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Review Article

REVIEW OF HERBAL DRUG FORMULATIONS AND ITS EVOLUTIONS

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ABSTRACT

Drug discovery from the medicinal plant has traditionally been lengthier and more useful than other drug discovery method of drug formulations Over the past several years, great advances have been made on development of novel drug delivery systems (NDDS) for plant actives and extracts. The variety of novel herbal formulations like polymeric nanoparticles, nanocapsules, liposomes, phytosomes, nanoemulsions, microsphere, transferosomes, and ethosomes has been reported using bioactive and plant extracts. The novel formulations are reported to have remarkable advantages over conventional formulations of plant actives and extracts which include enhancement of solubility, bioavailability, protection from toxicity, enhancement of pharmacological activity, enhancement of stability, improved tissue macrophages distribution, sustained delivery, and protection from physical and chemical degradation. The present review highlights the current status of the development of novel herbal formulations and summarizes their method of preparation, type of active ingredients, size, and entrapment efficiency, route of administration, biological activity and applications of novel formulations.

Keywords: Herbal drug formulations, Novel drug Delivery system.

INTRODUCTION

An herbal drug is to be defined as a drug intended for disease treatment, preventions, safety for human use in the day to day life. In an Asian country herbal drug play a vital role in human health care tradition. A Different dosage form of herbal drug formulation is used into health modern science of technology in human healthcare purposes. According to The World Health Organization estimates that 80 percent of populations of some Asian and African countries presently use herbal medicine for purpose of treatment and primary health care purpose worldwide. [1]

Often then the use of herbal remedies is more prevalent in patients with chronic diseases such as cancer, diabetes, asthma. Herbal formulations is a dosage form consisting of specified one or more herbs or proceed herb in specified quantities to provide specific supplementary, nutritional, cosmetics benefits is called herbal formulations. Majorly from the medicinal use, herbs are also used in natural dye, pest control, food, perfumes, and tea and so on. Medicinal herbs are an important source for Pharmaceutical manufacturing. A number of compounds derived from herbal sources are currently undergoing clinical trials and preclinical studies. The herbal medicine is used in preventions and treatment and it ranges from traditional and popular medicine for every country to the use of standardized and treated herbal extract. As compared to allopathic medicine there are fewer side effects of an herbal drug. The research provides a general idea of herbal medicine and intended to explain the therapeutic effectiveness of the various medications. Advantages of herbal medicine are greater than that of allopathic medicine in the day to day life of human science. Since they have high potency and efficacy, enhanced tolerance, more protections, fewer side effects. Several traditional healthcare systems play and exist in India for centuries and out of all the traditional practices, Ayurveda, Yoga, Unani, Siddha, and homeopathy are the official traditional systems of medicine.

The herb word is derived from Latin word herb herbs and old French world here. Medicinal plants such as aloe, tulsi, turmeric, and ginger. They are mainly considered as home remedies in many parts of the country. Herbal medicine has great advantages in evolved throughout the time of human civilization. [2]

Include advanced herbal drug formulations has great advantages and lower side effect as compared to other drug delivery system. Some of the reasons for the popularity of herbal medicine.

Factors affecting formulations include which affect the herbal drug formulations are as follows

- There is growing concern over the relief and safety of drugs and surgery.
- Modern medicine is failing to effectively treat many of the most common health conditions.
- Many natural measures are being shown to produce better results than drugs or surgery without side effects.

Herbal medicine is known as people medicine as it is easily available and safe.it is widely acknowledged for its effectiveness, Therapeutic, safety purpose in human drug treatment. While studying the history of Herbal Medicine, it is evident that it is the most ancient and form of medicine that is to being used for the purpose of primary health care purpose. From the observations of Scientist and researches from all over the world are active in research of herbal medicine. Valuable work and studies have been done by the eminent scientists. The acceptance of the Herbal medicine and other Alternative and Integrative medicines is increasing globally. It has many benefits against the side effects of allopathic medicines.

The majority of new herbal drugs have been generated from secondary metabolites (alkaloids, terpenoids, and phenolic compounds) of plant metabolism. [3]

More recently, the scientist depends on the increasingly on modern scientific methods and evidence-based medicine to prove the efficacy of herbal medicines and focus on better understanding of mechanisms of their action. Often used of the herbal drug for wound healing purposes covering a broad area of different skin-related diseases.

