



## **Review on Advanced Herbal Technology.**

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### **ABSTRACT**

Applications for natural products in medication research and discovery are growing. They can influence multiple targets at once in a complex system due to their diversity in chemical composition. Technology for natural drugs has significantly advanced during the previous ten years. Ancient traditional medical practises may be able to shed light on the safety of herbal medicines. The moment is opportune to make decisions regarding the efficacy and safety of herbal medicine items. Also, there are regional differences in the legal status and approval process for herbal medicines. As a requirement for global harmonisation, the World Health Organization [WHO] has established precise standards for the evaluation of the safety, effectiveness, and quality of herbal medicine. The advancement of science and technology invades the herbal drug products in broad manner.

Due to various benefits, individuals are becoming more interested in using herbal medicines nowadays. As treatment options for many disorders, herbal formulations have gained widespread acceptance. Although the majority of these uses are conventional, it is known that more than 80% of the world's population relies on herbal products and medications to maintain a healthy lifestyle. Due to the increased use of herbal goods, there have also been an increase in product abuse and adulteration, which can have catastrophic consequences for both consumers and manufacturers.

Hibiscus Rosa sinensis has antibacterial, anticonvulsant, and anti-diabetic properties. Hibiscus Rosa-sinensis, sometimes referred to as Chinese Hibiscus, China Rose, or Rose Mallow, is a species of tropical hibiscus and a member of the Malvaceae family of flowering plants. The tropics and subtropics are where it is most commonly grown as a garden plant, although vanuatu is where it is native.

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### **INTRODUCTION**

Herbal medicine are oldest remedies known to mankind. Herbs have been used by all cultures throughout history but India has one of the oldest, richest and most diverse culture living traditional associated with the use of medicinal plants. In the present scenario, the demand for herbal products is growing exponentially throughout the world and major pharmaceutical companies are currently conducting extensive research on plant materials for their potential medicinal value. Herbal drug technology is used for converting botanical materials into medicines, where standardization and quality control with proper integration of modern scientific techniques and traditional knowledge is important. Herbal formulations have gained widespread acceptability as therapeutic agents for diabetes, arthritis, liver diseases, cough and cold, and memory enhancement throughout the world. Herbs are traditionally considered harmful and increasingly being consumed by a people without prescription. The traditional medicine is increasingly solicited through the traditional practitioners and herbalists in the treatment of infectious diseases. The household remedies mostly consist of regular kitchen ingredients and are generally used as over-the-counter medicines.

The major drawback of modern medicine is their side effects which may lead to the life-threatening of patients. Herbal medicine also have their list of side effects like any other synthetic drug. Thus it is essential to evaluate their clinical safety and efficiency. The role of natural product, herbal medicines, traditional medicines is increasingly appreciated in recent years for the prevention and cure of human ailments.

Natural product research is often based on ethnobotanical information and many of the drugs used today were implied in indigenous societies. One of the aims of ethnopharmaceutical research is better understanding of the pharmacological effects of different medicinal plants traditionally used in health care. Plants have application in the development of therapeutic agents and act as a source of bioactive compounds for possible use as drugs.

Medicine is a substance that has nutritive, curative, or preventive properties, while the term "herbal" refers to a botanical or plant-based preparation. Hence, the term "herbal medicine" is used for plant-based substances that consist of nutritive, curative, or preventive properties. Herbal medicine is an interdisciplinary branch between herbal medicine and Ayurveda as it covers all fields of herbal medicine related to botany, medicinal plant research, pharmacognosy, phytochemistry, phytotherapy, botanical medicines, Ayurveda, natural chemistry, agriculture science, Unani medicine, biotechnology, and biochemistry. A person who deals with herbs, especially medicinal herbs, is known as an herbalist. Herbal journals deal with the use of plants in the treatment of diseases.

With many people now using herbal medicine, safety issues are also becoming an important concern. Indeed, certain HMs have been implicated in some important adverse events relating to cardio, neuro and nephro-toxicities as well as cancers. Toxicity due to HMs may occur and their seriousness may vary depending on the type of herb or herbal material, preparation and user: varying from minor to severe and sometimes fatal. Adulterations and concomitant

use of herbal medicines with conventional medicines constitute another area of attention, thus, the need for a strict regulation and enlightenment and control.

