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A REVIEW ARTICLE ON: SCOPE OF PHARMACOGNOSY

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ABSTRACT

Pharmacognosy has very vast applications in the therapeutics and Pharmaceutical Industry. The importance of Pharmacognosy includes the thorough knowledge on the, cultivation, collection, history, standardization, packaging and storage of a crude drugs and economic substances affecting the health of man and other animals. In Pharmacognosy the drug-drug, drug-food interactions are studied, which helps us avoids the untoward effects of severe interactions and hence helps in obtaining the optimal therapeutic benefits. It also includes plant taxonomy, plant breeding, plant pathology, and plant genetics and by this knowledge one can improve the cultivation methods for both medicinal and aromatic plants. In other way pharmacognosy is a connective link between basic and science pharmaceuticals as well as allopathic and Ayurvedic system of medicines. So Pharmacognosy is a science of active principles of crude drugs derived from natural origin can could be dispensed, formulated, formulated and manufactured in dosage forms acceptable in allopathic system of medicine. In short the complete knowledge of Pharmacognosy will help in the recent trend that is in pharma industries.

KEYWORDS

Pharmacognosy, Pharmaceutical Industry, Drug development and Discovery.

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INTRODUCTION

Pharmacognosy is the science of crude drugs of natural origin (plant, animal and mineral). The word Pharmacognosy was coined in 1815 by a German Scientist SEYDLER has been derived from two Greek words, *Pharmacon* means “a drug” and *gignosco* means “to acquire the knowledge of”¹⁻². Pharmacognosy is the study of drugs obtained from the vegetable, animal, mineral origin and tissue

culture. It can also define as the objective study of crude drugs of the natural sources processed scientifically. It is broadly defined as the scientific and systematic study of the structural, physical, chemical and sensory characters of crude drugs of vegetable, animal and mineral origin along with drug history, method of cultivation, way of collection and processing for the market.

According to the American Society of Pharmacognosy, the word Pharmacognosy defined as "the study of the physical, chemical, biochemical and biological or therapeutic properties of drugs, drug substances or potential drugs or active ingredients of natural origin as well as the search for new drugs or chemical from natural sources"³⁻⁶.

WHO estimates that 4 billion people, 60 per cent of the world's population, presently use herbal medicines as primary healthcare⁷. In the past 25 years, public dissatisfaction with the high cost of prescription medications, combined with an interest in returning to natural drug or organic herbs, has led to an increase in herbal medicine use in the United States. An estimated 158 million of the adult American population use natural or herbal medicine. The documents many of which are of great antiquity, unconcealed that plants were used medicinally in India, china, Greece and Egypt long before the beginning of the Common Era.

HISTORY OF PHARMACOGNOSY

Drug discovery from natural origin products have played and continue to play an invaluable role as natural sources of drugs or lead compounds in the prophylaxis and treatment of diseases. Plants, especially those with therapeutic uses have been the primary sources of medicines and have an advantage over other sources in drug discovery for various reasons.

The first pharmacist Galen (131-200 A.D.) was known to have had a number of pain relieving materials. The word 'Pharmacognosy' was used first and foremost by C. A. Seydler. In about 77 AD, Dioscorides, a Greek doctor, kept a record of about 600 kinds of crude drugs in his compiled book *De Materia Medica*, a book that had played an

important role in pharmacology and botany. In 1815, C. A. Seydler, a German scientist who used the word "pharmakognosie" in his book named *Analecta Pharmacognostica*, was referred to as the father of Pharmacognosy³⁻⁶.

Facts

During the past 50 years there is advancement in the biological and chemical techniques of analysis in research of Pharmacognosy. Natural medicines are accustomed to enhance human and veterinary health since past times and also the success of recent life science mostly depends on medication originally obtained from natural resources⁷⁻¹⁶.

The traditional and conventional medical practices adopted for identification and authentication of natural remedies eventually framed the botanico-chemical approach to Pharmacognosy throughout the 19th century. However, the last 200 years witnessed a considerable metamorphosis within the principles and practices of Pharmacognosy and it's become a vital domain of recent pharmaceutical science as a multidisciplinary high-tech science of natural medicines. In a very modern context, the scientific and systematic study of natural medicines in terms of purity, potency, consistency and safety became the foremost problems in Pharmacognosy¹⁷⁻²².

Moreover, the current days drug discoveries and therapeutics are progressively adopting ancient medication based mostly approaches to extend results and to handle safety issues. Thus, Clinical Pharmacognosy, industrial Pharmacognosy and analytical Pharmacognosy are established as specialised and skilled offshoots of Pharmacognosy to fulfill the modern advancements within the field of Pharmacognosy

- Approximately 60-70% of the world's population relies almost entirely on crude drugs for medication.
- Between 1983 and 1994, the 520 new drugs approved, 39% were natural products or derived from natural products.
- In modern allopathic drugs, also plant derived compounds feature quite significantly. About 25 per cent of all

allopathic prescription drugs contain at least one active ingredient derived from plants.