2. Global Scenario of Herbal Drug Formulations

From the ancient time, People are using herbal for safety, efficacy, and cultural acceptability of dosage form of the drug. Plant and plant-based products have utilized with varying success to cure and prevent diseases throughout history. [4]

Due to having side effects of synthetic products, herbal products are gaining popularity in the Indian market and worldwide. The herbs with several medicinal properties are used to treat a variety of disease conditions. Herbal medicines have different dosage form which is to be safe and are formulated in different forms of herbal product. Dosage forms such Tablets & capsules provide

dose accuracy compared to other dosage forms in herbal treatment. Herbal formulations are going to the most influential elements that are fundamentals for success and welfare for the people of nations. Many of modern medicine are produced indirectly from a medicinal plant. [5]

India is one of the 12 mega biodiversity centers having over 45,000 plant species. From the traditional time and ancient time, the with valuable guidelines for the selection, preparation, and application of the herbal drug is being given. In the last five decades the use of herbal medicine has grown to tremendous effect in the market of India and worldwide. [6]

3. Challenges Concerning with Herbal Medicine

For formulating an herbal drug the basic challenges are being studied.

- In most of the cases the active principals of a drug are unknown.
- In the performing herbal formulations selectively analytical methods or reference compounds may not be available commercially.
- The herbal plant materials are chemically and naturally variable.
- In the process of harvesting, drying, storage, transportations, and processing having an effect. The successful productions of quality herbal product and reproducibility of that quality are a major task. [7]
- The issues related to the financial, ethical, product standardizations, the design of the study and regulatory requirements.
- The outcome of the herbal treatment largely depends on patient participation.
- The treatments in herbal medicine compel consistency in the mixture of active components and also the specifications regarding their administrations.
- The problem associated with herbal drug formulations.
- Poor agriculture and propagations method.
- Most of the time inefficient processing techniques leading to low yields and poor quality products.
- Poor quality control procedures.
- Lack of current good manufacturing practices.
- Difficulties in marketing.
- Lack of trained personnel and equipment. [8]

4. Need for the herbal drug in Modern science Study.

The plant has been used for health and medical purpose since last thousands of years. Herbal medicine is an important part of healthcare throughout the world. In many countries including the U.S. herbal medicine are not regulated as extensively as conventional drug therapy. [9]

An Herbal medicine has been widely playing an important role as effective remedies for preventions and cure of multiple health conditions for centuries by almost known culture. In developing countries including India, the herbal drug has been playing the vital role in the preventions and cure of disease conditions. As compared to the allopathic drug treatment there is lesser side effect occurs in the treatment of herbal drug dosage forms. As in the form of supplements purpose, the use of the herbal drug is increased and has a great role in the pharmaceutical 0dosage treatment purpose in the science of life. Herbal supplements may contain vitamins, minerals, herbs, or other botanical amino acids and certain other substances. [10]

List of herbal medicine whose market potential value is very high. [11]

Sr. No.	Name of Plant	Common Name	Medicinal Use
1	*Allium sativum*	Garlic	Anti-hypertensive Antihyperlipidemic Platelet aggregation suppressant
2	*Azaracta indica*	Neem	Anti-septic, Anthelmintic.
3	*Emblica officinalis*	Amla	Anti-oxidant, Hepatoprotective Diuretic, Laxative ,Anti-inflammatory
4	*Asparagous racemosus*	Satavari	Galactogogue, Diuretic Nerving disorder.
5	*Oscium santum*	Tulsi	Aromatic, Stimulant Anti-diabetic, Anti-inflammatory tonic.
6	*Plantago ovate*	Isabgol	Aphrodiasic Laxative, Emollient Demulcent, anti-inflammatory
7	*Withina somminifera*	Ashwangadha	Sedative, Anti-rheumatic, Diuretic, Anti-inflammatory, Anti-stress, Anti-tumor, Immunomodulator, Hypotensive.

5. Standardization of Herbal Drug Formulations.

The quality control Standardizations of drugs mean confirmations of its identity and determination of its quality and purity. Standardizations of an herbal drug is not an easy process as numerous factors influence the bio efficacy and reproducible therapeutic effect. Standardizations are for the purpose of a batch to batch consistency, confirmations of the correct amount of extract per dose. Nowadays the herbal drug has been great demand in developed countries. [12]

WHO Guideline for quality standardizations herbal formulations.

