



Traditional medicinal plants and its contemporary impact on health-a review

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Abstract

Divine gift in the universe is Nature, It is recycled and balanced with various biological and physical sources but any kind of disturbance through human being for a long time on Natural resources may lead to signal of diseases, that is unknowingly arise handicapped, Now in this pandemic era. Nature nourishes human healthcare as said healthy food maintains healthy mind and Human explore their traditional knowledge with using its natural repository in the research area of medicinal and pharmaceutical fields etc. since ancient. India is a developing country and their 70% populations live in villages have been used traditional medicines for their primary healthcare from different parts of plants and enhanced their immunity capacity. It is an important center of plant diversity and ranked 4th in Asia and 10th in the World. It has great many domesticated and medicinal plant species, including various primary needs of animals and human welfare and manifest to balance each element in Ecosystem also. The natural bioactive constituents artimisinin, camptothecin, paclitaxel are well known and have been used in diseases and their derivatives are also synthesized. Therefore, natural demand is increasing for nutraceutical as well as health purposes. This review includes uses, key role of phyto-constituents and their wide spectrum biological activities from medicinal plants and explores the knowledge to get bioactive path. It is also help to encourage and sharing the knowledge each and every person which helps easy to cure and get healthy in low cost demand, now a day.

Keywords: Domestic uses; herbal drugs; medicinal potential of traditional plants.

Introduction

Disease, decay and death have coexisted with human life and thus began the search for the treatment and cure which ultimately turned out in the discovery of medicine. According to the World Health Organization, approximately 80% of the World's population uses herbal drugs as the part of their normal health care routine. In the United States, herbal medicines represent the fastest growing segment of pharmacy trade. For human and veterinary health care over 7500 plant species are used by 4635 communities and Indians are used 20,000 species of agricultural forms alone, about 9,500 species are of ethno botanical importance.

W.H.O. has listed over 21,000 plant species used around the world for medicinal purposes. In India, about 2,500 species have been placed to more than 1000 genera and higher flowering medicinal plants representing about 158 families are being used in indigenous system of Medicine¹.

Herbal extracts from various kinds of plants sources- root, seed, flower, bark, leaf etc are play powerful and magic effect due to presence of secondary metabolites and show wide spectrum activities like antiulcer, antiseizure, anti-asthamatic, antipyretic, antiviral, anti-hyperlipidemic and anticancer etc. They widely used in the treatments of cold, cough, different types of flu and also in present Covid-19 pandemic era.

Healing power of natural products

Ancient system of medicine is backbone of Vedas and explained uses, therapy and treatment to get healthy and happy life from herbs. Every Indian citizen includes five traditional plants Pan (Piper-beetle), Mango (Mangifera indica) leaves, Coconut (Cocos nucifera), Banana leaves, camphor (Cinnamomum camphora) for God worship. Hindu religious people have been treated these plants as God: Banyan tree, Piplal and Tulsi.

Bel- Patra (Aegle marmelos/Rutaceae) has been used in Indian culture for worship of God Shiva; leaves are trifoliolate and believed that having Brahma, Vishnu and Mahesh (Trideva) accords to them. Fruit is called Bael, very useful in summer to make juice, for joyful energy as well as protect from (loo) hot dry summer wind and maintain temperature of the body. It has been used in the disease of cholera, hemorrhoids, vitiligo, and gastric ulcers and for strengthens of bones. Reported study shows it has antibacterial, antiviral and antifungal properties. The juice of ripe fruit with pure ghee is taken daily to control heart diseases, blood-sugar and active metabolism in the body. Thus the whole tree can cure various problems is extremely important in human being².

At every year of Vikram Samwat, people have been taken orally a paste of leaves of Neem (Azadirachta indica) with jiggery in empty stomach at early morning for preventing disease in a whole year. Extract of Tulasi (Ocimum sanctum), Haldi

(*Curcuma longa*), Ashwagandha root powder (*Withania somnifera*), Guduchi (*Tinospora cardifolia*), Amla fruit (*Embllica officinalis*) are immunity enhancer; fight against to prevent flu, cold and cough in human being³.

Rich source of Herbal drugs from beauty of Nature

Natural herbs and spices having rich source of antioxidants, immunomodulators (Flavonoids) and flavoring agents, used in making kitchen-dishes and at a time of injury, cold, cough, pregnancy period, delivery period and during new born baby to every age of human life for healthcare.

Green tea, coffee-beans, various plants have polyphenolic compounds. Flavonoids show wide spectrum biological activities e.g. blood-lipid lowering, cyclo-oxygenase inhibition, anti-inflammatory, neuroprotective, anti-oxidant, anti-allergic, lipoxygenase inhibition, anti-viral and anti-cancer etc⁴.