- Between 1983 and 1994, 60–80% of anticancer and antibacterials drugs were derived from natural products.
- Of the 20 best-selling non-protein drugs in 1999, nine were either derived from or developed as the result of leads generated by natural products with combined annual sales of >US\$16 billion.
- There are estimated to be ~250,000 species of plant in the world and probably ~10% of these have been tested for some type of pharmacological activity.
- There are only approx 6000 bacterial species have been named and estimates of 1.5 million species of fungi and 1.5 million species of algae and prokaryote might have to be revised upwards.
- It appears that less than 1% of microbial diversity has been cultured and studied experimentally.
- There are probably 40,000 species of microalgae, but they have not been extensively studied in terms of their secondary metabolites²³⁻³¹.

Present status of pharmacognosy

In the early 19th century, when chemical analysis first became available, scientists began to extract and modify the active medicinal compounds found in the plants in order to use them as ingredients of allopathic medicines. Later, chemists began to synthesize these medicinal compounds, or to make their own versions of the plant compounds, and over time, the use of herbal medicines declined in favour of allopathic drugs. However, the herbal medicines are now gradually getting significant attention in global health forums and almost all systems of traditional medicine use herbal medicinal preparations as the main tool of treatment. Herbal medicinal preparations are also gradually taking new look in their presentation in order to keep pace with the progress of civilization. Most of them are now prepared by using modern pharmaceutical technology and dispensed in

modern pharmaceutical dosage forms. In this way herbal medicines are staging a graceful revival.

In the field of pharmacy Pharmacognosy has broad scope such as-

Isolation or Analysis of Phytochemical

Strong acting substances such as glycosides from digitalis leaves, Alkaloids from the plants of Belladonna, Hyocyamus, Rauwolfia. Morphine and other alkaloids from the opium plant were isolated and studied for clinical uses.

Structure activity relationship

Tubocurarine and Toxiferine from curare plant have muscle relaxant properties because of quaternary ammonium groups. The hypotensive and tranquillizing actions of reserpine are due to the trimethoxy benzoic acid.

Drugs obtained by partial synthesis of natural products

Preparation of Steroid hormones from diosgenin by acetolysis and oxidation and further preparation of cortisone by microbial reactions.

Natural products as models for synthesis of new drugs

Morphine is the model of a large group of potent drugs. Cocaine for local anaesthetics Atropine for certain spasmolytics.

Direct therapeutic uses of Drug

Most of the natural constituents which even now cannot be replaced are important group of antibiotics, steroids, ergot alkaloids, vincristine etc.

Biosynthetic pathways investigation

These are followings:

Biosynthetic pathways are of primary and secondary metabolites.

Some of the important pathways are Clavin's cycle of photosynthesis.

- Shikimic acid pathway of aromatic compounds.
- Acetate hypothesis for anthracene glycosides.
- Isoprenoid hypothesis for terpens.

Cultivation and collection of medicinal plants

Like clove, cinchona, cinnamon, senna, opium, etc.

Preparation of herbal formulations

Like Churnas, asvas, aristas, leha, etc.

A vital link between pharmacology and medicinal chemistry

Newly detected plant drugs are converting into medicine as purified photochemical. Pharmacognosy is very important for the evolution of new medicines because crude drugs are used for the preparation of extracts or as sources of therapeutically active metabolites.

Contribution in the advancement of physical and natural science

By the use of advanced technologies of cultivation, collection, purification, identification (characterization) of pharmaceuticals from nature. Concepts of chemical engineering and biochemistry help in the improvement of collection, processing and storage technologies of pharmaceuticals.

RELATED BRANCHES

As a new drug delivery systems and new research tools, there are the departments of pharmaceuticals and one can improve the healthcare facilities across the world.

Medical Ethnobotany

The study of the traditional use of plants for medical purposes.

Ethnopharmacology

The study of the traditional medicinal substances and their pharmacological qualities.

Phytotherapy

The study of the use of extracts of natural origin as medicines or health-promoting agents.

Zoopharmacognosy

The process by which animals self-medicate, by selecting and using plants, insects and soils to the treatment and prevention of diseases.

Marine Pharmacognosy

The study of chemicals obtained from marine organisms.

Aromatic Plants

The study of essential oils, their composition and their use in medicine, cosmetic industries and food industries.

Phytochemistry

The study of chemicals derived from plants (including the identification of new drug derived from plant sources).

Pharmaceutical Biotechnology

The science that covers all technologies required for the production, manufacturing natural products using plant cell culture.

FUTURE OF PHARMACOGNOSY

As a result, herbal medicine-based Traditional Medicine (TM) practices remain widespread in developing countries and that of Complementary and Alternative Medicine (CAM) is increasing rapidly in developed countries. This trend of growing and widespread use of herbal medicines is likely to increase even further throughout the world in the coming years with more and more scientific evidence of their quality, efficacy and safety coming from the researchers.

However, in order to ensure quality and safety of herbal medicines, their production, sale and use should be officially and legally controlled, as done with allopathic medicines, by established rules and regulations. But, regulations and registration of herbal medicines are not well developed in most countries, and the quality of herbal products sold is not guaranteed. Therefore, herbal medicines should be brought under legal control in all countries where they are used for medical and therapeutic purposes and efforts should be made to raise public awareness about the risks and benefits of using herbal medicines.

