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Review

Plants: A Rich Source of Herbal Medicine

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ABSTRACT

Nearly 80% of the global population still depends upon the herbal drugs for their health care. Plant based therapy are marked due to its low cast, easy availability, based on generation to generation knowledge. At present time, plant based industries are rising at international level but unfortunately due to uncontrolled growth of population and unplanned, excess use/misuses of plant species make them endangered. So with increasing use of medicinal plants and raising their demand in pharmaceutical, cosmetic and other industries we should try to make a world wide deep, healthy ethno-botanical knowledge and create attention for cultivation of useful medicinal plants at larger scale and their sustainable, better utilization.

Keywords: Plants; Plant products; Herbal drug; Ethno-botanical knowledge; Sustainable utilization.

INTRODUCTION

From ancient time, plants are rich source of effective and safe medicines. Herbal medicines have been main source of primary healthcare in many nations. About 80% of world populations are still dependent on traditional medicines.

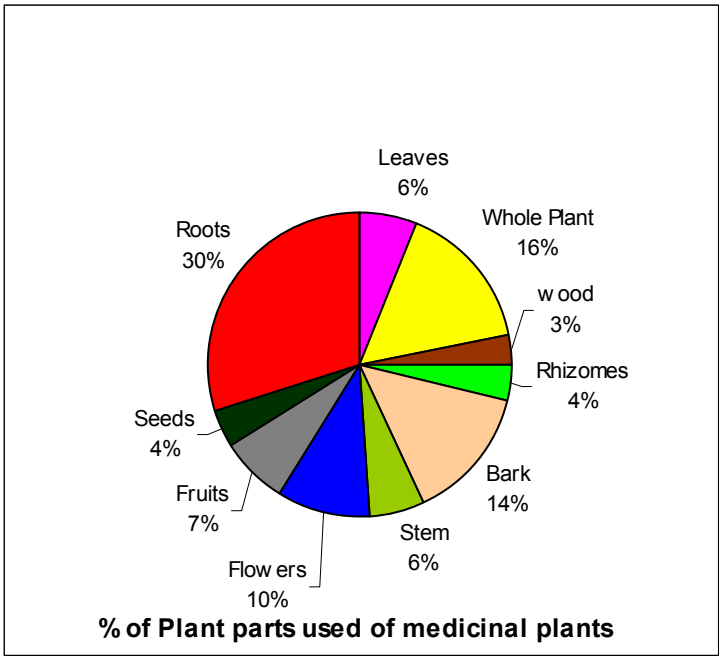
Herbal medicines are "finished, labeled medicinal products that contain as active ingredients, aerial or under ground part of plants or other plant materials, or combination thereof, whether in the crude state or as plant preparations. Plant materials include juices, gums, fatty oils, essential oils and any other substances of this nature. Herbal medicines may contain excipients in addition to the active ingredients. Medicines containing plant materials combined with chemically defined active substances, including chemically defined isolated constituents of plants are not considered to be herbal medicines" (WHO, 1998).

Even at present time very limited knowledge about the ingredients in herbal medicines and their effects in humans, the lack of stringent quality control and the heterogeneous nature of herbal medicines all necessitate the continuous monitoring of the safety of these plant products (Chan, 1997).

While ensuring quality of phyto-pharmaceuticals some important considerations are (Seth and Kakkar, 2003):

- Raw materials are not homogenous.
- The amount and quality of active ingredients can vary due to different cultivation and harvesting methods.
- Herbal drugs are effective due to their complex combinations.
- The method of manufacturing decisively influences the composition of herbal drug.

Indian Vedas describe the widespread use of herbal products and aqueous extract of different plant parts for curing different disease. Maximum 30% of root part of medicinal plant is used in different practices in compression to other plant parts (Ved, et al., 1998).



General classifications of medicinal plants on the basis of their uses are:

1. Used by traditional ones and herbal patrician's.
2. Used in formulation of different Ayurvedic products.
3. Used for making herbal products.
4. Used in synthetic medicinal formulation.
5. Used for extraction of their active moiety.
6. Used in other than pharmaceutical industries.

With development of pharmaceutical industries much more attainance has been created on plant products. They have attaince to isolated active constituents from

different plant parts and use them directly as drug or design them as pharmacologically active compounds with or without addition of synthetic ones.

In India traditional communities like tribal and rural populations are frequently using the crude extracts of local plants for medicinal and other purposes. Crude extracts and medicines manufactured on the principles of natural compounds even by pharmaceuticals companies, may lead to large-scale exposure of humans to natural products.

