IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Drug Discovery Of Natural Product

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Abstract

Drug discovery using natural products is a challenging task for designing new leads. It describe the bioactive compounds derived from natural resources, its phytochemical analysis, characterization and pharmacological investigation. It focuses on the success of these resources in the process of finding and discovering new and effective drug compounds that can be useful for human resources. From many years, natural products have been acting as a source of therapeutic agents and have shown beneficial uses.Research in drug discovery needs to develop robust and viable lead molecules, which step forward from a screening hit to a drug candidate through structural elucidation and structure identification through GC–MS, NMR, IR, HPLC, and HPTLC. The development of new technologies has revolutionized the screening of natural products in discovering new drugs. Utilizing these technologies gives us an opportunity to perform research in screening new molecules using a software and database to establish natural products as a major source for drug discovery. It finally leads to lead structure discovery. Powerful new technologies are revolutionizing natural herbal drug discovery.

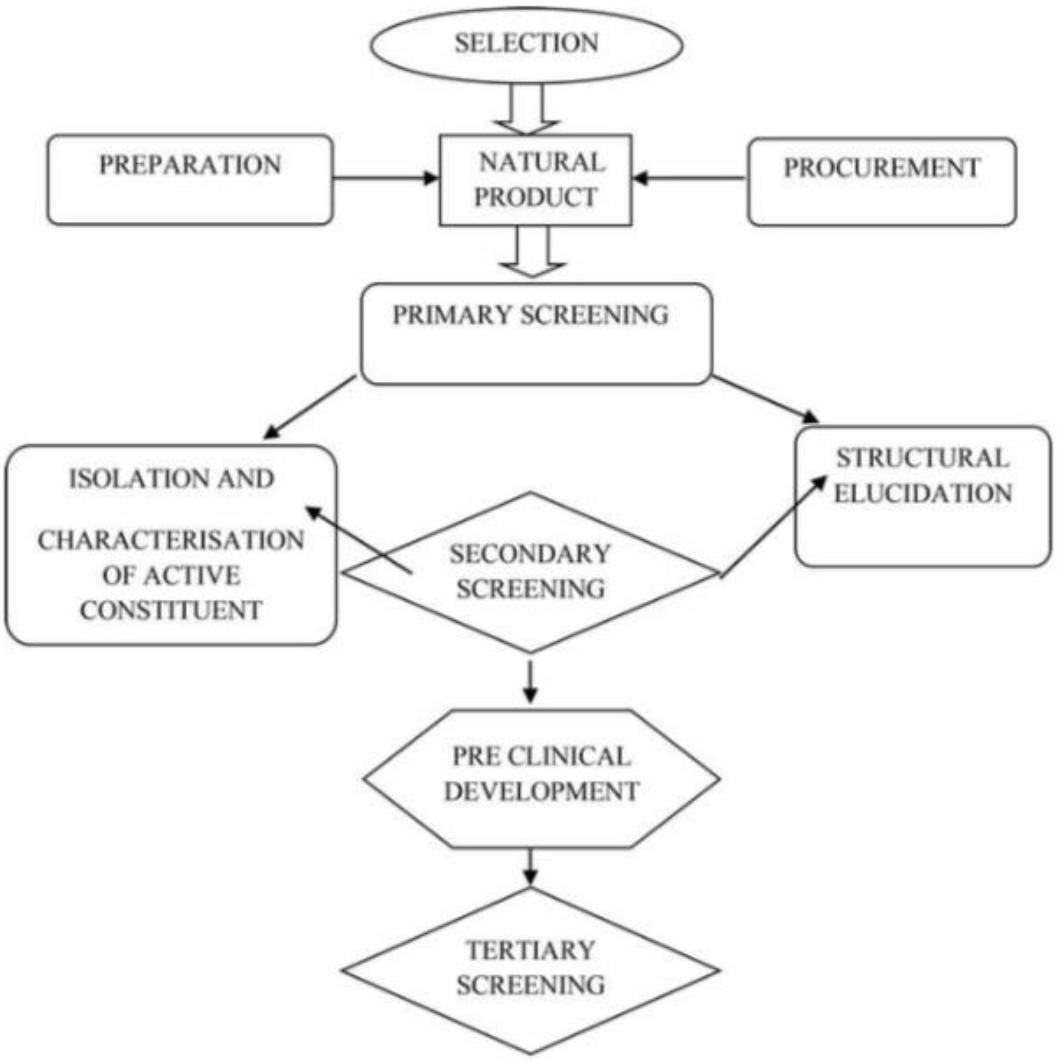
Keywords

Natural product,herbal drug discovery, phytochemicals bioactive

Introduction

Natural products and traditional medicines are of great importance. Natural products and their derivatives have been recognized for many years as a source of therapeutic agents and structural diversity. Natural products have a wide range of diversity of multidimensional chemical structures; in the meantime, the utility of natural products as biological function modifiers has also won considerable attention.The present article attempts to describe the process of isolation, characterization, and utilization of bioactive compounds derived from natural products as drug candidates called as lead, which focus on the success of pharmacological activity in the process of finding new and effective drug compounds; this process is commonly referred to as “natural product in drug discovery.”Working role of every green herbal drugs from plant source and synthesis of bioactive products in their own way as God’s gift and preserve them within which are extractable and used raw material as and when

required through various scientific process for various scientific investigations and study of herbal drug discovery. Many pharmaceutical compounds contain secondary metabolites of plants that are of vital importance in drug designing. However, in order to have a good supply of the source material, some factors like environmental changes, diverse geographical distribution, labor cost, and selection of the superior plant should be taken care of by green plant developers so that good plants will be beneficial to pharmaceutical industry to develop good-quality herbal.



Various strategies for discovery of drug from natural resources

Important steps for successful completion of natural drug discovery

Phytochemistry or phytoanalysis of natural product in chemistry research is the backbone and pillar of herbal pharmaceutical as well as food industry.

Extraction, isolation with chromatographic separation, purification, and characterization of new phytoconstituents having good bioactivity.

Use of newly isolated phytoconstituents as "lead" compound for designing of new analogues with either improved therapeutic activity or reduced toxicity.

Position of herbal drugs

In the current era, new and newer diseases are causing threat to common people around the world. Thus, disease percentage differs in every part of the world, but diseases are not new; due to global warming, they are detected newly. Prevention is better than cure, so WHO had taken the vouch of providing "Health for all" by 2000 AD.

