GLOBAL MARKET POTENTIALS OF AYRUVEDA DRUGS –SOME FACTS

PROF.A.V.DASTURE
Pharmaceutical consultant.

Received: 13.3.2002 Accepted: 28.3.2002

Keywords: Ayurveda, Phyto-Pharmaceuticals, International trade.

Medicinal plants, since times immemorial, have been used in virtually all cultures as a source of medicine. The widespread use of herbal remedies and healthcare preparations, as those described in ancient texts such as the Vedas and the bible, and obtained form commonly used traditional herbs and medicinal plants, has been traced to the occurrence of natural products with medicinal properties.

The use of traditional medicine and medicinal plants in most developing countries, as a normative basis for the maintenance of good health, has been widely observed (UNESCO, 1996). Furthermore, an increasing reliance on the use of medicinal plants in the industrialized societies has been traced to the extraction and development of several drugs and chemotherapeutics form these plants as well as form traditionally used rural herbal remedies (UNESCO, 1998) Moreover, in these societies, herbal remedies have become more popular in the treatment of minor ailments, and also on account of the increasing costs of personal health maintenance, indeed the market and public demand has been so great that there is a great risk that many medicinal plants, today, face either extinction or loss of genetic diversity.

Background

Medicine, in several developing countries, using local traditions and beliefs, is still the mainstay of health care. As defined by WHO, health is a state of complete physical, mental, and social well being and not merely the absence of disease or infirmity.

The practice of traditional medicine is widespread is china, India, Japan, Pakistan, Sri Lanka and Thailand.

In china about 40% of the total medicinal consumption is attributed to traditional tribal medicines. In Thailand, herbal medicines make use of legumes encountered in the caesalpiniaceae, the fabaceae, and the Mimosaceae. In the mid-90s, it is estimated that receipts of more than US$2.5 billion have resulted form the sales of herbal medicines. And, in Japan, Herbal medicinal preparation are more in demand than mainstream pharmaceutical products.

Africa is a rich source of medicinal plants perhaps, the best known species is phytolacca dodecandra.

Extracts of the plant, commonly known as endod, are used as an effective mollucide to control schistosomiasis (Lemma, 1991). Other notable examples are catharanthus roseus, which yields anti-tumour agents such as vinblastine and vincristine; and Ricinus communis, which yields the laxative- castor
oil. In Botswana, Lesotho, Namibia and south Africa, Harpagophytum procumbens is produced as a crude drug for export. Similarly, Hibiscus sabdariffa is exported from Sudan and Egypt. Other exports are Pausinyxstalia yohimbe from Cameroon, Nigeria and Rwanda, which yields yohimbine; and Rauwolfia vomitotria, from Madagascar, Mozambique and Zaire, which is exploited to yield reserpine and ajmaline.

The use of medicinal plants like Eupatorium perfoliatum (bonest), Podophyllum peltatus (mayapple), and Panax quinquefolium (ginseng) in the USA has long been associated with the American Indians. These plants have also been appreciated and recognized for their aesthetic and ornamental value. In central America medicinal plants have been widely used – by the Maya Indians in Mexico, the Miskitos and surmus in Honduras and Nicaragua, the Pech, Lencas, and Xicaques in Honduras, the Pipiles in El Salvador, the Talamancas in Costa Rica, and the Guaymis and Kunas in Panama.

In Europe, some 1500 species of medicinal and aromatic plants are widely used in Albania, Bulgaria, Croatia, France, Germany, Hungary, Poland, Spain, Turkey, and the United Kingdom. The Maltese islands constitute and apt example where medicinal plants are widely used in every day life as part of folk medicinal remedies (Lanfrance, 1992).

ISSUES:

Traditional and folklore medicine bequeathed from generation to generation is rich in domestic recipes and communal practice. Encompassing concepts and methods for the protection and restoration of health, traditional medicine has served as a fount of alternative medicine, new pharmaceuticals, and healthcare products. The best known examples of traditional medicine, differing in concept and protocol, are well developed systems such as acupuncture and ayurvedic medicine that have been widely used to conserve human health in China and India.