The shade-dried rhizome of *Curcuma longa* has been shown various activities due to presence of secondary metabolites in it. The effective components of turmeric commonly known as curcuminoids possessed two (α , β - unsaturated diketone functionalities) that conjugated with phenyl rings. Diferuloyl methane is a main constituent (curcumin) amongst to prevent variety of cancers *in vitro* and suppresses nuclear factor (NF- κ B) and inhibits angiogenesis. Anticancer research has been studied in a great way on basis of developed cancer in different parts of the body like-leukemia, breast cancer and neurological cancers etc⁵. Hepatological study suggested that ethanolic extract shows hepatoprotective activity against antitubercular drugs, when 500 mg/kg dose is given prior to with this drugs⁶.

Various phytoconstituents have been isolated and characterized from different target sites (e.g. roots, stems, seeds, leaves, and flowers) of medicinal plants and show pharmacological response and medicinal action Table-1.

Table-1: Protective herbal drugs.

Plant (Bot. name), common name/ family /source	Main Constituents	Biological Activities and uses
Trachyspermum <i>ammi</i> (Ajwain) Apiaceae Seeds, Fruits	Carvone, limonene, Petroselinic, linoleic and oleic acids, caffeic acids, quercetin, kaempferol, tannins, alkaloids, terpenoids	In the treatments of indigestion, pneumonia and as appetizer, galactagogue and carminative. Anti-aflatoxicogenic, antioxidant and antimicrobial and natural preservative ⁷ .
Cuminum <i>cuminum</i> cumin (Jeera) Apiaceae Seeds	Cuminaldehyde, cymene, γ -terpinenoids, safranal, p-cymene, and β -pinene, Pyrazine derivatives	Removes the bad cholesterols from the body, managing diabetes, reducing inflammation, rich source of Iron, for weight loss of body ⁸ .
Capsicum <i>annuum</i> Chili Pepper (Mirchi) Solanaceae Fruits	Vitamin C and B ₆ , Provitamin A and Beta-carotene, Capsaicin, capsaicinoid	Analgesic and used in skin disease, relieving pain, as a chemical irritants ⁹ .
Piper <i>nigrum</i> / Black Pepper (Kali Mirch) Piperaceae Fruit	Alkaloids: Piperine, piperidines, pyrrolidines and safrole, terpenes, limonene, alpha-phellendrene	In the treatments of several illnesses, such as constipation, insomnia, oral abscesses, sunburn, and toothaches and eye problems ¹⁰ .
Zingiber <i>officinalis</i> Ginger (Adarak) Zingiberaceae Rhizome	Sesquiterpenes; sesquiphellandrene, citral, zingiberene, gingerols and shogaols	Carminative, anti-inflammatory, antiallergic, antidiabetic and used in the treatment of malignant tumour ¹¹ .
Coriandrum <i>sativum</i> / Coriander (Dhaniya) Apiaceae Leaves, fruits and seeds	Terpinene, quercetin, tocopherols and vitamins	Lower blood sugar, immune-boosting, Antiinflammatory, neuro-protective, anticancer, lowering blood pressure and LDL ¹² .
Allium <i>cepa</i> /Onion (Pyaj), Amaryllidaceae Bulb	Polyphenols, flavonoids and anthocyanidin	Source of vitamin C, reduce the risk of cancer, antioxidant, improve skin and hair nourishment ¹³ .
Allium <i>sativum</i> Garlic (Lahsun) Alliaceae Bulb	Allicin, Vitamin B ₆ (Pyridoxin)	Arthritis, snake and insect bites, parasites, chronic cough, and as antibiotic for infectious diseases, small Pox, as an antiseptic, antibacterial, antiviral, antifungal, anticancer, to reduce platelet aggregation, reduces cholesterol ¹⁴ .
Nigella <i>sativa</i> Black cumin (Kala Jiri) Ranunculaceae Seeds	Thymoquinone, pinene, saponins, flavonoids, terpenoids, carbohydrates, vitamins	Shows anticancer, anti-inflammatory, nutritive supplements and used in the treatment of various disorders ¹⁵ .
Syzygium <i>aromaticum</i> Clove (Laung)	Caryophyllene, vanillin, eugenol tannins, methyl salicylate, Flavonoids;	Used in teeth pain, cold, cough, rheumatism and arthritis ¹⁶ .

