

# Important Medicinal Plant Families and Plant Based Drugs: A Review

Jayarama Reddy

**Abstract**—Plants have been used for medicinal purposes long before recorded history. They have historically proven their value as a source of molecules with therapeutic potential. Ancient Indian, Chinese, African and Egyptian writings describe medicinal uses of many plants. Several indigenous cultures used herbs in their healing rituals, while others developed traditional medical systems. At present they are learned to represent an important pool for the identification of novel drug leads. Drug companies are largely depending on the libraries of synthetic chemicals as the sources drug and drug discovery. They are easy to create, make and supply. It is also easy to demonstrate good compatibility with established high throughput screening platforms. However, at the same time there has been a declining trend in the number of new drugs reaching the market, raising renewed scientific interest in drug discovery from natural sources, despite of its known challenges. A review of historical development will provide a comprehensive knowledge of used approaches and recent developments relevant to plant-derived drug discovery. A critical look into the developments, strengths and associated challenges of the plant based drug discovery is absolutely required at this juncture. A preview of futuristic and advanced research and clinical trials is the need of the hour. It is important to understand a transformation from screening hit to lead compound to NCE to marketable drug product. Natural product based drug discovery and drug development is intrinsically complex. Exceedingly reviewed scientific developments, modern technological advancements and in depth knowhow about investigation trends will help in the better understanding of medicinal plants and their medically potential phytochemicals. This is a mini review of medicinal plant families and plant based drugs.

**Keywords**— plant based drugs, medicinal plant families, phytochemicals, *Tribulusterrestris*.

## I. INTRODUCTION

It is needless to say that no plant is useless. But man has identified through a process of continued selection and trial and error method only the most important ones. It is noteworthy to mention even the animals have the capacity to select the plants based on their specific needs. Man needs plants for all his needs like food, shelter and medicines; as a consequence he has exploited almost all the species coming under over 450 angiosperm families. More than half of these plants are coming from tropical nations. However only about 25 families are found to be extremely vital and crucial for the sustenance of the human race on the earth. Ever since ancient times, in search of a remedy of their diseases, humans looked for drugs in nature. The beginnings of the medicinal plants' use were instinctive, as is the case with animals (Stojanoski, 1999). In time, the reasons for

the usage of specific medicinal plants for treatment of certain diseases were being discovered; thus, the medicinal plants' usage gradually abandoned the empiric framework and became founded on explicatory facts (Petrovska, 2012). The traditional Medicine is used in all parts of the world and has a rapidly growing economic importance, mainly by the use of medicinal plants that have a respectable position today, especially in the developing countries (Agra et al. 2007). According to the World Health Organization (WHO, 1999), the current estimative suggests that many developed countries have a great proportion of the population making use of traditional practice of health, especially the use of the medicinal plants. Although the access to the modern medicine is available in these countries, the use of medicinal herbs has kept its popularity for historical and cultural reasons. Medicinal plants represent an important health and economic component of biodiversity and also conservation and sustainable use, according to Rahman et al. (2004). The acceptance and use of herbal medicine is on the increase globally (Joshi and Joshi, 2000: *Kamatenesi-Mugisha and Oryem-Orig, 2005; Asimwe et al, 2014*)

Medicinal plants have been used traditional in the conventional drug preparations by Ayurvedic and other medical practitioners for thousands of years. Almost all the plant based drugs used as therapeutic agents are extracted from plants and only a small number are made by using animal products and minerals. Drugs obtained from plants consist of entire plants or their parts. In the recent past they are seen as a source of lead compounds for making potential drugs. Especially in the process of bioinformatics fuelled drug discovery and drug development process leading to the production of NCE (New Chemical Entities). In most cases the herbal extracts like ginseng, aloe, herbal tea etc, with therapeutic properties are directly used for the treatment of ailments and also enhancement of the quality of life. Drugs are often directly used as bioactive compounds as in the case of steroidal glycoside, digoxin obtained from the plant species like, [Digitalis purpurea](#), [Digitalis lanata](#), and [Digitalis grandiflora](#). Some lead compounds like taxol and paclitaxel with more potent compounds are obtained from the plant species *Taxusbrevifolia*. The drug is well known for its anticancer and anti-rabies properties. In some cases novel chemophores are obtained and later they are converted into druggable compounds usually by a process called chemical analoging. For the purpose of getting marker compounds for standardization of crude plant material or extract, pure phytochemicals are directly used. Sometimes they can be used as pharmacological tools. Many of the medicines that are in the market now are just copies or only the modifications of the plant based drugs. The details of which are