- Quality control of crude drug materials, plant preparations, and finished products.
- Stability assessments and shelf life.
- Safety assessments, documentation of safety based on experience or topological studies.
- Example of method and techniques used for the standardization of herbal drug. [13]

1. Authentication.
2. Identifications of Foreign matter.
3. Organoleptic evaluation.
4. Finding of Tissues of diagnostic importance present in the drug powder.
5. Ash values and extractive values.
6. Volatile matter.
7. Moisture content determination.
8. Chromatographic and spectroscopic evaluation.
9. Determination of heavy metals.
10. Pesticide residue.
11. Microbial contamination.
12. Radioactive contamination.

6. Herbal as Novel drug delivery formulations system.

Nowadays phytotherapeutics is obtained in nanoparticle form for improvement of their pharmacokinetic and pharmacodynamics profile Nanoparticles measure approximately 1 - 1000 nm in dimension and exhibit properties different from their macroscale counterparts. The canonization of phytoceuticals leads to a high surface area to volume Ratio, enhancement in solubility and bioavailability, reticuloendothelial system uptake, an enhanced permeability and retention effect, improvement in tissue distribution of macrophages, sustained release, enhanced physicochemical stability, and so on. Nanoparticles contain the drug embedded in the matrix or absorbed onto the surface. [14]

To reap the aforesaid benefits, novel carriers and methods to prepare herbal Nanoparticles have been investigated, and numerous have been patented also. This is the basic idea behind incorporating a novel method of drug delivery in herbal medicines. It should deliver the drug at a rate directed by the needs of the body, over the period of treatment. [15]

Another one it should channel the active entity of herbal drug to the site of action. Modern medicine cures a particular disease by targeting exactly the affected zone inside a patient's body and transporting the drug to that area. In India, over the ancient times, people used plants to extract plant actives to make drug formulations. [16]

Herbal drugs have enormous therapeutic potential which can be explored through various beneficial drug delivery systems. In recent time the less use of herbal formulations due to lack of their standardization. These formulations have reported having various advantages over the traditional formulations such as improved solubility & bioavailability, reduced toxicity, controlled drug delivery, protections of plant actives from degradation. [17]

Also, these having the drug targeting properties with improved selectivity, drug delivery and effectiveness with dose reduction which not only increase the safety but also patient compliance. In nutshell, the combinations used of novel drug delivery technology and herbal medicines provide a boon for a safer and effective therapy for humans. [18]

1. Phytosomes.

   Phytosomes are lipid compatible molecular complex which is composed of "phyto" which means plant and "some" meaning cell-like. Most of the bioactive constituents of phytomedicines are water-soluble molecules such as phenolic, glycosides, and flavonoids.

   [19]. The phytosome technology creates intermolecular bonding between one or two phospholipids, phosphatidylcholine and a single molecule of phytoconstituent were the phospholipid molecule(s) enwrap each phytoconstituent molecule. [20]

   Phytosomes are the natural active ingredient. Phytosomes are the complexes chemical mixture prepared from plants. In the market, many products are available based on phytosome technology which includes popular herbal extract such as curcumin, Ginkobiloba, Grapeseed and many more. [21]

   Phytosomes are better absorbed, an advanced form of herbal products are utilized as the result produced better results than conventional herbal extracts the increased bioavailability of phytosome over non-completed botanical derivative, has been demonstrated by pharmacokinetic studies and pharmacodynamics tests in experimental animals and in human beings.[22]

2. Ethosomes.

   Ethosomes entrap drug molecule with various physicochemical characteristics i.e. of hydrophilic, lipophilic, or amphiphilic. Ethosomes are defined the noninvasive carrier that enables the drug to reach the deep skin layer or the systemic circulations." [23]

   Herbal ethosomes is a new area in vesicular research for Transdermal Drug Delivery System. It has a promising future in herbal drug technology. Further, the research in this will allow better control over in vivo drug release, it also offers a good opportunity for noninvasive delivery of all sized drug molecules. [24]

   E.g. Ethosomes loaded with cryptotanshinone for acne treatment through a topical gel.

   The aim of study this is to develop loaded with cryptotanshinone (CPT) and formulate them as a topical gel for the treatment of acne. The study demonstrates that ethosomal formulation is an effective dermal delivery system for CPT and that CPT Ethosomal gels are promising future acne treatments. [25]

   E.g. Ethosomal gels of *Mangifera indicia* leaf extract.

   The study revealed that these ethosmal formulations have been considered as a possible vesicular carrier for transdermal drug delivery system of herbal extract. [26]

3. Microemulsion.

   Microemulsion are defined as the clear, thermodynamically stable, Isotropic liquid mixture of oil, water, and surfactant. [27]

   E.g. Microemulsion based hydrogel for the dermal delivery system.

