A REVIEW ON: RECENT TRENDS IN HERBAL DRUGS

Bande Nilam Pralhad
Student
Siddhant College of Pharmacy, Sudumbare
Gowekar Narendra
Asst. Professor
Siddhant College of Pharmacy, Sudumbare.

ABSTRACT

This Review Focuses on Recent Trends in Herbal Drugs, in recent years, more people throughout the world are turning to use medicinal plant products in the healthcare system. The worldwide need for alternative medicine has resulted in the growth of natural product markets and interest in traditional systems of medicine. Herbal drug technology is used for converting botanicals materials into medicines, where standardization and quality control with proper integration of modern scientific techniques and traditional knowledge are important. Herbal medicines make up a significant constituent of the tendency toward alternative medicine. Herbal medicines have been used since the dawn of civilization to maintain health and to treat various diseases. To compete with the growing pharmaceutical market, there is an importance to use and scientifically authenticate more medicinally useful herbal products. This article provides a general idea of herbal medicines and intended to explain the therapeutic effectiveness of various herbal medicines, adverse drug reactions, drug interactions, standardization and stability testing of herbal medicines, pharmacovigilance and regulatory status of herbal medicines.

KEYWORDS: Herbal drugs, Standardization, Stability testing, pharmacovigilance, regulatory status, Efficiency

INTRODUCTION

What Is Herbal Medicine? Herbal medicines are naturally occurring, plant-derived substances that are used to treat illnesses within local or regional healing practices. These products are complex mixtures of organic chemicals that may come from any raw or processed part of a plant. Herbal medicine has its roots in every culture around the world. There are many different systems of traditional medicine, and the philosophy and practices of each are influenced by social conditions, environment and geographic location, but these systems all agree on a holistic approach to life. Well-known systems of herbal medicine like Traditional Chinese Medicine and Ayurvedic Medicine believe in the central idea that there should be an emphasis on health rather than on disease. By using healing herbs, people can thrive and focus on their overall conditions, rather than on a particular ailment that typically arises from a lack of equilibrium of the mind, body and environment. Herbal medicine has its origins in ancient cultures. It involves the medicinal use of plants to treat disease and enhance general health and wellbeing. Herbal medicine, also known as herbalism or botanical medicine, is a medical system based on the use of plants or plant extracts that may be eaten or applied to the skin.

Herbal drugs referred as plants materials or herbalism, involves the use of whole plants or parts of plants, to treat injuries or illnesses. Herbal drugs are use of therapeutic herbs to prevent and treat diseases and ailments or to support health and healing. These are drugs or preparations made from a plant or plants and used for any of such purposes. Herbal drugs are the oldest form of health care known to mankind. There are many herbal products offered that assert to treat the symptoms of a broad range of problems, from depression to cold and flu. World Health Organization4 (WHO) has distinct herbal drugs as complete, labelled medicinal products that have vigorous ingredients, aerial or secretive parts of the plant or other plant material or combinations. World Health Organization has set precise guidelines for the evaluation of the safety, efficacy, and quality of herbal medicines. WHO estimates that 80% of the world populations currently use herbal drugs

for major healthcare. Exceptionally, in some countries herbal drugs may also enclose by tradition, natural organic or inorganic active constituents which are not of plant source.

Seeds, leaves, stems, bark, roots, flowers, and extracts of all of these have been used in herbal drugs over the millennia of their use. Herbal products have reached extensive adequacy as beneficial agents like antimicrobial, antidiabetic, antifertility, antiageing, antiarthritic, sedative, antidepressant, antianxiety, antispasmodic, analgesic, anti-inflammatory, anti-HIV, vasodilatory, hepatoprotective, treatment of cirrhosis, asthma, acne, impotence, menopause, migraine, gall stones, chronic fatigue, alzheimer‟s disease and memory enhancing activities . Herbal drugs have been recognized for approximately 4000 years. These drugs have survived real world testing and thousands of years of human testing. Some drugs have been discontinueddue to their toxicity, while others have been modified or combined with additional herbs to counterbalance side effects.[1-7]