Jayarama Reddy is with St. Joseph's College, 36, Langford Road, Bangalore, Karnataka, India. 560027. Corresponding author: drjayaramreddy@gmail.com.

generally given in the "Drug" column. For example the plant based drug taxol is derived from the plant *Taxusbrevifolia*. Anticancer drug Paclitaxel™ is a derivative of taxol synthesized, patented and marketed by a pharmaceutical company. More than 120 plant based drugs are sold as medicines in the world today (Table 2). Many nations in Europe and the United States of America regulate herbal drugs. They regulate them because drugs makers just prepare by extracting the active compounds from the plants (Taylor, 2005).

The family Poaceae (Graminae) to which all the grasses belong and the family of pulses, Fabaceae are the two most significantly exploited by the mankind. Rosaceae the family of fruits and flowers, Solanaceae and Cucurbitaceae the families of vegetable are also very important. Similarly, although all plants are medicinal only about 20 families are found to be most dominant as the families of medicinal plants (Table-2). This paper is a review of nearly 250 medicinal plants, medicinal properties and the plant based drugs extracted from them. This is one of the first reviews of medicinal plant families.

### Methodology

There is enormous amount of data and information regarding the medicinal values of plants in various forms. Hence all the possible sources were searched the information was collected. Collection of data was also done by interviewing by using proper questionnaires. Field trips with traditional and conventional healers and ayurvedic practitioners were also done. The information presented in this paper is mostly based on the research work carried out by many scientists in this field. In addition to the data from other scientists the results of research work conducted by the author as a part of pharmacological and monographic studies on *Tribulusterrestris* (Fig-2) is also included in this paper (Jayarama Reddy, 2008). SAS programing was used to analyze and present the data.

## II. RESULTS AND DISCUSSION

### A. A Brief Review of Ancient History

The development of ancient Indian medicine system can be traced right from the Indus Valley Civilization. The oldest known Ayurvedic texts are the *SuśrutaSamhitā* and the *CharakaSamhitā*. The former text by *Susruta* is the oldest treatise dealing with the practical problems of surgery and obstetrics. *Atreya*, and *Agnivesa* have dealt with principles of Ayurveda in about 800 BC. The Indian holy books *Vedas* mention treatment with plants, which are abundant in India. Numerous spice plants used worldwide even today originated from India: nutmeg, pepper, clove, etc. The oldest written evidence of medicinal plants' usage for preparation of drugs has been found on a Sumerian clay slab from Nagpur, in India. It is approximately 5000 years old. It is correlated to the Vedic periods of India. It comprised 12 recipes for drug preparation referring to over 250 various plants, some of them are alkaloids such as poppy, henbane, and mandrake. Chinese book, "Pen T'Sao" on roots and grasses written by Emperor *ShenNungin* 2500 BC, gives details about 365 drugs (dried parts of medicinal plants), many of which are used even nowadays such as the following: *Rheirhisoma*,

*Cinnamomumcamphora*, *Theaefolium*, *Podophyllum*, the great yellow gentian, ginseng, jimson weed, cinnamon bark, and ephedra. The *Ebers Papyrus*, written in 1550 BC, represents a collection of 800 proscriptions referring to 700 plant species and drugs used for therapy such as pomegranate, castor oil plant, aloe, senna, garlic, onion, fig, willow, coriander, juniper, common centaury, etc. According to data from the Bible and the holy Jewish book the Talmud, during various rituals accompanying a treatment, aromatic plants were utilized such as myrtle and incense (Kelly, 2009; Wiart, 2006; Tucakov, 1971; Glesinger, 1954; Tucakov, 1964, Dimitrova, 1999). *Theophrastus* (371-287 BC) is known for his books "De Causis Plantarum" and "De Historia Plantarum" which in detail describe the plants. "De re medica" is written by the famous philosopher *Celsus* (25 BC-50 AD). "De Materia Medica" by *Dioscorides* is also an important book on the medicinal plants and their uses.