   The purpose of the present investigation was to develop and optimize the microemulsion as a transdermal system for Pd-Ia, a poor water soluble and low bioavailable drug. The pseudo-ternary phase diagrams were constructed for various ME formulations including oleic acid as the oil phase, Cremophor RH40 as the surfactant, ethanol as the cosurfactant, and water.[28]

   E.g. formulations of microemulsion based poly herbal sunscreen lotions.

   The novel of the study is to formulate the microemulsion based poly-herbal sunscreen cream. The size of the microemulsion is less and better solubility of herbal component motivated for the formulation of microemulsion based sunscreen. The plant selected for study was Nardostachys Jatamansi, it reduces the burning sensation and improved skin texture. Rubia cordifolia is antioxidant, antifungal, and anti-inflammatory. Solanum Lycopersicum contains unsaturated compound (Lycopene) absorbs UV radiation and increases Sun protection factor. [29]

4. NANOEMULSIONS

   Nanoemulsion are defined as the oil in water emulsion with a mean droplet having a diameter ranging from 50 to 1000 nm.

Examples of Nanoemulsion are

1. Tocopherol
2. Lecithin

For the preparations of the nanoemulsion, we required very high-pressure homogenization. Applications of nanoemulsions are in most food, cosmetic and chemical industry. [30]

E.g. Nanoemulsion mixture for the treatment of the inflammatory disorder.

The studied nanoemulsion components played the key role in permeation enhancing the effect. Compared with Carbopol gel, the skin permeation ability of boswellic acids was significantly increased by Nano-emulsion. The research focused on plant extract loaded formulation development of a novel Nano-emulsion based drug delivery system which may furnish important initiative and facet by enhancing the bioavailability of herbal drugs. [31]

E.g. Antioxidant Effect of Nanoemulsions Containing Extract of *Achyrocline satureioides* (Lam) D.C.—*Asteraceae*

The protection against lipoperoxidation by the formulations was also measured in the skin, where the lower formation of reactive species was observed after treatment with NEE. In conclusion, this study shows the formulation effect on the physicochemical properties of nanoemulsion as well as on the skin retention and antioxidant activity of quercetin.

SUMMARY

Herbal drug formulations Yesterday, Today, Tomorrow.

As the herbal drug is having a great advantage over the last hundreds of year in living science to cure, preventions, treatment. The growing era of human science is having a great impact on herbal drug formulations. The herbal drug formulations have been promoted as beneficial and effective in disease conditions. India has one of the richest plant traditions in the world. Herbal medicine has great applications as supplement purpose as major drug uses in human science nowadays. The herbal drug has enormous and important therapeutic potential which can be explored various beneficial as a dosage form.

A nanoparticle such as phytosomes, liposomes have a great advanced over as the herbal drug formulations since last hundreds of years in life science. The nanoparticles have a report to be as one of the greatest advantages over the allopathic drug formulations in India. These formulations are has been reported to

be one of the important dosage forms in herbal drug formulation in India. Herbal medicines are natural plants and their parts which are being used s medicinal purpose. Herbal medicine is one of the oldest type of medicine in human history. There are plenty of open access journals, knowledge is available on herbal medicine, natural plant, and their products etc. Herbal drugs constitute a major share of all the officially recognized systems of health in India viz. Ayurveda, Yoga, Unani, Siddha, Homeopathy, and Naturopathy, except Allopathic. More than 70% of India's 1.1 billion population still use these non-allopathic systems of medicine. Currently, there is no separate category of herbal drugs or dietary supplements, as per the Indian Drugs Act. However, there is a vast experiential-evidence base for many of the natural drugs.

CONCLUSION

Drug discovery from the medicinal plant has traditionally been lengthier and more useful than other drug discovery method of drug formulations. The therapeutic as well as having the low side effect of the herbal drug formulations occurs in the science of disease and hence the herbal drug formulations are being good for health treatment, preventions and another beneficial effect in the science.

As the herbs are obtained from natural products having and their chemical composition varies depending on several factors and therefore varying from people to people, from energetic decoctions to the use of herbal extracts following western methodologies of mainstream medicine. Traditional medicine has a very long history as compared to another drug system in science it is the sum total of the practices based on the theories, beliefs, and experience of different cultures and times often inexplicable, used in the maintenance of health, as like in the preventions, diagnosis purpose.

CONFLICT OF INTEREST

Authors have no conflict of interest.

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