ADVANTAGES OF HERBAL DRUGS

Herbal medicines tend to be more effective for long-standing health complaints that don't respond well to traditional medicine. Herbs typically have fewer side effects, and may be saferto use over time. An example may be seen with herbs and alternative remedies used to treat arthritis. Viox, a well-known prescription drug uses to treat arthritis, was recalled due to increased risk of cardiovascular complications. On the other hand, alternative treatment for arthritis has few side effects

- Low cost
- Minimum cost
- Potency and efficiency
- Enhanced tolerance
- More protection
- Fewer side-effects
- Complete accessibility
- Recyclable

DISADVANTAGES OF HERBAL DRUGS

An herbalist would not be able to treat serious trauma, such as a broken leg, nor would he be able to heal appendicitis or a heart attack as effectively as a conventional doctor using moderndiagnostic tests, surgery, and drugs. Modern medicine treats sudden illness and accidents much more effectively than herbal or alternative treatments. Another disadvantage of herbal medicine is the very real risks of doing oneself harm through self-dosing with herbs. While one can arguethat the same thing can happen with medications, such as accidentally overdosing on cold remedies, many herbs do not come with instructions or package inserts. There's a very real riskof overdose. Harvesting herbs in the wild is risky, if not foolhardy, yet some people try to identify and pick wild herbs. Because herbal products are not tightly regulated, consumers also run the risk of buying inferior quality herbs. The quality of herbal products may vary among batches, brands or manufacturers. This can make it much more difficult to prescribe the properdose of the herb.[8-10]

USAGE AND PREPARATION OF HERBAL DRUGS

The use of herbal drugs in the correct way provides effectual and safe treatment for many ailments. The efficiency of the herbal drugs is typically subjective to the patient. The strength of the herbal drugs varies based on the genetic distinction, growing conditions, timing and method of harvesting, revelation of the herbs to air, light and dampness, and type of conservation of the herbs. Some of the plants that make up herbal drugs are cultured and processed in the country and others are imported from around the world. Raw materials for herbal drugs may be derived from carefully cultivated plants or collected in the wild. Herbal drugs are accessible in several forms and often require preparation before their use. They can be normally purchased in mass form as dried plants, plant parts or insecurely packed for herbal teas and decoctions. Decoctions are made by boiling the herb in water, then straining out of theplant material. More intense forms of herbal drugs are available in the form of hydro alcoholictinctures and fluid extracts. Methods of preparation may differ because of the nature of the plants active chemical constituents.[10-11]

PHARMACOLOGICAL ACTIONS OF HERBAL DRUGSANTI-

INFLAMMATORY ACTIVITY

Achillea millefolium L. is a perennial herb native to Europe and highly recognized in traditionalmedicine for its anti-inflammatory properties. The plant has been traditionally used externallyfor treatment of wounds, burns, swollen and irritated skin. Studies have shown two classes of secondary metabolites, isoprenoids and phenolics, contribute mainly to the anti-inflammatory properties15. Aqueous and alcoholic extracts of A. millefolium are used in traditional medicine internally in treatment of gastro-intestinal and hepato-biliary disorders and as an antiphlogisticdrug. The topical anti-inflammatory activity of sesquiterpenes is caused by inhibition of arachidonic acid metabolism. The three flavnoids present in the crude extract and enriched in flavnoid fraction are rutin, aspigenin-7-O-glucoside and luteolin-7-Oglucoside. The crude plant extract and two fractions enriched in the dicaffeoyquinic acids and the flavnoids inhibit human neutrophil elastase as well as the matrix metalloproteinases, which are associated withanti-inflammatory process in vitrostudies.