A large no. of plants and plant products are using from **anti-biotic to anti-infective** and from **anti-cancer to anti-aging**. Several plants with their families and their specific medicinal properties ((Loi, et al., 2005) are listed in table-1.

Table-1: Some common medicinal plants and main therapeutic uses of their different plant parts.

Plant Family	Plants	Plant parts used	Main therapeutic use/aliments treated
Anacardiaceae	*Pistacia lentiscus* L.	Fruit	Rheumatism
Apocynaceae	*Vinca sardoa*	Leaf	Sedates nausea
Araliaceae	*Hedera helix* L.	Leaf	Rheumatism, anti-inflammatory, burns
Betulaceae	*Alnus glutinosa* L.	Bark	Anti-inflammatory
Boraginaceae	*Borago officinalis* L.	Leaf	Stomach pain, intestinal regularization, diuretic, hypotensive
	Cerinthe major L.	Leaf, flower	Eye inflammation
	Cynoglossum creticum Mill.	Root	Emollient, hydrated burns
Cactaceae	*Opuntia ficus-indica* L.	Clado phyll	Skin emollient
Caprifoliaceae	*Lonicera implexa* Aiton	Leaf	Diuretic
Chenopodiaceae	Beta vulgaris L.	Leaf	Lenitive, gentle laxative, reconstituent
Cistaceae	*Cistus* spp.	Leaf	Contusions, analgesic
Compositae	*Anthemis arvensis* L.	Whole plant	Anti-inflammatory, emetic, sedative
	Artemisia arborescens L.	Flower	Digestive, stimulant, expectorant
	Calendula arvensis L.	Flower, leaf	Antispasmodic, burns, Diuretic, disinfectant, vulnerary
	Cichorium intybus L.	Leaf, root	Blood purification, arterioscelerosis, anti-arthritis, anti-spasmodic, digestive, Hypotensive, aperitif, laxative
	Helychrysum microphyllum Willd.	Leaf, flower	Expectorant

Table-1: Continued

Plant Family	Plants	Plant parts used	Main therapeutic use/aliments treated
Convolvulaceae	*Convolvulus althaeoides* L.	Whole plant	Fat digestion
Crassulaceae	*Umbilicus rupestris*	Leaf	Vulnerary
Cruciferae	*Capsella bursapastoris* L.	Leaf	Skin emollient, renal calculus
Cucurbitaceae	*Ecballium elaterium* A.	Root	Neuralgia, laxative
Diascoreaceae	*Tamus communis* L.	Fruit	Rheumatism
Ericaeae	*Arbutus unedo* L.	Root, fruit	Antipyretic, arteriosclerosis, intestinal astringent
Euphorbiaceae	*Euphorbia spp.*	Latex	Antiverrucose
	Ricinus communis L.	Seed	Laxative
Gentianaceae	*Gentiana lutea* L.	Root	Digestive, aperitif, fever, anorexia
Graminaceae	*Agropyron junceum* L.	Aerial parts	Diuretic, urinary system, anti-inflammatory
	Arundo donax L.	Dissepiments	Hemostatic, vulnerary
	Triticum spp.	Fruit	Emollient erythema, headache
Guttiferae	*Hypericum perforatum* L.	Leaf	Vulnerary, burns
Labiatae	*Lavandula stoechas* L.	Leaf	Asthma, headache, palpitation
	Melissa officinalis L.	Leaf	Digestive, lenitive, bad breath
	Mentha rotundifolia L.	Aerial parts	Digestive, lenitive
	Mentha spp.	Leaf	Anti-inflammatory, sedative, helmithiasis
	Ocimum basilicum L.	Leaf	Anti-inflammatory
	Origanum majorana L.	Leaf	Neuralgia, sedative, stomach pain
	Rosmarinus offcinalis L.	Leaf	Inappetence, digestive, diuretic, sedative, headache, pruitus
	Savia officinalis L.	Leaf	Stomatic, cooling of oral cavity, digestive, vulnerary
	Thymus capitatus L.	Whole plant	Digestive, depurative, balsamic, neuralgia, anticatarrhal
Lauraceae	*Laurus nobilis* L.	Leaf	Anti-inflammatory, digestive
Leguminosae	*Pisum elatius* Bieb	Fruit	Nutraceutical properties
Liliaceae	*Allium cepa* L.	Bulb	Renal calculus, antispasmodic
	Allium nigrum L.	Bulb	Helminthiasis
	Allium roseum L.	Bulb	Helminthiasis