### B. A Review of Medicinal Families

Plant species belonging to more than fifty families of angiosperms have been extensively used for medicinal purposes. However about twenty families are found to be more important based on the extent of plants used for making herbal medicines (Table-1 and Fig-1). In this survey it was found that Fabaceae is most interminably used family showing more than 25 percent of representation. This family is the third-largest in terms of number of species, with about 751 genera and some 19,000 known species (*Christenhusz and Byng, 2016*). According to *Magalion and Sanderson* (2001) the major genera of the family are *Astragalus* (2,400 species), *Acacia* (950 species), *Indigofera* (700 species), *Crotalaria* (700 species), and *Mimosa* (500 species). A survey conducted in *Rajshahi region of Rajasthan, India* it was found that a total of 32 plant species under 23 genera of Fabaceae family have been used for the treatment of different diseases. (*Mahbubur and Parvin, 2014*).

Family Asteraceae is in the second position in terms the number of medicinal plants. It accounts for about 9.8 percent of the total medicinal plants. It has more than 23,600 species in about 1,620 genera and family mostly includes herbaceous plants. The species are economically highly valuable and are known for [cooking oils](#), [lettuce](#), [sunflower seeds](#), [artichokes](#), [sweetening agents](#), coffee substitutes and [herbal teas](#). The largest genera of the family are *Senecio* (1,500 species), *Vernonia* (1,000 species), *Cousinia* (600 species) and *Centaurea* (600 species). In a study by *Bisht and Bisht* (2010) 85 species of medicinal and aromatic plants of 54 genera were discovered in *Uttarakhand region of India*. In another similar study by *Arasan and Kaya* (2015) eight species belonging to Asteraceae families were determined which have been used for therapeutic purposes. The plants determined in research are were: *Achilleaaleppica*, *Achilleaiebersteinii*, *Chrysophthalmumontanum*, *Gundeliatournefortii*, *Matricariaaurea*, *Notobasi ssyriaca*, *Onopordumcarduchorum* and *Tripleurospermumparviflorum*. Rubiaceae is the third largest family with respect to the number of medicinal plants accounting for 6.2 percent. This is the fourth largest family of angiosperms with about 611 genera and 13,500 species. Many of these species are with antimalarial, antimicrobial, antihypertension, antidiabetic, antioxidant, and

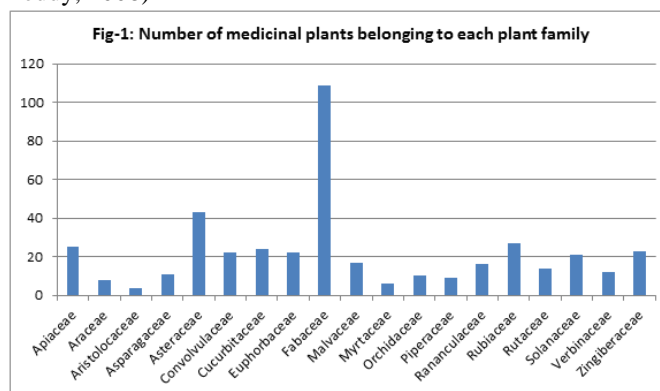
Sl No	FAMILY NAMES	NUMBER OFPLANTS	PERCENTAGE
4	Amaranthaceae	12	2.7586
8	Apiaceae	25	5.7471
7	Araceae	08	1.8391
9	Aristolocaceae	04	0.9195
12	Asparagaceae	11	2.5287
10	Asteraceae	43	9.8851
16	Convolvulaceae	22	5.0575
17	Cucurbitaceae	24	5.5172
3	Euphorbaceae	22	5.0575
2	Fabaceae	109	25.0575
1	Malvaceae	17	3.9080
19	Myrtaceae	06	1.3793
18	Orchidaceae	10	2.2989
20	Piperaceae	09	2.0690
5	Ranunculaceae	16	3.6782
13	Rubiaceae	27	6.2069
14	Rutaceae	14	3.2184
11	Solanaceae	21	4.8276
15	Verbinaceae	12	2.7586
16	Zingiberaceae	23	5.2874