Practical outlook of herbal drug discovery

The following facets represent outlook of the stages involved in the development of bioactive molecule as pure drug from a plant source.

Collection and identification of the plant, authentication, and deposition of sample in herbarium like the botanical survey of India.

Literature survey and analysis on the plant species along with the activity present in the selected plants for studies.

Extraction of nonpolar to polar solvent and preparation of extracts for phytochemical analysis and their biological testing.

Evaluation of plant extracts by judging of different biological test methods.

Chromatographic analysis by activity-guided fractionation of the extract, monitoring each chromatographic fraction, its isolation calculating Rf values,area as per the computer based software's and comparison with available bioactive markers which leads to the investigation

Structure elucidation using spectroscopic techniques of bioactive isolates using cheminvestigatio

Testing of each bioactive compound in all in vitro and in vivo phytopharmacological test methods, in order to determine potency and selectivity of the herbal extract or isolates for the discovery of herbal drugs

Performing molecular modeling studies and preparing derivatives of the active compound of interest

When total synthesis is not practical, carrying out large-scale reisolation of interesting active compounds for toxicological and pharmacological studies

Clinical trials (phase I–III).

General procedure for obtaining active principles from plants.

First of all, in order to study medicinal plants, selection of plant and which type of pharmacological activity is to be studied should be clear to the researcher. Five principles of selection of plants are very important to know

which are the random, the taxonomic, the phytochemical, the ethno-medical and the information-managed approach (Figure 2)[14].

In the random selection, collection of all available plants in the area, which is to be studied, is collected based only on visualization and observation without having knowledge and experience about the selected plants.

In the taxonomic approach, prior knowledge about the plants of interest with their specific genus or family and their different locations should be known.

The phytochemical (chemotaxonomic) approach is based on the knowledge of bioactive chemical type for treating particular disease of interest should be known and are collected. Taxonomic and the phytochemical approaches are interrelated.

In the ethnomedical approach, selection is totally based on the information of the medicinal use of that particular plant in various areas.

Lastly, information managed approach is basically collection of plants based on survey and use of plants from their local area that gives prior idea about their usage and activity and then their evaluation scientifically.

Multidisciplinary research on plants has led to many new drugs, as well as prototype active molecules and biological tools; for examples, see.

Natural drugs available in market: anti-inflammatory

1. Ginger

From long years ago, herbal medicine has paid hats off to ginger due to its ability to boost the immune system. It is believed that ginger is used in day-to-day life because it plays an important role in warming the body. It can help to clean our body from accumulated toxins by its break down in your body. It's also known to cleanse the lymphatic system, our body's sewage system. Ginger prevents the accumulation of toxins and a person's body is highly safe guarded from viral, fungal, and bacterial infections. Medicinal plant ginger also shows many health benefits. It is specially used as natural remedy for nausea and pain alleviation and for its anti-inflammatory properties and inhibiting diabetes.