Myristicaceae Fruits	kaempferol, triterpenoids and several sesquiterpenes.	
E. <i>cardamomum</i> Elaichi (Green cardamum) Zingiberaceae Seeds	α -terpineol, myrcene, limonene, menthone, β -phellandrene, 1,8-cineol, sabinene 1,8-cineol, limonene, borneol	As antiseptic, antispasmodic, carminative, digestive, diuretic Anti-oxidant, anti-inflammatory, low blood sugar, anticancer and diuretic, help in digestion ¹⁷ .
Myristica <i>fragarance</i> Nutmeg (Jaiphah) Myristicaceae Seeds	Camphene, eugenol, isoeugenol, elemicin, limonene, myristicin, pinene, safrole, terpineol and terpine	Used in Skin problems, Hearth burn, Rheumatism, Muscle spasm, Increasing appetite, Aphrodisiac, Premature ejaculation. Clearing throat, cough, asthma, Irritable bowel syndrome and cyanidin diabetes and urinary tract infection. Relieve pain, induce abortion, diarrhea ¹⁸ .
Cinnamomum <i>verum</i> Cinnamon (Dal Chini) Lauraceae Seeds	Cinnamaldehyde, eugenol	Used in the treatment of throat pain, migraine headache, rhinitis, anorexia and rheumatoid arthritis, hemorrhoids and piles and infectious wounds ¹⁹ .
Citrus <i>limon</i> Lemon (Neembu) Rutaceae Fruits	Ascorbic acid, limonene, citral and neryl acetate	Used in the treatment of hay fever, swine flu, tinnitus, reduce inflammation, kidney stone and rich source of vitamin C shows antioxidant ²⁰ .
Foeniculum <i>vulgare</i> / fennel Apiaceae Flower, foliage and Leaf	Trans-anethole, astragole, fenchone, limonene and polyphenols	Flavoring agent in Toothpaste, tea and bakery, digestive ²¹ .
Camellia <i>sinensis</i> L. Tea/ Theaceae (Leaves)	Caffeine, theophylline polyphenols; tannins, catechin type flavonoid glycosides	Antiviral activity of catechins on influenza virus, hepatotoxic effect and antioxidant ²² .
Coffea <i>Arabica</i> Coffee beans Rubiaceae (Seeds)	Caffeine theophylline	Can reduce risk of heart diseases, used to treat insomnia, Alzheimers, diabetes, Parkinson's disease, and dementia. Prevents certain cancers, heart rhythm problems, and strokes ²³ .
Theobroma <i>cacao</i> L. Cacao beans Sterculiaceae (Seeds)	Polyphenols (Dark chocolate), catechin and epicatechin theobromine	Anti-cancer drug and antioxidant ²⁴ .
Aloes <i>barbadensis</i> Ghritkumari /Gwarpatha Liliaceae (Leaves)	Aloin A, B (10-C--D- glucopyranoside of aloe emodin-anthrone), aloe-emodin, aloeresins, aloesin A (chromone-C-glucoside), aloesin B (p-coumaric acid ester of aloeresin A), aloesin C (glucoside of aloesin B) active glycoprotein fraction contain 58% protein	Vaginal contraceptive, antioxidant, immunoregulatory, anticancer, hypoglycemic, antitumor, anthelmintic and radical scavenging activity ^{25,26} .
Cymbopogon <i>citratum</i> Lemon grass Poaceae (Leaf)	Citronellol, myrcine, citral and geraniol	Anxiolytic, hypnotic, anticonvulsant, antipyretic, carminative, antibacterial, used in HIV disease ²⁷ .
Ocimum <i>sanctum</i> (Tulsi/ Holy Basil) (Lamiaceae)	Oleanic acid, ursolic acid, anthocyanin, eugenol, carvacrol, linalool, beta-caryophyllene, beta-elemene, germacrene	Pain killer, antioxidant, antihyperlipidemic ²⁸ .
Beta <i>vulgaris</i> (Beet Root) Amaranthaceae (root)	Vitamin C, A and folate, Iron	Reducing blood pressure, improve digestion, in the treatment of diabetes ²⁹ .
Catharanthus <i>roseus</i> L. Syn. Vincarosea Sadabahar Apocynaceae (Leaf, stem)	Vinblastine, vincristine, vindoline, raubasins and ajmalicine	Antitumour, anti-diabetic, anti-microbial, antioxidant and antimutagenic, Leaf extract is used in diabetes, cancer and B. P. ³⁰

Boosting sources from Chyawanprash and Trifla

Another natural remedy used in home hold preparation is *Embilica officinalis* (Amla), mainly used in Chyawanprash, murabba, gem and Jelly, to rebuild and maintain new tissues and

increases red blood cell count, having active Rassayans and rejuvenators in its fruits. It is the utmost natural source of vitamin C and reduces pitta without change in balance of vata and kapha. It is one of the constituent used in triphala (equal part of bibhitaki + Amalaki + haritaki) and acts as antioxidant,

anti-inflammatory, and antibacterial effects, a primary Ayurvedic tonic for healthcare.

Methanolic extract of triflawere found to inhibit lipid peroxide formation and to scavenge hydroxyl and superoxide radicals in vitro³¹. Chyawanprash reduces postprandial glycema and blood cholesterol, it is suggested major role of vitamin C (Amla) present in it. Experimental study showed that methanolic extract of Amla, showed ulcer protective, healing effect and antioxidant properties³²⁻³³.