Example: Artemisia vulgaris, Bauhinia tarapotensis, Curcuma longa, Forsythia suspense, Houttuynia cordata, Glycyrrhiza uralensis, Lonicera japonica, Ruta graveolens, Securidaca longipedunculata and Valeriana wallichii have shown anti-inflammatory activity.[12]

ANTIDIABETIC ACTIVITY

The most common and effective antidiabetic medicinal plants of Indian origin are Babul (*Acacia arabica),* bael *(Aegle marmelose),* church steeples *(Agrimonia eupatoria),* onion *(Allium cepa),* garlic *(Allium sativum),* ghrita kumara *(Aloe vera),* neem *(Azadirachta indica),* ash gourd *(Benincasa hispida),* Beetroot *(Beta vulgaris),* fever nut *(Caesalpinia bonducella),* bitter apple *(Citrullus colocynthis),* ivy gourd *(Coccinia indica),* eucalyptus *(Eucalyptus globules),* banyan tree *(Ficus benghalenesis),* gurmar *(Gymnema sylvestre),* gurhal *(Hibiscus rosa-sinesis),* sweet potato *(Ipomoea batatas),* purging Nut *(Jatropha curcas),* mango *(Mangifera indica),* karela *(Momordica charantia),* mulberry *(Morus alba),* kiwach *(Mucuna pruriens),* tulsi *(Ocimum sanctum),* bisasar *(Pterocarpus marsupium),* anar *(Punica granatum),* jamun *(Syzygium cumini),* giloy *(Tinospora cordifolia),* and methi *(Trigonella foenum-graecum).[13]*

ANALGESIC ACTIVITY

Bougainvilla spectabilis, Chelidonium majus, Ficus glomerata, Dalbergia lanceolaria, Glaucium grandiflorum, Glaucium paucilobum, Nepeta italic.[14]

ANTICANCER ACTIVITY

Medicinal plant products exhibiting anticancer activity continue to be the subject of extensive research aimed at the development of drugs for the treatment of different human tumors. The medicinal plants used for the treatment of cancer are, Acalypha fruticosa, Alangium lamarki, Catharanthus roseus, Celastrus paniculatus, Embelia ribes, Ficus glomerata, Ficus racemosa, Ocimum basilicum, Plumbago zeylanica, Terminalia chebula, Tylophora indica, Wrightia tinctoria. The extracts used for the treatment of breast cancer is Buthus martensi, Colla cornu, Herba epimedii, Fructus lycii, Radix angelicae, Radix bupleuri, Rhizoma corydalis, Rhizoma curculiginis, Radix paeoniae , Radix glycyrrhizae, Scolopendra subspinipes, Squama manitis, Tuber curcumae. The herbal drugs used for treatment of pancreatic cancer are Emblica officinalis, Nigella sativa and Terminalia belleric.[15-16]

ANTIAGEING ACTIVITY

Some of important anti-ageing plants are Aloe vera, Vitis vinifera, Triticum sativum, Dioscoreavillosa, Camelia sinensis.[17]

ANTIPSORIASIS ACTIVITY

A variety of natural proprietary formulas and preparations containing plant materials have beenused to provide symptomatic relief in psoriasis. The different herbal remedies for psoriasis are, turmeric, curcumin, shark cartilage extract, oregano oil, milk thistle. Various antimicrobial agents Azadirachta indica, Calendula officinalis, Cassia tora, Wrightia tinctoria have been usedin the management of psoriasis.[18-21]

ANTIOXIDANT ACTIVITY

Oxygen is a highly reactive atom that is capable of becoming part of potentially damaging molecules commonly called free radicals such as Reactive oxy gen species (ROS). When ROS are present at certain levels, they greatly overwhelm the capacity of endogenous cellular antioxidant defense system, thus cause oxidative stress. The resulting damage to cells and organs may induce and/or accelerate disease processes. Oxidative stress has been implicated in cancer, aging, atherosclerosis, ischemic injury, inflammation, and neurodegenerative diseases. Free radicals are capable of attacking the healthy cells of the body, causing them to lose their structure and function. Antioxidants are capable of stabilizing, or deactivating, free radicals before they attack cells. Antioxidants are absolutely critical for maintaining optimal cellular and systemic health and wellbeing. [22-24]

