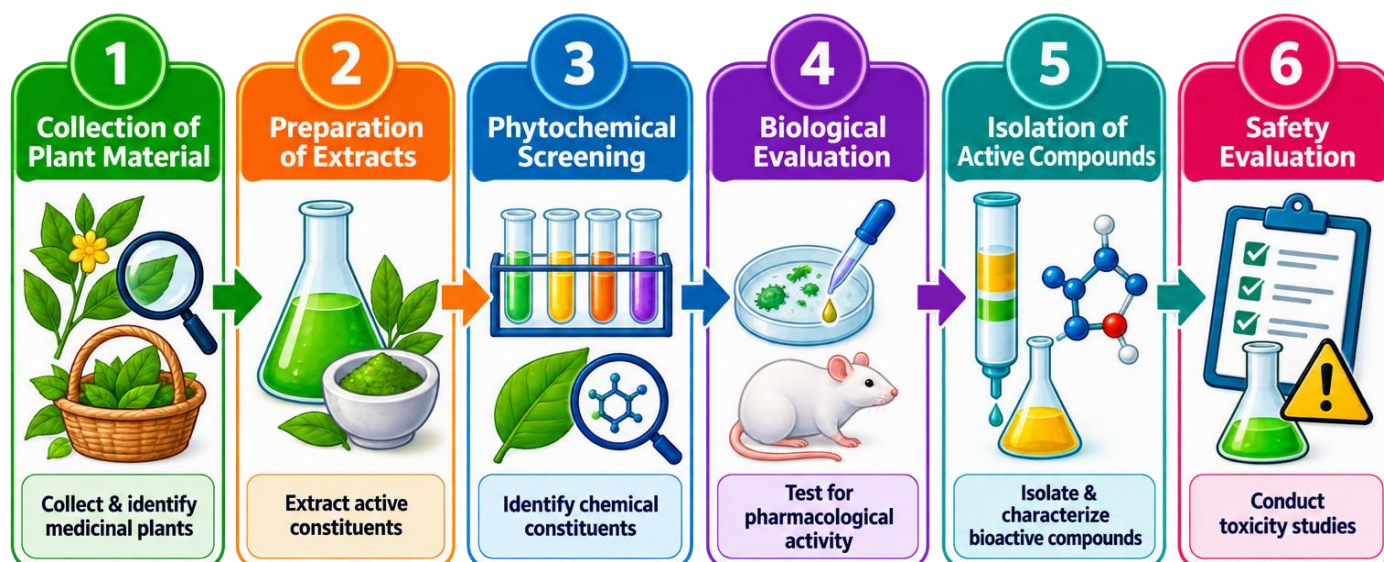
4. Discovery of Lead Molecules

- Medicinal plants serve as sources of potential drug candidates.

5. Regulatory Acceptance

- Biological screening data support regulatory approval of herbal products.

Steps in Phyto-Pharmacological Screening



1. Collection of Plant Material

- Authentic medicinal plants are collected and identified.

2. Preparation of Extracts

- Suitable extraction methods are used to obtain active constituents.

3. Preliminary Phytochemical Screening

- Chemical constituents are identified.

4. Biological Evaluation

- Extracts are tested for pharmacological activities.

5. Isolation of Active Compounds

- Bioactive constituents are isolated and characterized.

6. Safety Evaluation

- Toxicity studies are conducted before clinical use.

New Strategies for Evaluating Natural Products

Introduction

- Modern evaluation of natural products combines traditional knowledge with advanced scientific techniques.
- New strategies improve the efficiency of identifying bioactive compounds.
- These approaches accelerate drug discovery and reduce development time.
- In Advanced Pharmacognosy, modern evaluation techniques have become essential for natural product research.

Need for New Evaluation Strategies

1. Large Number of Medicinal Plants

- Thousands of medicinal plants require systematic evaluation.

2. Complex Chemical Composition

- Herbal drugs contain multiple active constituents.