anti-inflammatory activities. Bioactive compounds like indole alkaloids, terpenoids and anthraquinones have been isolated from these species. About 3000 plants of this family have been known to possess anticancer properties. Some of them are subsequently used as potent anticancer drugs. Based on the previous reports, it is realized that the species such as *Morindalucida* and *Nauclealatifolia* showed potent cytotoxic activities. *Coffee* and *Cinchona* are the most important medicinal and economical genera of Rubiaceae. 27 plant extracts were obtained from seven species; *Antirheaborbonica*, *Chassaliacoriaceae*, *Danaisfragrans*, *Gaertnerapsychotrioides*, *Mussaendaarcurata*, *Mussaendalandia* and *Paederiafoetida*. Eleven of the 27 extracts showed antibacterial properties, five showed antifungal properties while two showed potent smooth muscle relaxation and contractile properties (Pederson et al, 1999).

Apiaceae (Umbelliferae) is a family of about 434 genera and 3700 species. It is the fourth largest medicinal family accounting for 5.7 percent. *Conium maculatum*, *Cicuta maculate* and *Aethusacynapium* are the poisonous plant species of this family with high medicinal values. *Dorema ammoniacum* and *Aegopodium podagraria*, *Trachymenecoerulea* and *Eryngiummaritimum* are also highly medicinal.

Similarly all the other fourteen families contain varied number of medicinal plants. The selection and representation of these top twenty families is subjective and is based on the 250 and odd papers selected in this survey. It does not mean that this

is the ultimate list and it is subjected to change. Fabaceae and Asteraceae are found to be the largest families with highest number of medicinal plants; this is probably because these two are some of the largest families of angiosperms. *Tribulusterrestris* (Fig-1) of the family Zygophyllaceae is also highly medicinal. Its roots and fruits are cooling, diuretic, aphrodisiac, mollient, appetiser, digestive, anthelmintic, expectorant, anodyne, anti-inflammatory, laxative, cardio tonic, styptic and lithotriptic. They are also known to be useful in strangury, dysuria, vitiated conditions of vata and pitta, renal and vesical calculi, anorexia, dyspepsia, helminthiasis, spermatorrhoea, anaemina, scabies, ophthalmia, ulocace and general weakness. The leaves are astringent, diuretic, aphrodisiac, depurative, anthelmenthic and tonic. They are also used in the treatment of gonorrhoea, inflammation, menorrhagia, leprosy, skin diseases, verminosis and general weakness. The seeds are astringent, strengthening and are useful in epistaxis, haemorrhages and ulcerative stomatitis (Jayarama Reddy, 2008)



### C. Review of Plant Based Drugs

Heart ailments, lung diseases, cancer and diabetes are known as the top 4 deadliest diseases. According to WHO about 67 percent deaths in the world are caused due to these non-communicable diseases. The other diseases and causes account for the remaining 23 percent deaths globally. Natural products undoubtedly have the potential to provide remedy for all these.