STANDARDIZATION OF HERBAL DRUGS

This involves adjusting the herbal drug preparation to a defined content of a constituent or a group of substances with known therapeutic activity by adding excipients or by mixing herbal drugs or herbal drug preparations. Botanical extracts made directly from crude plant material show substantial variation in composition, quality, and therapeutic effects. Standardized extracts are high-quality extracts containing consistent levels of specified compounds, and theyare subjected to rigorous quality controls during all phases of the growing, harvesting, and manufacturing processes. No regulatory definition exists for standardization of dietary supplements. As a result, the term "standardization" may mean many different things. Some manufacturers use the term standardization incorrectly to refer to uniform manufacturing practices, but following a recipe is not sufficient for a product to be called standardized. Therefore, the presence of the word "standardized" on a supplement label does not necessarilyindicate product quality. When the active principles are unknown, marker substances should be established for analytical purposes and standardization. Marker substances are chemically defined constituents of an herbal drug that are important for the quality of the finished product. Ideally, the chemical markers chosen would also be the compounds that are responsible for thepharmacological effects in the body. There are two types of standardization. In the first category, "true" standardization, a definite phytochemical or group of constituents is known to have activity. Ginkgo with its 26% ginkgo flavones and 6% terpenes is a classic example. These products are highly concentrated and no longer represent the whole herb, and are now considered as phytopharmaceuticals. In many cases they are vastly more effective than the whole herb. However the process may result in the loss of efficacy and the potential for adverse effects and herb–drug interactions may increase. The other type of standardization is based on the guarantee of the manufacturers for the presence of a certain percentage of marker compounds which are not indicators of therapeutic activity or quality of the herb.[25]

STANDARDIZATION AND QUALITY CONTROL OF HERBAL CRUDE DRUGS –

Processes and procedures 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:

1. Macro and microscopic examination: For Identification of right variety and search of adulterants.

2. Foreign organic matter: This involves removal of matter other than source plant to get the drug in pure form.

3. Ash values: These are criteria to judge the identity and purity of crude drug – Total ash, sulphated ash, water soluble ash and acid insoluble ash etc.

4. Moisture content: Checking moisture content helps reduce errors in the estimation of the actual weight of drug material. Low moisture suggests better stability against degradation of product.

5. Extractive values: These are indicative weights of the extractable chemical constituents of crude drug under different solvents environment.

6. Crude fibre: This helps to determine the woody material component, and it is a criterion forjudging purity.

7. 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 ofthe active constituents of pharmaceutical importance.

8. Chromatographic examination: Include identification of crude drug based on the use of major chemical constituents as markers.

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

10. 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.[25]

STABILITY TESTING OF HERBAL DRUGS

Stability testing of herbal products is a challenging task, because the entire herb or herbal product is regarded as the active substance, regardless of whether constituents with defined therapeutic activity are known. The objective of a stability testing is to provide evidence on how the quality of the herbal products varies with the time under the influence of environmentalfactors such as temperature, light, oxygen, moisture, other ingredient or excipient in the dosage form, particle size of drug, microbial contamination, trace metal contamination, leaching fromthe container, etc. and to establish a recommended storage condition, retest period and shelf-life. Therefore evaluation of the parameters based upon chemical, physical, microbiological, therapeutic and toxicological studies can serve as an important tool in stability studies.[26]