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Developed countries, in recent times, are turning to the use of traditional medicinal systems that involve the use of herbal drugs and remedies. About 1400 herbal preparations are used widely, according to a recent survey in Member states of European Union. Herbal preparations are popular and are on significance in primary healthcare in Belgium, France, Germany and Netherlands, Such popularity of healthcare plant-derived products has been traced to their increasing acceptance and use in the consmetic indurey as well as to increasing public costs in the daily maintenance of personal health and well being. Examples of such beauty-oriented therapeuticals are skin tissue regenerators, anti-wrinkling agents and anit-age creams.

Most dermaceuticals are derved from algal extracts that are rich in minerals and the vitamin B group.

Skincare products such as skin creams, skin tonics, etc. derived from medicinal plants are grouped together as dermaceuticals. Also amongst the poor, cures and drugs, derived from plants, constitute the main source of healthcare products.

Gorman (1992) drew attention to the power of Chinese folk medicinal potions in treating maladies from eczema and malaria to
respiratory disorders. In the quest for new medicines to treat old and emergent diseases such as malaria and AIDS, attention is now being given to discovering the active ingredients encountered in the treasury of over 5,000 Chinese herbs, plants and roots that have been used routinely and traditionally. Quinghaosu and Chaihu are two such examples. Whereas the former, called artemisinin and obtained from Artemisia annua is expected to yield, in the coming millennium, a potent new class of antimalarials, the latter, obtained from Bupleurum Chinese and used as a popular remedy for hepatitis is the focus of intense research by the Japanese pharmaceutical industry. More recently, the biochemistry of tianhuafen or cucumber is being studied in the USA to decipher the identity of compound Q, an extract used in China and credited with remedial and relief properties in AIDS sufferers.

Medicinal plants are an integral component of ethno veterinary medicine. Farmers and pastoralists in several countries use medicinal plants in the maintenance and conservation of the healthcare of livestock. Intestinal disorders in cows, in Mexico, are treated with herbal extracts of Polakowskia tacacco. Dietary supplements such as vitamin A in poultry feeds in Uganda are supplied through enrichments of amaranth (Amaranthus sp.) It is estimated that medicinal plants, for several centuries, have been widely used as a primary source prevention and control of livestock diseases. In fact, interest of such use in the veterinary sector has resulted primarily from the increasing cost of livestock maintenance and the introduction of new technology in the production of veterinary medicines and vaccines.

McGee (1998), Surveying the use of spice and their medicinal properties around the world, concluded that spices serve the adaptive purpose of reducing food-borne disease. In reviewing relevant texts ranging from the preservative properties of spices against food spoilage to the present of antimicrobial substances that lay claim to the elimination of pathogenic organisms in food preparations, the case is made for a more objective analysis and study of the medicinal properties of spices in victo rather than in victo. A whole range of plant-derived dietary supplement s, phytochemicals and pro-vitamins that assist in maintaining good health and combating disease are now being described as functional foods, nutriceuticals and nutraceuticals. Table 1 provides some examples of national activities concerning medicinal plants in several developed and developing countries.

Despite the increasing use of medicinal plants, their future, seemingly, is being threatened by complacency concerning their conservation. Reserves of herbs and stocks of medicinal plants in developing countries are diminishing and in danger of extinction as a result of growing trade demands for cheaper healthcare products and new plant-based therapeutic markets in preference to more expensive target-specific drugs and biopharmaceuticals. Such concerns have stimulated positive legal and economic interest.

Issues concerning intellectual property rights, compensation for loss of finance-rich biodiversity resources, and the acquisition and safeguarding of traditional healthcare knowledge are no longer neglected.

Bioprospecting of new drugs from medicinal plants and the exploitation of unprotected traditional knowledge in starting up potentially new bioindustries are the focus of new monitoring measures. Such concerns
that call for adherence to and observation of cultural and intellectual property rights have been addressed and enshrined in the chiang-Mai and Kari – Oca declarations (Table 2). The first countries to seriously tackle these issues are china and India. Indeed, programmes dealing with medicinal plant conservation, cultivation, community involvement and sustainable development being initiated elsewhere, could benefit immensely form the Chinese and Indian experiences (World Bank, 1997).

Genetic biodiversity of traditional medicinal herbs and plants is continuously under the threat of extinction as a result of growth exploitation, environment-unfriendly harvesting techniques, loss of growth habitats and unmonitored trade of medicinal plants.