Proper use of herbal medicinal products of 'assured quality' is sure to produce beneficial therapeutic effects on the users and reduce the risks associated with them. At the same time, it should be noted that, similarly to allopathic drugs, herbs, and herbal products are not free from side-effects. They are also likely to cause adverse effects. Furthermore, use of adulterated herbal ingredients and inappropriate formulation must be stopped as these may result in the production of low-quality and harmful or even dangerous herbal medicines. Therefore, rules and regulations of GMP should be

strictly followed in the production of herbal medicines.

Recently it includes

- Modern isolation techniques.
- Pharmacological testing procedures to prepare purified substances.
- Cultivation and propagation by tissue culture.

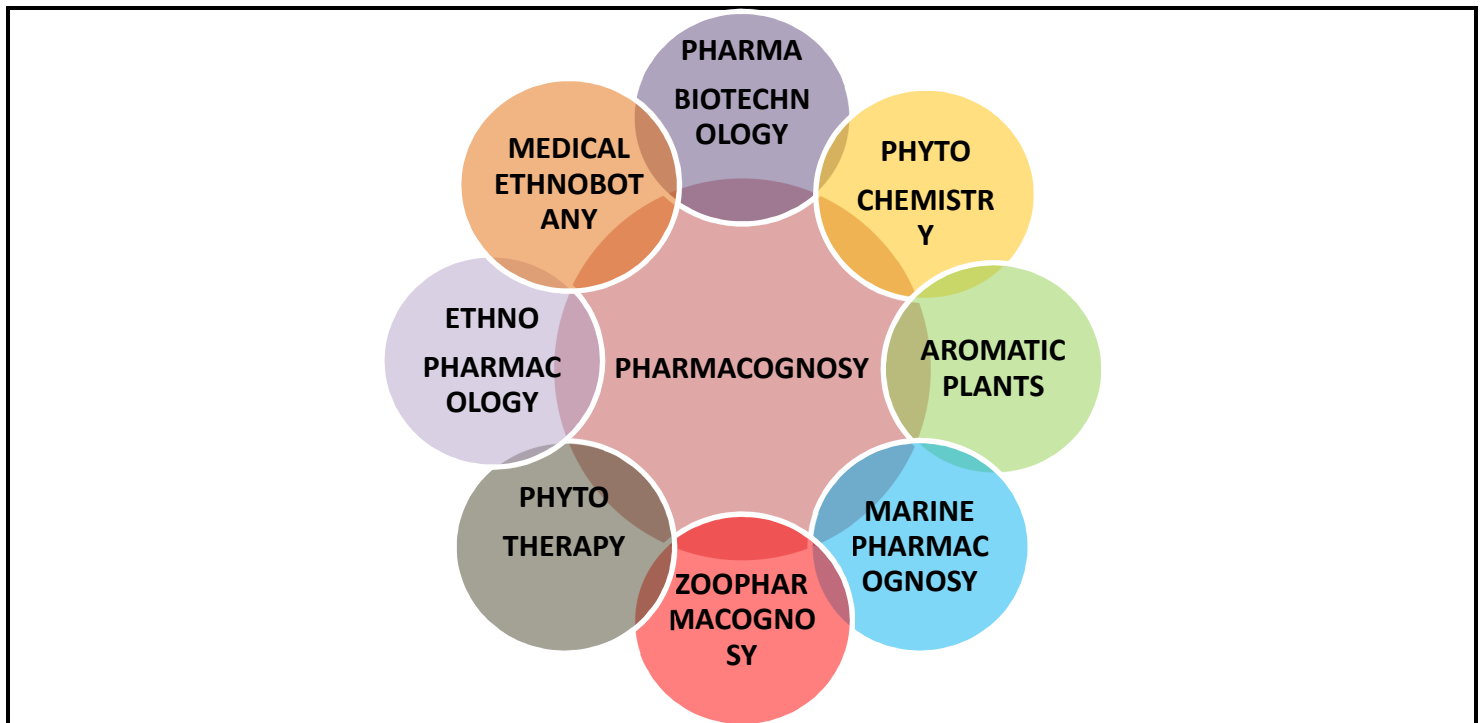


Figure No.1: Related Branches

CONCLUSION

Natural products very important to medicine. Can act as templates for new drug development. It is clear that the herbal industry can make great strides in the world with the co-operation between drug regulation authorities, scientists and industries. However, standardization of methods and quality control data on safety and efficacy required for proper understanding of the use of herbal medicines. Plant based discovery program continues to provide new drug leads. The drug from biological origin are the back bone of medicinal therapy, about 60% of drugs derived from natural origin, such as alkaloids, glycosides, vitamins, hormones, antibiotics and many more.

Pharmacognosy its evolved and developed over the years to adapt itself with the ever-changing surroundings, and is currently appropriate meet the challenges of the current and also the way forward for drug development and discovery.

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CONFLICT OF INTEREST

We declare that we have no conflict of interest.

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