In contemporary times, HMs are prepared and used in different forms, which also affect their activity outcomes. The dosage form of herbal medicines varies widely depending on such factors as the type of disease to be treated, route of application, patient, culture and even philosophical backgrounds. In homes and traditional medicine clinics, HMs are prepared often from fresh or dried herbs which are commonly made into infusions, decoctions, poultices, powders to be poured into open wounds or incorporated into native beverages, puddings, and so on. Conventional commercial HMs products are commonly available as pills, capsules, tablets, powders/granules, creams, ointments, and so on. The presentation of HMs in pharmaceutical dosage forms is expected to enhance accurate dosing, esthetics as well as compliance by enticing usage.



FIG NO 1

## IDENTIFICATION OF PLANTS

Identification is a basic activity and one of the primary objectives of systematics. Although identification is a separate activity or process, in practice it involves both classification and nomenclature. Identification is simply the determination of the similarities or differences between two elements, i.e., two elements are the same or they are different. The comparison of an unknown plant with a named specimen and the determination that the two elements are the same also involves classification, i.e., when one correctly decides that an unknown belongs to the same group (species, genus, family, etc.) as a known specimen, the information stored in classification systems becomes available and applicable to the material at hand.

## DIFFERENT METHOD OF IDENTIFICATION OF PLANT

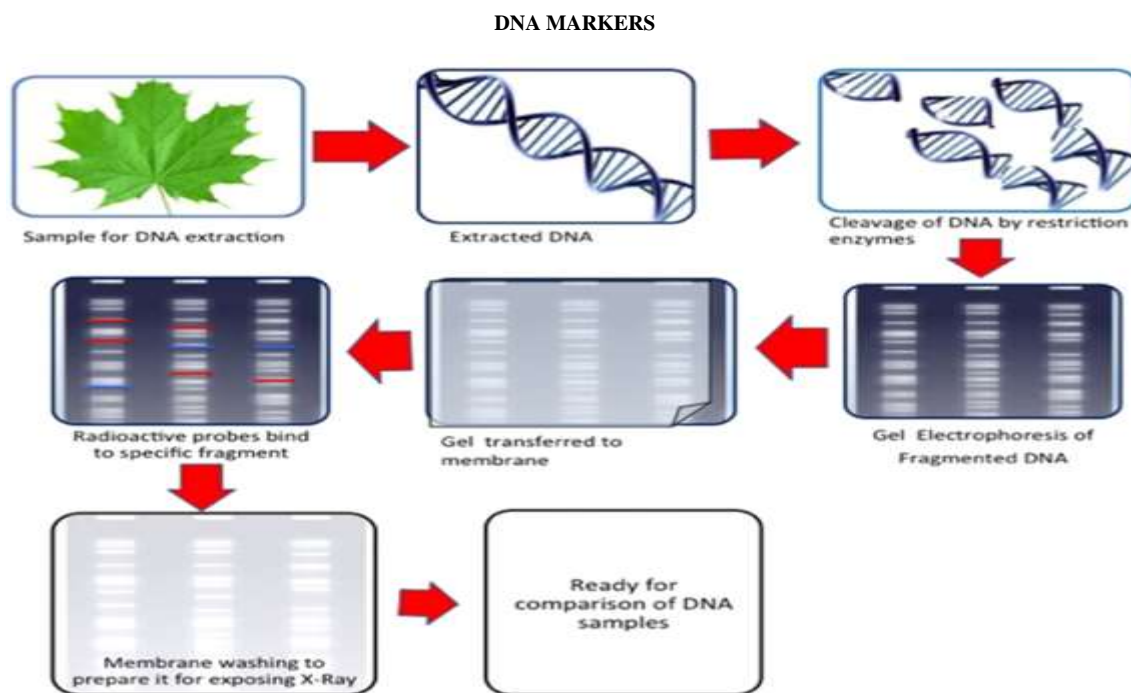
- 1) **Expert determination** -The best method of identification is expert determination in terms of reliability or accuracy. In general the expert have prepared treatments (monographs, revisions, synopses) of the group in question, and it is probable that the more recent floras or manuals include the expert's concept of taxa.
- 2) **Recognition** – this is based on extensive, past experience of the identifier with the plant group in question.
- 3) **Comparison** - A third method is by comparison of an unknown with named specimens, photographs, illustrations or descriptions.
- 4) **The Use of Keys and Similar Devices** – This is by far the most widely used method and does not require the time, material or experience involved in comparison and recognition