Medicinal herbs, possessing penile potency properties and anti-cancer principles are the focus of smuggling to import markets in Germany, France, Switzerland, Japan, the U.K. and the U.S.A. The best known example, in recent times, is that of tetu lakda (Nothadoytes foetida). Commonly encountered in southern India and Sri lanka, the herb is exploited as a source of anti-cancer drugs.

On the other hand, Adonis vernalis, extinct in Italy and the Netherlands, is an endangered species in Germany, Slovakia, Sweden and Switzerland. Fortunately, to safeguard against such practices and losses, guidelines and licensing concerning the use of such plants are provided for in the convention on international Trade Endangered species of Wild Flora and Fauna (CITES).

The industrial uses of medicinal plants are many. These range from traditional medicines, herbal teas, and health foods such as nutricuticals to galenicals, phytopharmaceuticals and industrially produced pharmaceuticals. Furthermore, medicinal plants constitute a source of valuable foreign exchange for most developing countries, as they are a ready source of drugs such as quinine and reserpine; galenicals like tinctures and of intermediates (e.g. diosgenin from Discorea Sp.) in the production of semi-synthetic drugs.

The world market for plant derived chemicals pharmaceuticals, fragrances, flavours, and colour ingredients, alone exceeds several billion dollars per year. Classic examples of phytochemicals in biology and medicine include taxol, vincristine, vinblastine, colchicines as well as the Chinese antimalarial-artemisinin, and the Indian ayurvedic drug-forkolin. Trade in medicinal plants is growing in volume and in exports. It is estimated that the global trade in medicinal plants is US $ 800 million per year.

The botanical market, inclusive of herbs and medicinal plants, in the U.S.A. is estimated, at retail, at approximately US$ 1.6 billion p.a China with exports of over 120,000 tonnes p.a., and India with some 32,000 tonnes p.a dominate the international markets. It is estimated that Europe, annually imports about 400,00 t of medicinal plants with an average market value of US$ 1 billion form Africa and Asia. A growing awareness of this new contributor to the foreign-exchange reserves of several national treasuries is beginning to emerge. To satisfy growing market demands, surveys are being conducted to unearth new plant sources of herbal remedies and medicines.

In several industrialized societies, plant-derived prescription drugs constitute an element in the maintenance of health.
Medicinal plants are an integral component of research developments in the pharmaceutical industry. Such research focuses on the isolation and direct use of active medicinal constituents, or on the development of semi-synthetic drugs, or still again on the active screening of natural products to yield synthetic pharmacologically-active compounds. In Germany, for example, over 1500 plant species encountered in some 200 families and 800 genera have been processed into medicinal products. In South Africa, likewise, some 500 species are commercialized trade products. Today, Bulgaria, Germany and Poland are recognized as major exporters of plant-based medicinal products.

The development and commercialization of medicinal plant-based bioindustries in the developing countries is dependent upon the availability of facilities and information concerning upstream and downstream bioprocessing, extraction, purification and marketing of the industrial potential of medicinal plants. Absence of such infrastructure compounded by lack of governmental interest and financial support restricts the evolution of traditional herbal extracts into authenticated market products. Furthermore the absence of modernized socio-economic and public healthcare systems reinforce reliance of rural and lower-income urban populations on the use of traditional medicinal herbs and plants as complementary aids to routine pharamaceutical market products.

The prophylactic and therapeutic effects of plant foods and extracts in reducing cardiovascular disease has been reviewed (Walker, 1996). Non-nutrient phytochemicals are increasingly being recognized as potential health promoters I reducing the risks of cardiovascular disease and atherosclerosis. Prominent herbs identified were Achillea millefolium (yarrow), Allium Sativum (garlic), Convallaria majalis (lily of the Valley), (hawthorn), Cynara scolymus (globe artichoke), Gingko biloba (gingko) and Viburnum opulus (cramp bark).

Saint-john’s work known as Johanniskrant in German for centuries has been used to treat people with mild and moderate depression without the side effects of Prozac. Widely sold in Germany and other European countries, and awaiting official approval by the US food and Drug Administration, Saint-john’s wort is being regarded as a serious rival to Prozac (Andrews, 1997).