Table-1: Continued

Plant Family	Plants	Plant parts used	Main therapeutic use/aliments treated
Liliaceae (continue)	*Allium sativum* L.	Bulb, leaf	Hypotensive, diuretic, stomach pain, antibacterial, antiinflammatory
	Asparagus acutifolius L.	shoot	Diuretic, gout
	Asphodelus microcarpus	Flower	Emollient, lenitive, lung diseases
	Ruscus aculeatus L.	Rhizome, leaf	Gout, hemorrhoids, anti-verrucose
	Smilax aspera L.	Root	Asthma
	Linum usitatissimum L.	Seed	Gout, anti-inflammatory, laxative, gentle laxative, erythema
Malvaceae	*Malva sylvestris* L.	Whole plant, leaf	Expectorant, anti-inflammatory, laxative, emollient, eye inflammation, pressure regulation
Moraceae	*Ficus carica* L.	Leaf	Antiverrucose, cough sedative, anti-inflammatory
Myrtaceae	*Eucalyptus globules* Labill.	Leaf	Anti-catarrhal,expectorant
	Myrtus communis L.	Leaf, fruit	Vulnerary, cough, sedative, digestive
Oleaceae	*Olea europea* L.	Leaf, fruit	Hypotensive, baldess, emollient, erythema, laxative, anti-inflammatory, sore throat, otitis
Papveraceae	*Papaver rhoeas* L.	Leaf, flower	Sedative, analgesic, gout
Polygonaceae	*Rumex obtusifolius* L.	Leaf	Hypotensive, diuretic
Polypodiaceae	*Adiantus capillus veneris* L.	Leaf	Diuretic, sedative, emollient
	Polypodium vulgare L.	Rhizome	Cough sedative
Primulaceae	*Anagallis arvensis* L.	Whole plant	Bronchial asthma, sedative, stimulant
	Cyclamen repandum	Tuber	Abortifacient
Ramnaceae	*Zizyphus sativa*	Fruit	Sedative
Rosaceae	*Crataegus monogyna*	Flower	Diuretic, cardiac sedative
	Cydonya oblonga	Fruit	Sedative
	Pirus spp.	Fruit	Digestive, heartburn
	Prunus avium L.	Pedicel	Laxative, depurative, nephrolithiasis

Table-1: Continued

Plant Family	Plants	Plant parts used	Main therapeutic use/aliments treated
Rosaceae (continue)	*Prunus spinosa* L.	Leaf, fruit	Diuretic, laxative
	Rosa canina L.	Fruit	Diarrhoea, diuretic, reconstituent
	Rubus fruticosus L.	Leaf	Diarrhoea, dysentery
Rutaceae	*Citrus limon* L.	Fruit	Disinfectant, hypotensive, headache
Scrophulariaceae	*Scrophularia trifoliate* L.	Leaf, rhizome	Diuretic, vulnerary
Umbelliferae	*Apium graveolens* L.	Seed	Anti-inflammatory, aperitif
	Daucus carota L.	Seed	Intestinal analgesic
	Ferula communis L.	Leaf	Analgesic, cardio-kinetic nervous stimulant
	Foeniculum vulgare	Fruit, seed, leaf	Digestive, galactogen, carminative, sedates nausea
	Petroselinum sativum	Leaf	Skin emollient, diuretic stomach pain
Urticaceae	*Cotyledon umbilicus veneris* L.	Leaf	Antisepatic, antibacterial
	Parietaria diffusa	Whole plant	Cough sedative, headache
	Urtica atrovirens	Leaf	Baldness, gastritis
	Urtica dioica L.	Leaf	Baldness, dandruff
Verbenaceae	*Verbena officinalis* L.	Whole plant	Inappetence, hepatic diseases, sedative, anti-pyretic, cholagogue
Vitaceae	*Vitis vinifera* L.	Fruit	Cough sedative

India has been identified as one of the top twelve mega bio-diversity center of the world. This is because India has a vast area with wide variation in climate, soil, altitude and latitude. India with its biggest repository of medicinal plants in the world may maintain an important position in the production of raw materials either directly for crude drugs or as the bioactive compounds in the formulation of pharmaceuticals and cosmetics etc.

In India nearly 15000 plant species are used as a source of medicine. Distribution of different plant species in India (singh, et al., 2003) are listed in table-2.

Table-2: Availability of medicinal plants in different bio-geographical zones of India.