## AUTHENTICATION OF PLANTS

Herb authentication is a quality assurance process that ensures the correct plant species and plant parts are used as raw materials for herbal medicines. The proper authentication of herbal raw materials is critically important to the safety and efficacy of herbal medicines. Morphological, anatomical, chemical and DNA markers solve the problem by differentiating the genuine material from the adulterants, substitutes and spurious drugs.

**Macroscopic examination**–They involves the comparison of morphological characters that are visible with the naked eye or under low magnification with descriptions of the plant or botanical drug in floras or monographs. Characters such as size, shape and colour of leaves (or leaf fragments), flowers or fruits are commonly used in macroscopic identification.

**Microscopic examination** -They focuses on anatomical structures in the plant material that are visible only with the help of a microscope. Features such as trachoma (hair) shape and structure, the arrangement of stomata in the epidermis, the presence or absence of compounds such as mucilage, starch or lignin, or the presence of tissues with characteristic cells might be used in the microscopic identifications of herbal drugs.



## EXTRACTION OF HERBAL PLANT

Extraction of medicinal plants is a process of separating active plant materials or secondary metabolites such as alkaloids, flavonoids, terpenes, saponin, steroids, and glycosides from inert or inactive material using an appropriate solvent and standard extraction procedure.

**Maceration** - This is an extraction procedure in which coarsely powdered drug material, either leaves or stem bark or root bark, is placed inside a container; the menstruum (The solvent used for the extraction of medicinal plants) is poured on top until completely covered the drug material. The container is then closed and kept for at least three days.

**Infusion** -infusion is a chemical process that uses botanical (dried herbs, flowers) that are volatile and release their active ingredients readily in water, oil or alcohol. In this process, a liquid is typically boiled and poured over the herbs.

**Digestion** - This is a form of maceration in which gentle heat is used during the process of extraction. It is used when the moderately elevated temperature. The solvent efficiency of the menstruum is increased.

**Decoction** - Decoction involves first drying the plant material; then cutting the material to allow for maximum dissolution; and finally boiling in water to extract oils.

## Importance of standardization

### STANDARDIZATION OF HERBAL FORMULATION

Standardization of herbal formulation requires Implementation of Good Manufacturing Practices (GMP). In addition, study of various Parameters such as pharmacodynamics, Pharmacokinetics, dosage, stability, self-life, toxicity Evaluation, chemical profiling of the herbal Formulations is considered essential. Other factors Such as pesticides residue, aflatoxine content, heavy Metals contamination, Good Agricultural Practices (GAP) in herbal drug standardization are equally important.

### STANDARDIZATION OF POLYHERBAL FORMULATION

Hyperlipidemia is a very common medical condition. A fairly less invasive, more effective and efficient method with lower or no side effects to treat Hyperlipidemia are to be developed. Thus, use of traditional herbal medication can be a relevant solution to it. Development of highly standardized Polyherbal formulation with respect to chemical content and therapeutic activity is considered as a valuable approach in the field of herbal industry. Traditional medicine is known for its Polyherbal contents and multicomponent therapeutics for managing health problems. Thus, the present research is focused on to formulate, standardize a polyherbal medicine to treat hyperlipidemia.

## STANDARDIZATION AND QUALITY CONTROL OF HERBAL CRUDE DRUGS

### PARAMETERS

According to WHO (1996a and b, 1992), Standardization and quality control of herbals is the Process involved in the physicochemical evaluation Of crude drug covering aspects, such as selection and Handling of crude material, safety, efficacy and Stability assessment of finished product, Documentation of safety and risk based on Experience, provision of product information to Consumer and product promotion. Attention is Normally paid to such quality indices such as:

**Morphology and organoleptic evaluation:** In case Of whole drug morphological characters are Important for differentiating purpose. It mainly includes colour, odour, taste, shape, size etc. Detail Characteristics includes fractures, texture, venation Etc.