Medicinal plants can make an important contribution to the WHO goal to ensure, by the year 2000, that all peoples, worldwide, will lead a sustainable social-economic productive life., The centre for Science and Technology of the Non-Aligned and other Developing Countries in India organized an international Workshop on Tissue Culture of Economic Plants in April, 1994, as a means of using modern biotechnological techniques to nurture and conserve medicinal plants.

In late 1997, the World Bank, within the framework of the Global Environmental Facility provided a US $ 4.5 million grant for the SriLanka conservation of Medicinal Plants Project which focuses on the conservation of medicinal plant populations, their habitats, and their sustainable use in medicinal Plant conservation Areas (MPCAs), Inventories with emphasis on the management, research and conservation of rare and endangered species of medicinal plants are the main programmes at MPCAs at Ritigala, Naula, Rajawaka, Kanneliya and Bible.
Aspects of policy and research concerning the cultivation of non-tropical and tropical medicinal plants and their genetic improvement; their conservation in botanical gardens, their storage in liquid nitrogen; their economic potential in international pharmaceutical trade; and their vulnerability to over-exploitation and extinction have been dealt with authoritatively (Akerere et al, 1991; Chadwick and Marsh, 1994). Moreover, such concerns and issues are addressed through a variety of programme activities and projects conducted, and promoted by several international, regional, and non-governmental organizations (Table 3).

CONCLUDING REMARKS

Recent and renewed interest in medicinal plants coupled to developments in information technology had fuelled an explosion in the range and content of electronic information concerning medicinal plants as a re-emergent health aid. Bhat (1997) recently reviewed diverse sources of such information in traditional abstracting services as well as in a variety of online electronic databases. As a result of such developments, access to indigenous people and cultures concerning medicinal plants are greatly facilitated. Furthermore, the active participation of such natural custodians and practitioners of valuable knowledge is guaranteed in the generation of research focusing on screening programmes dealing with the isolation of bioactive principles and the development of new drugs.

REFERENCES

1. Akerere, O., Heywood, V. and Synge, H.(1991). Eds., Conservation of Medicinal Plants, Cambridge University Press Ltd., Cambridge, UK, Pgs. 362.

2. Andrews, E.L. (1997) A Humble Herb as Rival to Proza, International Herald Tribune, Paris, 11 November.

3. Anjara, J. (1996) Ethnoveterinary Pharmacology in India: Past, Present and future. In: Ethnoveterinary Research and Development. Eds. McCorkle, C.M., Mathias, E. and Schillhorn van veen, T.W., Intermediate Technology Publications, London, UK., pgs 137-147.

4. Bhat, K.K.S. (1997). Medicinal and plant information databases. In: Medicinal Plants for Forests Conservation and Health Care. Eds. Bodeker, G. and Vantomne, P., Fao, Non-Wood Forest products series No.11, FAO, Symposium 185, John Wiley and sons, Chichester, UK, Pgs. 280.

5. Gorman, C. (1992). The power of potions, Tim, April 20, pgs. 52-53.

6. Lanfranco, G. (1992). Popular Use of Medicinal Plants in the Maltese Islands, Insula, No.1 pgs. 34-35.

7. Lemma, A. (1991) The Potentials and Challenges of Endod, the Ethiopian Soapberry Plant for Control of Schistosomiasis. In : Science in Africa: Achievements and Prospectus, American Association for the Advancement of Sciences (AAAS), Washington, D.C., USA.
8. McGee, H., (1988). In victu, Nature 392:649-650

9. UNESCO (1996). Culture and Health, Orientation Texts – World Decade for cultural Development 1988 – 1997, Document CLT/DEC/PRO – 1996, Paris France, pgs. 129.

10. UNESCO (1998) FIT/504 – REF-48 Terminal Report: Promotion of Ethnobotany and the sustainable Use of Plant Resources in Africa, pgs. 60, Paris 1998.

11. Walker, A.F. (1996). Of Hearts and Herbs, Biologist 43: 177-180.

12. World Bank (1997). Medicinal Plants-Rescuing a Global Heritage. Eds. Lambert, J., Srivastava, J. and Vietmeyer, N., Technical paper No. 355, pgs. 61.