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HERBS AND SPICES : RESOURCES FOR MILLENNIUM DRUGS

HERBS and spices have been valued for ages not only for their culinary uses but also for their medicinal properties. These provided the materials used in various systems of alternate medicine such as Ayurveda, Siddha, Unani, Chinese, Tibetan, Naturopathy, Aromapathy, Homoeopathy and Flower remedies. Ayurveda developed to its peak form some two thousand years ago and widely practised for centuries thereafter, fell to the modern antibiotics and synthetic generic drugs in the twentieth century. Indeed, traditional knowledge of folk and tribal medicine has gifted several modern drugs to civilised man, as best exemplified by quinine from *Cinchona* bark and Salicylate (the mother compound for aspirin) from a willow tree. The high cost of R and D for discovering a new synthetic drug, the elaborate time consuming procedure for testing the drug before putting to market, enormous cost in the form of compensation in case of a harmful side effect found later, development of resistance by the causative pathogen and the ineffectiveness of synthetic drugs in chronic diseases have forced pharmaceutical giants, the so-called MNCs to look for sources of lead compounds in the traditional medicine. Another reason for going 'green' by people of the developed countries is the awareness of nature with the innate philosophical belief that, since nature created human, all of his needs including cures for diseases are also provided in nature.

One of the major reasons for the lack of faith in our traditional system of medicine today is that many unfounded claims by untrained quacks with spurious degrees in alternative medicine mask the genuine practices, which have stood the test of time for centuries. These practitioners lack the experienced clinical eye or botanical training for identification of the crude drug or plant properly, have scant regard for the time, season or the proper plant part for collection and may even take recourse to fraud by mixing modern medicines like antibiotics or steroids to show 'magical' cures for publicity. It is the very poor, the old-fashioned senior citizens with traditional values or people in remote villages lacking even primary health care systems

fall victims to such practices. But systematic evaluation by well-trained and well-intentioned practitioners with experience in both modern and traditional medicine have proven the efficacy of many indigenous drugs, particularly in the treatment of chronic or late onset aging-related diseases.

In Charaka and Susruta Sanhita, elaborate instructions on classification and description of the medicinal plant, its stage, parts, time of the day and season of collection, even the direction of wind during collection etc. are given. May be a dose of mysticism or spirituality was blended with the science of healing commensurate with the mindset of people at that time to ensure strict adherence to the instructions. One point to be noted here is that the mental preparation, state of cleanliness and compassion of the healer and a feeling of assurance and faith on the part of the healed established a dialogue between the two minds. This communication is essential for a treatment by any system of medicine, but is unfortunately lacking today in the business-minded world where even human service is just another commodity.

Proper identification (taxonomic and genetic stock) of the plant is of utmost importance, as many plants are sold in the market with mistaken identity deliberately or by ignorance. For example, the common plant *Centella asiatica* (Thankuni or Mandukparni in vernacular name) Fam. *Umbelliferae* used in various gastrointestinal disorders is often confused and substituted with *Ipomoea reniformis* (Bhuinkamri in vernacular) Fam. *Convolvulaceae* lacking the healing power. Also, controversy exists regarding the identity of 'Brahmi', the legendary herb that enhances memory. In rest of Northern India, *Centella* passes for Brahmi, while in W. Bengal Brahmi is *Bacopa monniera* (Fam. *Scrophulariaceae*). Similarly, dried Kalamegh (*Andrographis paniculata*) passes for Chirata (*Swertia chirata*).

In most of the cases, systematic investigations for the isolation and assay of the active principles, animal experimentation with proper controls, clinical trials and dose

determination have not been carried out. The system runs mostly empirically by experience handed down through generations. Though India had and still has the leading expertise in natural products chemistry, scarcely any drug was developed. This was mostly due to more emphasis being placed over isolation and characterization of a "pure crystalline" compound and subsequently testing pharmacological activity. It may be that the healing property is not in the "pure" compound, it may be synergistic in mixture with other "impurities" or it might have been thrown away in the mother liquor. To start a new search, the experiments should be undertaken the other way round : start with a suitable bioassay of all fractions throughout and follow the fractions where activity is found. Controlled animal experiment or better animal cell culture as test systems should be developed. Obviously, this type of investigation will need an interdisciplinary team work involving money, manpower and infrastructure.

MNCs are already going to all corners of the earth to search for lead compounds from natural sources and setting up "combinatorial chemistry" laboratories involving chemistry, molecular cell biology, genetics and protein engineering, bioinformatics and structural biology, molecular modelling, robotics and of course patents / IPR cells. In this age of IPR and WTO, if India can not make a head start in documenting, protecting and utilising our enormous floral and faunal biodiversity, it will simply be an exporter for crude drug and a huge importing market of patented drugs or patents of the 21st century with highly inflated monopolised price tag.

Experts are now talking of 'designer' drugs : specific for each race or even individual. In indigenous medicine, we know of many drugs where the same drug being used for many different ailments of different origin or even different drugs being prescribed for different persons suffering from the same disease, depending on their constitution (*dhatu*). Though apparently sounding unscientific, this phenomenon is now gaining scientific

ground and is the basis of modern day "designer drug" concept. In fact, drugs act mostly by binding to specific receptor protein molecules which may vary from person to person or even from tissue to tissue of a particular person. Also, a plant or crude drug may contain more than one active constituent. Using bioinformatics and molecular modelling of known receptor molecules and their mutant forms in different individuals, pharmaceutical company R and D departments are expecting to market such designer drugs in a decade or so.

The same arguments apply to many spices which have medicinal values. The uses of turmeric or chilli, pepper or garlic are commonly known. What is not known to general public is that even the commonly prevailing notion of chilli being called 'hot' has now been shown to have a profound scientific basis. Capsaicin (the hot principle of chilli) activates that promoter of a brain receptor gene, which is also activated by heat. Curcumin (the active principle of Haldi, *Curcuma longa*) is not only an antibiotic, for which it is used in boils or ulcers, but also has cancer retarding or preventing properties. Many such examples can be cited for the existence of curing principles in spices. In fact, MNCs are now heavily investing on searching more closely herbs and spices for drugs for resistant pathogens like those for Malaria, TB or AIDS as also for treating late onset age-related chronic diseases like arthritis, Parkinson and Alzheimer's diseases, diseases of heart and lung and even cancer. It is imperative for India now to collect, collate and document all indigenous knowledge in traditional, tribal and folk medicine so that we may not be deprived of the use of our very own intellectual property. Fortunately, Government of India has already taken action on this line and has already successfully won over patent claims on Basmati rice and Haldi in the international arena. It is now also the duty and responsibility of scientists, institutions and NGOs to keep these issues in mind and help to protect national interest. □

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