Fig: 2-Medicinal plant, *Tribulus*



Plants collected by the author for study

Seeds of *Tribulus*

Synthetic medical products exhibit high degree of popularity and they continue to remain preferred on account of their production cost of production, time required to manufacture, effectiveness, easy quality control, stringent regulation and quick effects. Unfortunately their side effects, safety and efficacy always remains questionable, resulting in the dependence on the natural products by more than 80% of the total population in the developing world. A massive number of plant based drug compounds are in different stages of drug production gives an idea about the existing feasibility and consequence of the exploitation of plant based drugs and emergence of new drug molecules. Even today plants are the important sources for active drug compounds with many famous drugs are being obtained directly or indirectly from higher plants. The contribution of plants to disease treatment and prevention is always enormous. About eleven percent of the 252 drugs considered as basic and essential by the World Health Organisation are completely from plants. Newman and Cragg (2012) say the effectiveness of plants to contribute novel drug molecules is always green. About half of the approved drugs in the last three decades are plant based, directly or indirectly especially for the treatment of cancer. Eighty percent of the more than 120 phytochemical drug have been found to linked to the original ethno-pharmacological origins (Fabricant and Farnsworth, 2001). Merck in 1826 introduced and marketed, Morphine as the first commercial pure plant based drug. Subsequently, Bayer in 1899 introduced salicina plant based drug from the medicinal plant, *Salix alba*.

Phytochemicals extracted earlier from *Coleus forskohlii* and *Stephaniaglabra*, are now being rediscovered and are finding new uses followed by recent and better research. They are now

known to be used for the treatment of obesity and atherosclerosis. Renewal, rediscoveries and better understanding of the plant based drugs is resulting different challenges related to the cost, quality and standardization. The rehabilitated awareness in the improvement of plant based drugs require the convergence of the contemporary methods and techniques and synchronization of conventions with regards to the investigations and growth connecting diverse areas and disciplines of science. More than 120 novel chemical substances (See Table-2) of medical importance have been derived from about 100 plant species. They are worldwide considered to be significantly crucial in the treatment of a number of diseases. They are extensively used in the current times in many developing and developed nations. The focus of research lies mainly on cancer and diabetes. Innumerable number of plants known to antidiabetic and anticancer.

Non-insulin-dependent diabetes (Type-2) accounts for about 95 percent of diabetic cases. WHO estimates that there will be 300 million diabetic patients in the world by 2025. Phytochemicals such as alkaloids, glycosides, galacto-mannan, polysaccharides, peptidoglycans, hypoglycans, guanidine, steroids, carbohydrates, glycopeptides, terpenoids and amino acids derived from *Momordica charantia*, *Pterocarpus marsupium*, *Trigonella foenum-graecum* and about 800 more plants are known to possess antidiabetic properties. Pseudoprototo-saponin AIII and prototosaponins AIII from *Aloe vera*, Mangiferin and mangiferin-7-O- $\beta$ -dglucoside from *Anemarrhena asphodeloides*, Roseoside from *Bauhinia variegata* and a host of antidiabetic drugs are known to us now (Patel et al, 2012)

There has been a constant battle globally between man and cancer even with massive progress in prevention and control of this dreaded disease. Plant based drugs such as polyphenols, brassinosteroids and taxols are known to be used in the treatment of cancer. Polyphenolics like gallacatechins, flavonoids, tannins, resveratrol and curcumins are the important anticancer compounds. Plant derived anticancer drugs can be directly given to the patient's through dietary intake. Methytransferase inhibitors, DNA damage preventive drugs or antioxidants, histone deacetylases (HDAC) inhibitors and mitotic disruptors are the four groups into which plant based anticancer drugs are classified. Camptothecin from *Mappia foetida*, Sulphoraphane from *Brassicacsp*, Paclitaxel from *Taxusbrevifolia*, Epipodophyllotoxin from *Podophyllumpeltatum*, Vincristine, Vinblastine, Vinorelbine, Vindesine, Vinflunine, from *Catharanthus roseus*, Pomiferin from *Maclurapomifera*, Combretastatin A-4 phosphate from *Combretum caffrum*, Roscovitine from *Raphanus sativus* and Noscipine from *Papaversomniferum* are known to be highly potential anticancer drugs of today (Greenwell and Rahman, 2015).