**Microscopic and histologic evaluation:** These are Valuable in both whole as well as powdered drug. It Mainly includes study of characteristics like Parenchyma, trichomes, calcium oxalate crystals, Vascular bundle arrangements, stomata, fibres etc.

### **Quantitative microscopic study:**

Microscopic Determination such as vein islet number, stomatal Index, stomatal number, vein termination number, Size of fibres, palisade ratio. Such study helps in Differentiation of closely allied species.

### **Physical evaluation:**

Study of various physical Parameters like moisture content, solubility, Viscosity, refractive index, melting point, optical Rotation, ash values, extractives and foreign organic Matter. Size of fibres, palisade ratio. Such study helps in differentiation of closely allied species.

### **Qualitative chemical evaluation:**

This covers identification and characterization of crude drug with respect to phytochemical constituent. It employs different analytical technique to detect and isolate the active constituents. Phytochemical screening techniques involve botanical identification, extraction. With suitable solvents, purification, and characterization of the active constituents of pharmaceutical importance

**Quantitative chemical evaluation:** To estimate the amount of the major classes of constituents.

### **Toxicological studies:**

This helps to determine the pesticide residues, potentially toxic elements, safety studies in animals like LD50 and Microbial assay to establish the absence or presence of potentially harmful microorganisms.

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**Formulation herbal WHO guidelines for quality standardization** Reference to the identity of the drug. Botanical evaluation – sensory characters, foreign organic matter, microscopical, histological, histochemical evaluation, quantitative measurements etc.

Reference to the physicochemical character of the drug. -Chromatographic profiles, ash values, extractive values, refractive index, polarimetric readings, moisture content, volatile oil content, etc.

Reference to the pharmacological parameters. Biological activity profiles, bitterness values, haemolytic index, astringency, swelling factor, foaming index, etc.

Toxicity details – heavy metals like cadmium, lead, arsenic, mercury, etc. Pesticide residue.

Microbial contamination – Total viable aerobic count, pathogenic bacteria like enterobacteria, *E.coli*, salmonella, *Pseudomonous aeruginosa*, *Staphylococcus aureus*, etc. and presence of aflatoxins etc.

Radioactive contamination - However, recent reports on contamination can be seen, especially in herbal drugs. The contamination of radionuclides in many vegetables post the nuclear accident period is proven. In the post Chernobyl crisis, radionuclide contamination could be detected in many medical plant products, including tea and juniper. Of interest, although a lot of care is taken with regard to foods from contaminated areas, there is little attention paid to the drugs from those settings. There are many concerns about some drugs, to prevent or fight their radioactive contamination, but there is lack of concern about the possible contamination within the drugs.

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## APPLICATIONS OF HERBAL DRUGS

- i. Herbal Remedies for Psoriasis Diseases.
- ii. Herbal drugs for disorders caused by "cell phones"
- iii. Polyhedral Therapies

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## CONCLUSION

Plants, herbs, and ethno botanicals have been used since the early days of humankind and are still used throughout the world for health promotion and treatment of disease. Plants and natural sources form the basis of today's modern medicine and contribute largely to the commercial drug preparations manufactured today. About 25% of drugs prescribed worldwide are derived from plants. Still, herbs, rather than drugs, are often used in health care. For some, herbal medicine is their preferred method of treatment. For others, herbs are used as adjunct therapy to conventional pharmaceuticals.

The hypoglycaemic effect of the ethanolic extract of *H. rosasinensis* flowers on the fasting blood sugar levels of diabetic rats. After a single dose of extract only the dose of 500 mg/kg showed significant reduction in the blood sugar level after 1 h, where the extract at a dose of 250 mg/kg showed a significant reduction in the blood glucose level only after 3 h. In the sub-acute study at the end of the study the extract at dose of 500 mg/kg showed a significant reduction in the blood glucose comparable with that of glibenclamide (10 mg/kg) treated group. It was suggested that the regeneration of  $\beta$  cells following destruction by alloxan might be the primary cause for the antidiabetic activity of the extract. Similar result of  $\beta$  cell regeneration also has been reported for *Vinca rosea* extracts.

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