I J R B A T, Issue (Special-17), June 2021: 117-121
A Double-Blind Peer Reviewed & Refereed Journal
OPEN ACCES
e-ISSN 2347 – 517X
Original Article
INTERNATIONAL JOURNAL OF RESEARCHES IN BIOSCIENCES, AGRICULTURE AND TECHNOLOGY

IMPORTANCE OF PHYTOCHEMICALS IN SOME INDIAN MEDICINAL PLANTS

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ABSTRACT:
Phytochemicals are naturally occurring substances which are present in the plants and shows biological and therapeutic significance by playing very important role in the plants metabolism to protect themselves from various kind of pathogens. The secretion of these compounds varies from plant to plant and it also vary in quantity in different kind of plants. Sometimes they can be harmful and sometimes they can be very useful. The drugs from plants are easily available, less expensive, very efficient and rarely have any side effect. Even in this modern era, in most of the regions, traditional medicines are made from medicinal plants. These medicines prepared from plants are Eco-friendly, Bio-friendly and also requires relatively very less quantity of chemicals. A latest report by World Health Organization (WHO) has estimated that 80% of the world's population depends on traditional medicine for their treatments.

Keywords: Phytochemicals, Pathogens, Secretion, Traditional medicines, Bio-friendly.

INTRODUCTION:

The word Phytochemical is derived from Greek word Phyto which means plants. Phytochemicals are non-essential i.e.; they are not essential to sustain life for plants. There are thousands of phytochemicals which are important for variety of disease curation. The abundance of plants in the world as vegetables, leaves, roots, spices, fruits, etc. of which more than 80% of their chemical compositions and contents have not been discovered yet. Therefore, search of these phytochemicals as alternative drug sources which are safer, have fewer side effects and relatively cheaper. There are different phytochemicals such as alkaloids, saponins, tannins, terpenoid, steroid, anthraquinones, flavonoids, carotenoids, and phenols considering their chemical properties and their usefulness to human kind. Phytochemicals have been part of phytomedicines from many decades which can be derived from leaves, roots, fruits, barks, seeds, flowers. Knowledge and information of the chemical constituents of plants is desirable and required too because such information will be important for synthesis of complex chemical substance (RNS Yadav et al., 07 Dec 2011). Those plants which have a relatively high content of phenolic and flavonoids have greater antioxidant activities that play a vital role in the prevention of the development of age-related disease and tumour.

Various species of plants contains various kind of phytochemicals which can be used to treat many types of aliments. The importance of the plants as medicine and the distribution of phytochemicals were discussed with along with the role of these plants as traditional medicine in India.

OBJECTIVES OF THE STUDY:

- Preliminary phytochemical screening, isolation of crude extracts of:
- To screen the in vitro antioxidant studies like DPPH, hydroxyl radical scavenging properties and reducing power property in different solvent extracts.
- To identify the active compounds from bioactive extracts using GC-MS analysis and to isolate and purify the phytochemicals using standard chromatographic protocols.
- Structural elucidation of the isolated pure compounds through supportive spectral studies viz. UV, FT-IR,1H-NMR, etc.
- To study topical biological applications such as in vitro antioxidant, antibacterial, etc. and to review the knowledge and discover about medicinal plants in relation to their medicinal properties.

Classification, Identification and standardization of active principles in medicinal plants

Medicinal plants produce some chemical compounds which protect them against environmental threats like pollution, insects, pathogens, microbes, etc and these chemicals are known as secondary metabolites (phytochemicals) and their medicinal potencies are due to these chemical compounds. A medicinal plant may contain a mixture of different phytochemicals which can perform different functions for plants and serve for humans too. If we can identify these biologically active compounds in a medicinal plant this can serves as a guide in its quality control and dose determination for various diseases. The entire earth has more than 250,000 species of plants which can be studied and used as medicines. Examples of plant-based drugs are ginger some, digitalis, opium, codeine, and quinine.

MATERIALS AND METHODS:

Firstly, Pre-extraction preparation of plant samples will be done, the very initial stage in studying and analysing medicinal plants is the preparation of plant samples to preserve the biomolecules or phytochemicals present in the plants prior to extraction. Plants samples derived from various parts such as leaves, barks, roots, fruits and flowers can be extracted from fresh or dried plants material. Some pre-preparation such as grinding and drying also effects the preservation of phytochemicals in the final extracts [Azwanida NN et al.,2015]

Plant collection and sampling:

1. Collection of Plants:

Medicinal plants under consideration may be collected from forests or from nursery or herbariums. The biggest advantage of plants collected from forest is that they will not contain any pesticides. After the plants are collected, they have to be processed for cleaning in order to prevent the worsening of phytochemicals present in plants.