The other important area of research involving plant based drugs is herbal psychopharmacology This is a promising area of the future, which is going to produce many useful medicines for the treatment of CNS disorders. *Ginkgo biloba*, *Hypericum perforatum*, *Piper methysticum*, *Valeriana officinalis*, *Centella asiatica*, *Bacopamonniera* and *Convolvulus pluricaulis*, are widely used for their reputed

effectiveness in the treatment of disorders related to CNS. Neuroprotective drug, L-DOPA from *Mucunapruriensis* known to be effective against Parkinson's disorder (Manyam et al, 2004).

PLANT SPECIES	PLANT BASED DRUG	MEDICINAL PROPERTY
<i>Aesculus hippocastanum</i>	Aescin	Antiinflammatory
<i>Agrimonia eupatoria</i>	Agrimophol	Anthelmintic
<i>Ammivisage</i>	Kheltin	Bronchodilator
<i>Anabasis sphylla</i>	Anabesine	Skeletal muscle relaxant
<i>Andrographis paniculata</i>	Andrographolide, Neoandrographolide	Bacillary dysentery
<i>Anisodanguticus</i>	Anisodamine, Anisodine	Anticholinergic
<i>Areca catechu</i>	Arecoline	Anthelmintic
<i>Artemisia maritima</i>	Santonin	Ascaricide
<i>Atropa belladonna</i>	Atropine	Anticholinergic, pain killer
<i>Berberis vulgaris</i>	Berberine	Bacillary dysentery
<i>Betula alba</i>	Betulonic acid	Anticancer
<i>Brassica nigra</i>	Allyl isothiocyanate	Rubefacient
<i>Camellia sinensis</i>	Caffeine	CNS stimulant
<i>Camptotheca acuminata</i>	Camptothecin, Irinotecan, Topotecan	Anticancer
<i>Cannabis sativa</i>	$\alpha$ -Tetrahydrocannabinol(THC)	Antiemetic, decrease ocular tension
<i>Carica papaya</i>	Chymopapain, Danthron Papain, Sennosides A, B	Proteolytic, mucolytic, Laxative
<i>Cassia angustifolia</i>	Senna	Laxative
<i>Catharanthus roseus</i>	Vinblastine, Vinblastine, Vasicine Vinorelbine, Vindesine, Vinflunine	Anticancer, Antileukemic agent, Cerebral stimulant
<i>Centella asiatica</i>	Asiaticoside	Vulnerary
<i>Cephaelis ipecacuanha</i>	Emetine	Amoebicide, emetic
<i>Chondodendron tomentosum</i>	Tubocurarine	Skeletal muscle relaxant
<i>Cinchona ledgeriana</i>	Quinidine, Quinine	Antimalarial, antipyretic Antiarrhythmic
<i>Cinnamomum camphora</i>	Camphor	Rubefacient
<i>Cissampelos pareira</i>	Cissampeline	Skeletal muscle relaxant
<i>Citrus species</i>	Hesperidin, Rutin	Capillary fragility
<i>Colchicum autumnale</i>	Demecolcine, Colchicine,	Antitumor agent, anti-gout
<i>Combretum caffrum</i>	Combretastatin A-4 phosphate	Anticancer
<i>Coptis japonica</i>	Palmatine	Antipyretic, detoxicant
<i>Corydalis ambigua</i>	Tetrahydropalmatine	Analgesic, sedative, traquillizer
<i>Curcuma longa</i>	Curcumin	Choleretic
<i>Daphne genkwa</i>	Yuanhuacine, Yuanhuadine	Abortifacient
<i>Datura stramonium</i>	Scopolamine	Sedative
<i>Digenea simplex</i>	Kaibicacud	Ascaricide
<i>Digitalis lanata</i>	Lanatosides, Deslanoside Acetyldigoxin	Cardiotonic
<i>Digitalis purpurea</i>	Gitalin, Digoxin, Digitalin, Digitoxin	Cardiotonic
<i>Ephedra sinica</i>	Ephedrine, Pseudoephedrine	Sympathomimetic, antihistamine
<i>Erythroxylum coca</i>	Cocaine	Local anaesthetic
<i>Fraxinus rhynchophylla</i>	Aesculetin	Anti-dysentery
<i>Gaultheria procumbens</i>	Methyl salicylate	Rubefacient
<i>Glaucium flavum</i>	Glaucine	Antitussive
<i>Glycyrrhiza glabra</i>	Glycyrrhizin	Sweetener, Addison's disease
<i>Gossypium species</i>	Gossypol	Male contraceptive
<i>Hemsleya amabilis</i>	Hemsleyadin	Bacillary dysentery
<i>Hydrangea macrophylla</i>	Phyllodulcin	Sweetner
<i>Hydrastis Canadensis</i>	Hydrastine	Hemostatic, astringent
<i>Hyoscyamus niger</i>	Hyoscyamine	Anticholinergic
<i>Larrea divaricata</i>	Nordihydroguaiaretic acid	Antioxidant
<i>Lobelia inflata</i>	$\alpha$ -Lobeline	Smoking deterrent, respiratory stimulant
<i>Lonchocarpus nicou</i>	Rotenone	Piscicide, Insecticide
<i>Lycorissquamigera</i>	Galanthamine	Cholinesterase inhibitor
<i>Maclurapomifera</i>	Pomiferin	Anticancer
<i>Mentha viridis</i>	Menthol	Rubefacient
<i>Mucunapruriensis</i>	L-Dopa	Anti-parkinsonism