2. Licorice root

Licorice is becoming evident and lighten up in various researches for treatment and prevention of diseases like hepatitis C, HIV, and influenza. From a study, it confirms the antiviral activity of licorice root due to its triterpenoid content. It notes that licorice's antioxidant, free radical-scavenging and immuno-stimulating effects. Licorice root benefits also include pain relief.

3. Olive leaf

The olive leaf has antiviral properties, giving it the ability to treat the common cold and dangerous viruses.

4. Oregano

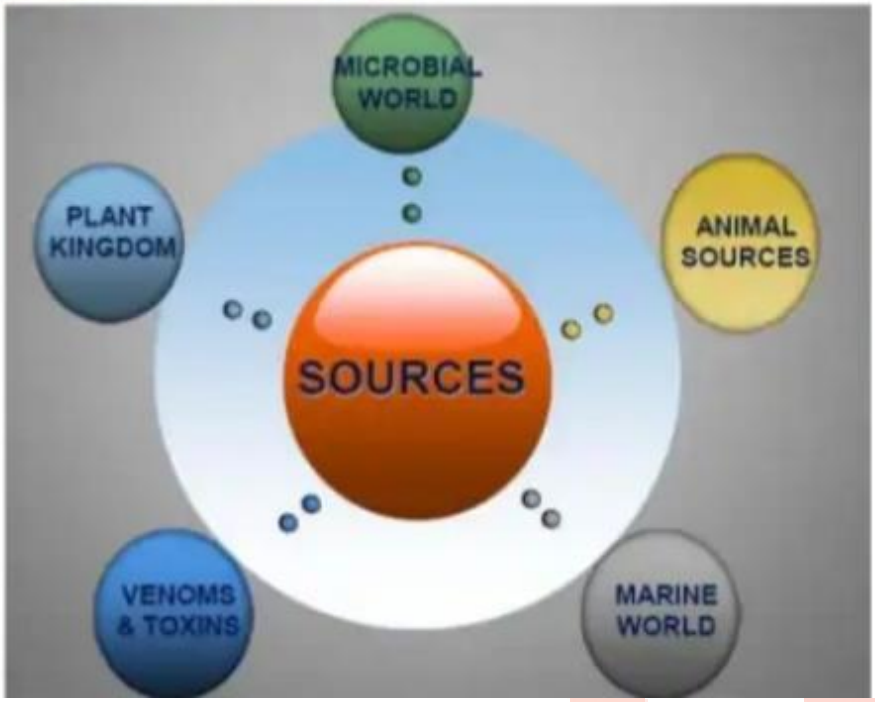
Oregano oil benefits are lightening up to be more superior to some antibiotics, with no harmful side effects on health, and can be used in day-to-day life. Carvacrol and thymol are the bioactive molecules isolated and studied and reported to have powerful properties and uses. They act upon viral infections, as well as allergies, tumors, parasites and disease-causing inflammation.

Future avenues in herbal drug discovery

In the current era, in many developed countries, priorities has been given to scientific research on medicinal plants is growing need of an hour in various research institutes, universities and pharmaceutical laboratories as well as in the clinics thereof. This research is put forward in mainly two directions: first, bioactive molecule of plants that have long been known and used for their healing properties based on the prior knowledge of the survey and literatur

ROLE OF NATURAL PRODUCTS IN DRUG DEVELOPMENT

The natural products can be classify into



Conclusion

With growing interest in herbal drug development with minimum side effects, there are better opportunities to explore the medicinal and other biological properties of previously inaccessible natural products. To establish its usefulness, it is mandatory to focus on visualization and identification of unused herbal plants over the world. Then, it is emphasized on extraction, its isolation, and characterization of phytochemicals, which is a gift of nature in a rational and scientific way. There is an unmet need for utilization of the natural products for the benefit of human kind and development of new lead for drug discovery. Once the phytochemical is obtained, this can be used for further exploration through QSAR studies, molecular modeling, and animal studies followed by clinical trial.

Reference

https://www.intechopen.com/chapters/65128

Newman, D. J.; Cragg, G. M.; Snader, K. M. J. Nat. Prod. 2003, 66, 1022– 1037

Lipinski, C. A. Drug Discovery Today: Technol. 2004, 1, 337– 341