2. Cleaning of Plants: After plants collection it has to be cleaned properly. The process of cleaning may involve the following steps. Cleaning, washing, peeling or stripping leaves from stems or barks. Cleaning has to be done by hands for obtaining better and accurate results. The fruits, leaves, seeds, stem, root will be washed with distilled water and sterilized with 10% Sodium Hypo chloride solution, rinsed again with distilled water and then air dried at room temperature under

shadow and then grinded to a powdered form. [K. Sahira Banu & Dr, L.Catherine]

3.Drying: Drying is essential to remove the water content from plants so that they can be stored. Plants have to be dried immediately as soon as the plants collection or this will lead to decomposition of plant materials. The drying consists of two methods either natural or artificial. Natural process includes sun-drying. Artificial drying can be done with the help of artificial driers. This process will reduce the drying time.

Extraction of plant material

The study of medicinal plants for extraction of phytochemicals starts with the pre-extraction and the extraction procedures, which is an important step in the processing of the phytochemicals from plant sample. Extraction of phytochemicals can be done with the help of cold or hot method i.e., Maceration or Soxhlet method respectively by using various solvents such as Methanol, Acetone, Chloroform etc. Traditional methods such as maceration and Soxhlet extraction are commonly used at the small research or Small Manufacturing Enterprise (SME) level. The modern extraction methods such as; microwave-assisted (MAE), supercritical fluid extraction (SFE), in which these advances are used to increase yield at relatively lower costs.

The fruits, leaves, seeds, stem, root wll be washed with distilled water and sterilized with 10% sodium hypo chloride solution. Rinsed again with distilled water and then air dried at room temperature in shadow and then grinded into powder form.

Phytochemical Activity:

The Phytochemical analysis of selected medicinal plants can be carried out by using following tests:

Alkaloids: These are End product of plant metabolism. Nitrogen containing phytochemical bases that help in various important and diverse physiological effect on human, plants and animals. It is present in coffee seeds, tomato seeds, potatoes etc. It includes morphine, strychnine, quinine, ephedrine, and nicotine.

Test for alkaloids: Plant Extract from root, leaves, stem, fruits, seed is filtered and then treated with potassium mercuric iodide and observe if colour change.

Flavonoids: Flavonoids and carotenoids are responsible for different colours fruits, vegetables, roots etc. Flavonoids are found in almost all types vegetables and fruits and its is the largest group of Phytonutrients having more than 6,000 types.

Flavonoids are used as antioxidants because of their ability to scavenge free radicals such as peroxide and hydroperoxide of lipid hydroxyl hence inhibiting oxidation that lead to degenerative diseases. Flavonoids have been found to have antibacterial activity due to their ability to complex with bacterial cell wall and with extracellular and soluble proteins.

Test for Flavonoids: Plant Extract is taken in the test tube and then add 2ml of diluted sodium Hydroxide and mixed well and after Mixing dil. HCL is added to test tube and colour change is noticed.

Terpenoids: Terpenoids also called as isoprenoids are a diverse class of phytochemicals being used as antimicrobial,

antifungal, antifungal, antiviral, antioxidant, anti-inflammatory, etc. Most of them are multicyclic structures with functional group having Oxygen.

Test for Flavonoids: In a test tube plant extract and 2ml of chloroform is mixed well and then 2ml of conc. Sulphuric acid was added and confirmation is done by reddish brown colour.

RESULT AND DISCUSSION:

As it is very well-known fact that plant extracts generally occur as a combination of various type of bioactive compounds commonly known as phytochemicals, their separation is still a big challenge for the process of identification and characterization. For the isolation most commonly, used tools are different separation techniques such as TLC, column chromatography, HPLC. In short, we can day that chromatography should be used to obtain pure or isolated compounds. The pure compounds are then used for the structure Elucidation and to check biological activity. Various Kind of Spectroscopy is used for the characterization of phytochemicals.

Implications of the study: This Study shows that phytochemicals can be very useful for curation of various disease without any harmful or side effect. Variety of plant species can be selected and phytochemical can be isolated, characterized and studied.

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 Plausible research on isolating naturally occurring constituents will allow to detail the exact nature of the biological effects of natural compounds on the human body, as well as to uncover possible synergies, which holds much promise for the development of new therapies against many devastating diseases.The conclusions if established positively, this piece of work may be a boon to the Indian medicinal heritage, for the opted plants to be employed in clinical trials.

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