



Herbal Research: Current Status

S Basalingappa*, S Amarnath, Arun Sharma

Department of Pharmacology, Sri Lakshmi Narayana Institute of Medical Sciences, Puducherry, India.

*Corresponding author's E-mail: basalingappa.s@gmail.com

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ABSTRACT

The many of the modern medicines are obtained from plant source in earlier days. Ayurvedic and siddha system of medicine use herbal derived products for many illnesses based on their folkloric and traditional claims. Herbal research conducted earlier was aimed at isolating active principles and there by attributing cause-effect relationship on the herbal material. Since the possibility of losing the activity of the plant during extraction and the huge cost involved in isolating the active principle, World Health Organization, has recommended 'reverse pharmacology' where scientific validation for the existing drugs was attempted. Public are now using alternative system of medicine as an add on therapy to modern medicine. This probably might result in herbal-allopathic drug interaction which is to be monitored through herbal pharmacovigilance.

Keywords: Herbal drugs, Modern medicine, Reverse pharmacology, Herbal pharmacovigilance.

INTRODUCTION

Clinical use of herbs of medicinal value has been well documented since ages. Traditional and folkloric claim suggesting the use of certain herbs as medicines has been followed in ayurveda and siddha medicine. It will be imperative to provide supporting scientific evidence to such claims to accept them scientifically. Research on herbal medicine has been initiated during early 20th century with available facilities at that time. However, transformation in herbal research has taken place over years suiting the benefit of the researchers and end users. The present review details the various approaches to herbal research existed earlier, their merits and demerits, besides outlining the recent concepts of herbal research including its limitation.

REVIEW OF LITERATURE

Herbal medicines are the most commonly used and in fact most of the modern medicines such as digitalis, morphine, ergotamine, colchicine, etc. are derived initially from plant sources. Later considering their heavy demand, these drugs were synthesized from the laboratory for clinical use. Still, plants are considered as the main source for deriving medicines.

In India, plants are used based on traditional and folk claims for several diseases for example, opium mixture was used for pain relief, to suppress cough and to relieve diarrhea. They were used either as tincture, decoction or as aqueous extract. It is note worthy that most of the herbal medicines were used only through orally. Despite plenty of materials available for therapeutic use for various illnesses through folkloric claims, scientists attempted to carry out organized research based on the claims very effectively only from early 1970's. Two schools of thought were put forth while designing herbal research to support the therapeutic claim based on

traditional system. The first one proposed is to subject the plant or the parts of the plant (used for treatment cited in folkloric claim) to chemical extraction using polar and non polar solvents. The extract thus obtained was subjected to physical and chemical tests using various techniques like chromatography, atomic absorption spectrometry and mass spectra. Based on the physiochemical nature, the lead molecule was identified for pharmacological screening. The identified molecule may be a crude extract of solvents used (example: alcoholic, benzene, hexane extracts) or can be a pure substance (either, an alkaloid, glycoside or tannin); either of them can be subjected to pharmacological screening. The modern medicine scientist insisted on active principle investigation. This is mainly to avoid impurities or ingredients with doubtful therapeutic value present in the crude extract; although this approach appears attractive, there are limitations such as loss of active principles during extraction and high cost involved in the isolation process. The conventional pharmacological screening methodology such as acute or subacute toxicity studies were used initially to prove the safety of the test material; this was followed by routine screening procedures for the anticipated therapeutic activity based on their folkloric claim; for example, if a particular plant has been recommended for anti inflammatory action, the screening of the compound was done on acute and chronic inflammatory animal models. Following identification of the activity, the possible mechanism of action was also investigated employing routine approaches. For example if a plant extract exhibit analgesic activity, using naloxon, the possible mechanism weather the compound involves opioid or non opioid pathways can be identified on the whole by routine standard screening procedures available to evaluate a particular activity in the modern medicine were adopted in toto while screening a plant material.



This reports available were diffuse and isolated so that a concrete evidence could not be attributed for a particular plant material based on its folkloric claim, such isolated reports found difficult to get published in a reputed journals since the herbal research was not of prime importance in those days. Therefore scanty evidences were available to provide scientific support for their folkloric claim. Later, the Indian council of Medical Research [ICMR] identifying the significance of herbal medicine, has focussed the scientists from many of its research institutions. The ICMR has published a book in two volumes on the Indian medical plants compiling the traditional claim and research carried out on a number of plants.^{1, 2} As a result, enormous support was received from the apex bodies for carrying out research on medicinal plants and separate research centers were established by ICMR for herbal research.³ Similarly, Central Drug Research Institute (CDRI), Lucknow carried out a number of preclinical testing and reported various activities for a large number of plants.⁴ Unfortunately, much advancement could not be made in herbal research for one or more of the following reasons.