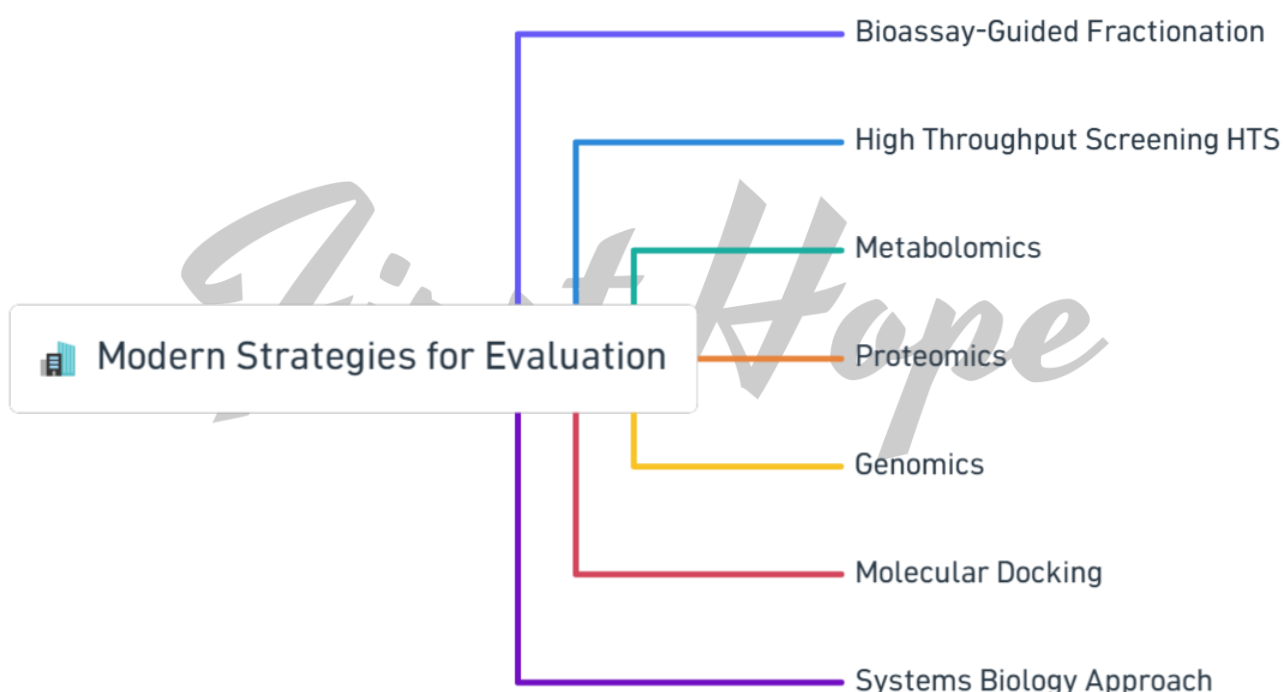
3. Requirement for Rapid Screening

- Faster methods are needed for drug discovery.

4. Need for Scientific Validation

- Modern healthcare systems require evidence-based herbal medicines.

Modern Strategies for Evaluation



1. Bioassay-Guided Fractionation

Principle

- Plant extracts are fractionated and tested for biological activity.

Purpose

- To identify the fraction containing active constituents.

Advantages

- Efficient isolation of bioactive compounds.

2. High Throughput Screening (HTS)

Principle

- Large numbers of samples are screened simultaneously using automated systems.

Advantages

- Rapid analysis.
- Increased efficiency.

3. Metabolomics

Principle

- Comprehensive analysis of metabolites present in a plant.

Techniques Used

- LC-MS.
- GC-MS.
- NMR.

Applications

- Identification of biomarkers and active compounds.

4. Proteomics

Principle

- Study of proteins involved in biological activity.

Applications

- Understanding mechanisms of action.

5. Genomics

Principle

- Analysis of genetic information associated with medicinal plants.

Applications

- Identification of genes involved in biosynthesis of active compounds.

6. Molecular Docking

Principle

- Computer software predicts interaction between natural compounds and biological targets.

Advantages

- Reduces time and cost of drug discovery.

7. Systems Biology Approach

Principle

- Studies interactions among genes, proteins, metabolites, and biological pathways.

Applications

- Understanding complex pharmacological effects of herbal medicines.

Advantages of Modern Strategies

1. Faster Drug Discovery

- Large numbers of compounds can be evaluated quickly.

2. Improved Accuracy

- Advanced techniques provide reliable results.

3. Better Understanding of Mechanisms

- Molecular studies explain biological effects.

4. Identification of Novel Therapeutic Agents

- New bioactive compounds can be discovered.

In Vitro Evaluation of Antioxidant Activity

Antioxidants protect cells from damage caused by free radicals and reactive oxygen species.

1. DPPH Radical Scavenging Assay

Principle

- DPPH is a stable free radical with a purple color.
- Antioxidants reduce DPPH, causing a decrease in color intensity.

Procedure

- Herbal extract is mixed with DPPH solution.
- Reduction in absorbance is measured spectrophotometrically.

Interpretation

- Greater reduction in absorbance indicates stronger antioxidant activity.

2. ABTS Radical Scavenging Assay

Principle

- Antioxidants neutralize ABTS radicals and decrease color intensity.

Application

- Widely used for evaluation of antioxidant potential.

3. Ferric Reducing Antioxidant Power (FRAP) Assay

Principle



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