PHARMACOVIGILANCE OF HERBAL DRUGS

Pharmacovigilance is the science and activities relating to the detection, assessment, understanding, and prevention of adverse effects of drugs or any other possible drug-related problems. Recently, its concerns have been widened to include herbals, traditional and complementary medicines, blood products, and biological.[1] The purpose of pharmacovigilance is to detect, assess, and understand, and to prevent the adverse effects or any other possible drug-related problems, which is not only confined to chemical drugs, but extended to herbal, traditional, and complementary medicines, biological, vaccines, blood products, and medical devices. The history of the use of herbs as medication is as old as historyitself. Some authors state that the first recorded use of herbs for medical treatment began over 4000 years ago. The origin of this type of medical treatment began in China and India. Traditional Chinese medicine centers on interactions between the body and the environment. A mixture of treatments, including herbs, acupuncture, and massage, is then prescribed. [27]

NEED OF PHARMACOVIGILANCE IN HERBALS

In order to provide consistency in the naming of herbs in adverse reaction (AR) reports, the WHO Collaborating Centre for International Drug Monitoring has recommended the use of proper scientific binomial names for herbs used in medicine, including the use of such names (where this information is available) in the coding of AR reports. This would ensure comparability between reports from various international pharmacovigilance databases. It is equally important for the authors of published AR case reports to identify the specific product(s) involved, including label and manufacturer information, specific ingredients, and dose employed. Published case reports would also benefit from analysis of the suspect productused, for contamination and adulteration, or species identification, where possible.[27]

HERBALS CONCEPT OF ADVERSE EFFECT

An AR is defined as a noxious and unintended response to a marketed health product, which occurs at doses normally used or tested for the diagnosis, treatment, or prevention of a disease or the modification of an organic function. It is undeniable that plants have an important role in the development of modern medicines. More than 60 to 70% of modern medicines in the world market are directly or indirectly derived from plant products. High-profile issues such as ARs associated with Ephedra and Aristolochia have shown that HMPs can produce toxicity in human beings. The most common adverse effects reported are hepatic and renal problems. However, it is difficult to identify the causative agent associated with the ARs encountered because traditional herbal preparations often contain multiple ingredients. The WHO database has over sixteen thousand suspected herbal case reports. Due to the lack of clinical trials for most HMPs, post market pharmacovigilance is a critical source of safety information; however, the assessment of ARs associated with HMPs offers unique challenges in the quantity and quality of available information.[27-29]

REGULATORY STATUS OF HERBAL DRUGS

Herbal drugs are regulated under the Drug and Cosmetic Act (D and C) 1940 and Rules 1945 in India, where regulatory provisions for Ayurveda, Unani, and Siddha medicine are clearly laid down. Department of AYUSH is the regulatory authority and mandate that any manufacture or marketing of herbal drugs have to be done after obtaining manufacturing license, as applicable.

Phytotherapeutic agents are standardized herbal preparations consisting of complex mixtures of one or more plants which contain as active ingredients plant parts or plant material in the crude or processed state. A marked growth in the worldwide phytotherapeutic market has occurred over the last 15 years. For the European and USA markets alone, this will reach about
$7 billion and $5 billion per annum, respectively, in 1999, and has thus attracted the interest of most large pharmaceutical companies. Insufficient data exist for most plants to guarantee their quality, efficacy, and safety. The idea that herbal drugs are safe and free from side effects is false. Plants contain hundreds of constituents and some of them are very toxic, such as the most cytotoxic anti-cancer plant-derived drugs, digitalis and the pyrrolizidine alkaloids, etc. [30-34]

CONCLUSION

Medicinal herbs as a potential source of therapeutics aids have attained a significant role in health care system all over the world for human beings not only in the diseased condition but also as a potential material for maintaining proper health. It is clear that the herbal industry can make great strides in the world. With the increased use of herbal products, the future worldwide labeling practice should adequately address quality aspects. Standardization of methods and quality control data on safety and efficacy are required for an understanding of the use of herbal drugs. A major factor impeding the development of the medicinal plant based industries in developing countries has been the lack of information on the social and economic benefits that could be derived from the industrial utilization of medicinal plants. Further research is required to exploit the compounds responsible for the observed biological activity.3[5-37]

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