1. Improper selection of plants and their parts.
2. Not adhering to the principles of preparing the extract for investigation.
3. Possibility of losing the active principles during extraction procedure.
4. Not using the material and formulation to be tested as suggested in traditional claim.

Much up roar was made by the scientists for imparting stepmotherly treatment for herbal research without assigning any reason. In fact, the above mentioned points could not be complied with in toto as many of the researchers insisted the identification of active principles for investigation. Some were successful in identifying such as 'tylophora alkaloids' for treatment of bronchial asthma and 'syllimarin' as hepato protective. Much more active principles have been proved to be beneficial in the therapy of inflammation [curcumin], jaundice [phylanthus] are worth mentioning. However, the success rate in such identification when compared with traditional claims was very low and the cost involved was enormous. It was considered such attempts are not cost effective.

Considering the above mentioned limiting factors, the World Health Organization (WHO) suggested 'Reverse pharmacology' where in a scientist can provide scientific support for the existing formulation in clinical use based on their traditional claims.⁵ This formed the second and recent approach on herbal research. The guideline suggested by WHO are:

1. The formulation already in clinical use based on folkloric claim can be suggested for investigation; this should have been an approved formulation by an appropriate regulatory authority.

2. The test substance should be the same formulation (like aqueous extract) as suggested in the folkloric claim.
3. The route of administration for investigation should be the same as suggested in the traditional claim.
4. The investigation can confine to the relevant screening of the activity for which it is therapeutically used.

As a consequence, a large number of scientists involved themselves in herbal research; Government of India, in order to promote alternative system of medicine formed a separate apex research body called department of Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homoeopathy (AYUSH)⁶ mainly focused to promote research in systems other than modern medicine. Following this, advancements were made not only in herbal research but also other non drug measures to be followed such as yoga, lifestyle modifications which are proved to benefit from many illnesses. This policy nurtured a new approach where in not only physical health is considered for the well being but also the mental health equally. In certain cases like diabetes mellitus, hypertension, gastro esophageal reflex disease (GERD) good mental health contribute to a major extent of well being of the afflicted individuals. Stress of any type has been associated with the expression of many diseases such as peptic ulcer, hypertension, diabetes mellitus, cardiovascular disorders, central nervous system disorders.⁷ Physical measures like calming, exercise, associated with dietary modification have helped these chronic diseases. Subsequently awareness has been created among the Indian population to maintain physical fitness and mental calming to prevent from diseases.

Herbal formulations, a majority of them are polyherbal in nature. These plants are selected based on the traditional claim. Currently many sources are available for easy access of information regarding herbs. World Wide Web (WWW) now offers information on most of the plants about their habitat, vernacular name, and therapeutic uses of various parts of the plants. Therefore the knowledge about herbs is now easily disseminated among the public and in fact combining traditional claim and web information they think with an inquiring mind on the possible uses of the plants. The advancements has reached to such an extent that herbal research is now carried out not only in medical colleges but also in pharmacy Colleges, biotechnology and molecular biology and science departments of various universities. Infact attempts are being made by biotechnology department for preparing nanoparticle from the plant.⁸ With the available sophisticated techniques like finger printing, chromatography separation, atomic absorption study are now feasible at affordable cost, the quality of herbal research is vast improving. Therefore with the introduction of reverse pharmacology, scientific validation for existing formulations is now attempted on a large scale. The fact that there is a shift in a paradigm by



the public towards the use of herbal products either as a food supplement or as a drug has influenced the scientists to focus more on herbal research. Additionally, the scope for publishing such results exclusively in journals confined to herbal research has become wider.

LIMITATIONS OF HERBAL RESEARCH

Through reverse pharmacology promotes herbal research on various aspects, it is to be admitted that the research will not be able to ascribe any particular plant for the beneficial actions in a poly herbal formulation.

Since, the formulations are allowed based on traditional and folkloric claim, a uniform yardstick could not be applied while granting approval for herbal products.

With the awareness to use herbal products as food supplements and as a add on therapy to the already existing modern medicines, the possibility of herbal-modern drug interaction possesses a big problem which warrants urgent notice of the scientists or clinicians of either discipline. This is now termed herbal pharmacovigilance.^{9,10,11} To achieve this to the fullest extent, lack of sufficient pharmacokinetic data in contrast to large pharmacodynamic data hinders the progress. Realizing this, it is essential to organize pharmacokinetic studies on herbal products and carry out pharmacovigilance programme to avoid toxicity or therapeutic failure.

CONCLUSION

A present approach of reverse pharmacology is more appropriate and thought provoking. However, the inclusion of more than two plant materials in a single formulation is a major limitation in attributing a cause effect relationship of a single plant. We do have herbal remedies for most of the ailments but their appropriate use and product quality need to be improvised to achieve

good results. Herbal pharmacovigilance is an absolute necessary entity which warrants urgent attention for the benefit of those who use herbal remedies.

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