It contains hydrolysable tannins as major bio-active constituents along with gallic and epigallic acids, ascorbic acid, phyllembic acid, emblicol and other alkaloids viz. phyllantidine and phyllantine, pectin flavonol glycoside. It has exhibited to resolve the digestive, heart health and diabetics problems. It reduces the lethal result after chemotherapy, repairs antioxidant level (immunity) to the kidneys and lower blood sugar levels in diabetics³⁴.

It has potent carminative, immunomodulatory, immunostimulant, antipyretic, spasmolytic, antifungal, antibacterial, antioxidant and antiviral activities.

Natural products and drug discovery

The Greek physician Dioscorides (first century A.D.), explained the process of wine of Mandragora to produce sleep, find anesthetics. Carl Koller showed that cocaine used as a local anesthetic in 1884. Cardiovascular drugs; digitoxin, Ouabain, strophanthin, unidineetc have been reported from natural sources by different scientists. As soon as various antibiotics, antituberculars, antihistaminics, antiepileptics, diuretics and anticancer drugs have been identified, may be Alkaloids, saponins, flavonoids, terpenoids and various heterocyclic compounds are well known naturally³⁵. Mechanism of action of a drug and its metabolism depends upon enzymes, pH of the medium and biological membrane systems.

Drug binds with specific receptor to produce pharmacological response. Various covalent, ionic, hydrogen bond/ van Der Waals interactions involved during drug-receptor interaction depends on hydrophilic and lipophilic nature of a drug, therefore need to be proper attention, when any drug is synthesized.

Research in drug discovery needs to develop robust and viable lead molecule based on natural or synthetic path, based on Extraction, Separation using normal phase / reverse phase (stationary phase C₈/ C₁₈) chromatography (SCC, HPLC, GPC, GC-MS), pH parameter and identification of unknown bioactive based on newly spectroscopic high resolution techniques like ¹H-nmr, ¹³C-nmr, IR and two dimensional spectroscopic techniques COSY, HMBC, HMQC. Various biological screening has to be done on the pure form of isolated compound then it will be authentically authorized as a drug Figure-1. A new method can be attempt to discover a drug, choosing short path, eco-friendly and cheapest solvents and chemicals may be achieved a goal and getting economical drug³⁶.

Thus field of natural products play as a natural factory in which various bio active secondary metabolites have been synthesized, accumulated using natural forces in nature and lots of phyto-constituents and their activities have been identified in research field and still challenging in the area where it is useful in synthetic field also.

Conclusion

Overall, This review concise the role of herbal products around us with great potential of chemical constituents present in traditional medicinal plants that beneficial to protect any type of disorder in the body and to maintain healthy, happy life. Thus information available in this review would be helpful to all kinds of persons who can be explore their knowledge and can be developed medicines with the vision of safety; efficacy and quality, will help not only to conserve the traditional culture but also to justify the use of natural products in the health care.

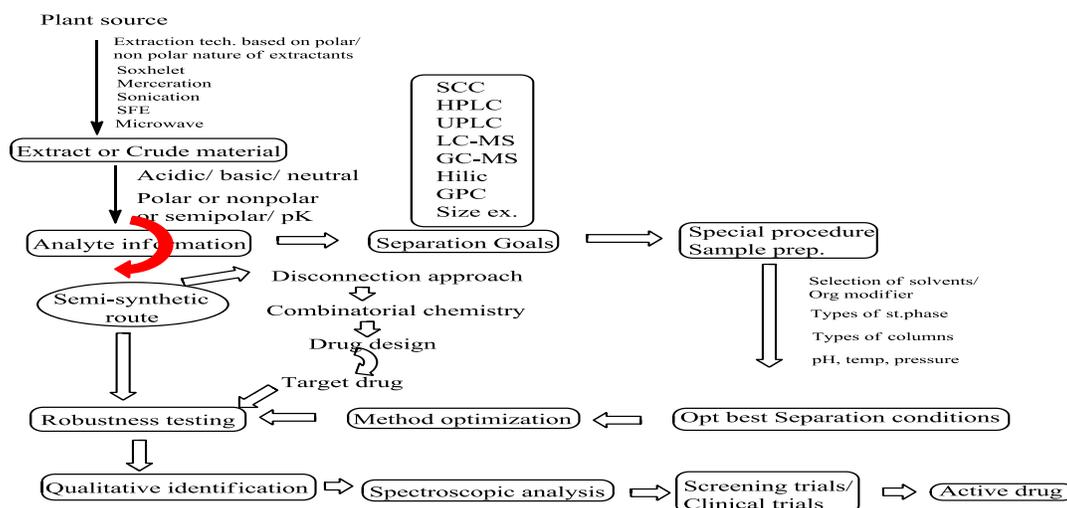


Figure-1: Diagram shows drug-discovery development.

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