Bio-geographical zones	No. of known medicinal plants	Occurrence of some important medicinal plants
1. **Trans Himalayan zone**	**700**	*Ephedra gerardiana, Hippophae rhamnoides, Arnebia euchroma.*
2. **Himalayan zone** (i) North West Himalaya (ii) Western Himalaya	**1,700**	*Aconitum spp., Berberis spp., Ferula jaeschkeana, Saussurea costus, Dactylorhiza hatagirea, Picrorhiza kurroa, Podophyllum hexandrum, Rheum australe, Swertia chirayita, Taxus wallichiana, Gentiana kurroo, Inula racemosa.*
(iii) Central Himalaya (iv) Eastern Himalaya	**1,200**	Nardostachys grandiflora, taxus wallichiana, coptis teeta, panax pseudo-ginseng, *Swertia chirayita, Rheum australe,picrorhiza kurroa, podophyllum hexandrum, gaultheria fragantissima, entada pursaetha.*
3. **Desert zones** Kutch and Thar	**500**	*Convolvulus microphyllus, Tecomella undulata, Citrullus colocynthis, Cressa cretica.*
4. **Semi-arid zone**	**1,000**	*Commiphora wightii, Alhagi pseudalhagi, Salvadora spp.*
5. **Western Ghats** (i) Western Ghats mountains (ii) Malabar coasts	**2,000**	*Myristica malabarica, Coscinium fenestratum, Garcinia indica, Vateria indica, Utleria salicifolia,*
6. **Deccan Peninsula** (i) Deccan Plateau south (ii) Central Plateau (iii) Eastern Plateau (iv) Chhota Nagpur (v) central Highlands	**3,000**	*Pterocarpus santalinus, Mesua ferrea, Decalepis hamiltonii, Aristolochia spp., Terminalia paliida.*
7.**Gangetic Plains** (i) Upper Gangetic Plains (ii) Lower Gangetic Plains	**1,000**	*Holarrhena pubscens, Mallotus phillipinensis, Pluchea lanceolata, Peganum harmala, Chlorophytum spp., Rauvolfia serpentine, Saraca asoca*
8. **North East India** (i) Brahmaputra valley (ii) Assam hills	**2,000**	*Aquilaria malaccensis, Smilax glabra, Abroma augusta, Hydnocarpus kurzii.*
9. **Islands** (i) Andaman islands (ii) Nicobar islands (iii) Lakshdeep islands	**1,000**	*Calophyllum inophyllum, Adenanthera pavonina, Barringtonia asiatica, Aisandra butyracea.*
10. **Coasts** (i) West coasts (ii) East coasts	**500**	*Rhizophora mucronata, Acanthus ilicifoloius, Avicennia marina, Sonneratia caseolaris.*

The valuable medicinal properties of different plants are due to presence of several constituents i.e. saponines, tannins, alkaloids, alkenyl phenols, glycoalkaloids, flavonoids, sesquiterpenes lactones, terpenoids and phorbol esters (tiwari and Singh, 2004). Among them some are act as synergistic and enhance the bioactivity of other compounds.

Artemisinin producted by *Artemisia annua* plant is very effective against *Plasmodium falciparum*, *P. vivax* and also drug resist ant parasite. The main active constituents of *Artemisia annua* are sesquiterpenoid lactone endoperonides named artemisinin and artemisinic acid.

Reserpine isolated from raw plant extract of *Rauvolfia serpentine* is used as tranquilizer and in control of high blood pressure. From 2000 years the powdered root of *Rauvolfia serpentine* has been used in treatment of mental illness in India.

Although synthetic drugs are often used in treatment of certain disease but a remarkable interest and confidence on plant medicine was found.

Expert consumers of plant medicines have vast botanical knowledge. And this knowledge is necessary because only a expert can knew the active ingredients, part of plant used in treatment, and they also know right time and method for collecting right amount of plant parts as drug during the time in which the plant materials have bioactive constituents and they also knew right method for drug preparation and their administration.

CONCLUSION

I strongly feel that use of these plants and their plant products in medicinal purposes are most convenient due to their:
(i) Easy availability; (ii) Easy biodegradability; (iii) Easy to handle; (iv) Low cost;
(v) Safe for mankind and environment both; (vi) Greater acceptance amongst the users; (vii) minimum side effect

Most of the studies have been done in the area of biologically active plant compounds but very little literature is available on the mode of action and their effect of non- target organisms. Obviously, these substances cannot be put to commercial use without a study of this aspect as well.

Thus we can concluded that before commercial use of these plant products their strict scientific tests, besides clinical ones on different vital systems is necessary because these natural products may have some few harmful ingredients in them as secondary metabolites, which may have perilous side effects including mutagenic potentials. It is therefore, desirable to evaluate the genotoxicity, physiological and biochemical effects, if any, of materials of plant origin before considering for medicinal and any other purposes.

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