<i>Nicotianatabacum</i>	Nicotine	Insecticide
<i>Nothapodytesfoetida (Mappiafoetida)</i>	Camptothecin	Anticancer
<i>Ocoteagalaziovii</i>	Glasiovine	Antidepressant
<i>Papaversomniferum</i>	Papavarine, Noscapine, Codeine, Morphine	Analgesic, antitussive, Smooth muscle relaxant
<i>Pausinystaliayohimbe</i>	Yohimbine	Aphrodisiac
<i>Physostigmavenenosum</i>	Physostigmine	Cholinesterase Inhibitor
<i>Pilocarpus jaborandi</i>	Pilocarpine	Parasympathomimetic
<i>Piper methysticum</i>	Kawain	Tranquillizer
<i>Podophyllumpeltatum</i>	Etoposide, Podophyllotoxin, Teniposide	Anticancer
<i>Potentillafragarioides</i>	(+)-Catechin	Haemostatic
<i>Quisqualisindica</i>	Qulsqualic acid	Anthelmintic
<i>Raphanussativus</i>	Roscovitine	Anticancer
<i>Rauwolfiacanescens</i>	Deserpidine	Antihypertensive, tranquillizer
<i>Rauwolfiaserpentina</i>	Reserpine, Ajmalicine, Rescinnamine	Circulatory Disorders, Antihypertensive, tranquillizer
<i>Rhododendron molle</i>	Rhomitoxin	Antihypertensive, tranquillizer
<i>Rorippaindica</i>	Rorifone	Antitussive
<i>Salix alba</i>	Salicin	Analgesic
<i>Salix babylonica</i>	Aspinin	Fever and pain
<i>Sanguinariacanadensis</i>	Sanguinarine	Dental plaque inhibitor
<i>Silybummarianum</i>	Silymarin	Antihepatotoxic
<i>Simaroubaglauca</i>	Glaucarubin	Amoebicide
<i>Sophorapschycarpa</i>	Pachycarpine	Oxytocic
<i>Stephaniasinica</i>	Rotundine	Analgesic, sedative, traquillizer
<i>Stephaniatetrandra</i>	Tetrandrine	Antihypertensive
<i>Stevia rebaudiana</i>	Stevioside	Sweetner
<i>Strophanthusgratus</i>	Ouabain	Cardiotonic
<i>Strychnosnux-vomica</i>	Strychnine	CNS stimulant
<i>Strychnostoxifera</i>	Curare, <a href="#">D-tubocurarine</a>	Muscle relaxant
<i>Tabebuia sp.</i>	Lapachol	Anticancer, antitumor
<i>Taxusbrevifolia</i>	Taxol	Antitumor agent
<i>Theobroma cacao</i>	Theobromine	Diuretic, vasodilator
<i>Theobroma cacao and others</i>	Theophylline	Diuretic, bronchodilator
<i>Thymus vulgaris</i>	Thymol	Antifungal (topical)
<i>Trichosantheskirilowii</i>	Trichosanthin	Abortifacient
<i>Urgineamaritime</i>	Scillarid A	Cardiotonic
<i>Valerianaofficinalis</i>	Valopatriates	Sedative
<i>Veratrum album</i>	Protoveratrine A, B	Antihypertensives
<i>Vanilla planifolia</i>	Vanillin	Antioxidant, Antimutagenic

## ACKNOWLEDGMENT

The author would like to thank the University Grants Commission, Government of India for sanctioning the research project and providing the financial assistance to carry out this research. He also would like to thank Rev. Fr. Brian Periera, S.J, the rector St. Joseph's College and Rev. Dr. Victor Lobo, S. J, principal of St. Joseph's College for providing laboratory facilities.

## REFERENCES

- [1] Agra MF, Freitas PF, Barbosa-Filho JM 2007.Synopsis of the plants known as medicinal and poisonous in Northeast of Brazil. Rev Bras Farmacogn 17: 114-140. <https://doi.org/10.1590/S0102-695X2007000100021>
- [2] ArasanSukru and Kayallhan. 2015. Some Important Plants Belonging to Asteraceae Family Used in Folkloric Medicine in Savur (Mardin/Turkey) Area and Their Application Areas.Journal of Food and Nutrition Research Vol. 3, No. 5, 2015, pp 337-340.
- [3] Asiimwe S, Namutebi A, Borg-Karlsson A, Kamatenesi-Mugisha M, Oryem-Origa H. 2014.Documentation and Consensus of Indigenous knowledge on medicinal plants used by the local communities in Western Uganda. J Nat Prod Pl Res. 2014;4(1):34-42
- [4] Bisht, Vinod Kumar and Purohit, Vineet. 2010. Medicinal and Aromatic Plants Diversity of Asteraceae in Uttarakhand.Nature and Science: Marsland Press.
- [5] Bottcher H. Miracle drugs. Zagreb: Zora; 1965. pp. 23-139.
- [6] Christenhusz, M. J. M.; Byng, J. W. 2016.The number of known plants species in the world and its annual increase. *Phytotaxa.Magnolia Press*.261 (3): 201-217.
- [7] Dimitrova Z. The history of pharmacy. Sofija: St Clement of Ohrid; 1999. pp. 13-26.
- [8] Fabricant, D S and N R Farnsworth. 2001. The value of plants used in traditional medicine for drug discovery.Environ Health Perspect. 2001 Mar; 109(Suppl 1): 69-75.
- [9] Glesinger L. Medicine through centuries. Zagreb: Zora; 1954. pp. 21-38.
- [10] Greenwell , M and Rahman. P.K.S.M. 2015. Medicinal Plants: Their Use in Anticancer Treatment. Int J Pharm SciRes.Int J Pharm Sci Res. 2015 Oct 1; 6(10): 4103-4112.
- [11] Jayarama Reddy. 2008. Monograph on *Tribulusterestrif*. Published and Funded by University Grants Commission, New Delhi.
- [12] Joshi AR and Joshi K. Indigenous knowledge and uses of medicinal plants by local communities of the Kali Gandaki Watershed Area, Nepal.JEthnopharmacol. 2000;73:119-29 [https://doi.org/10.1016/s0378-8741\(00\)00301-9](https://doi.org/10.1016/s0378-8741(00)00301-9).
- [13] Kamatenesi-Mugisha M, Oryem-Origa H. 2005.Traditional herbal remedies used in the management of sexual impotence and erectile dysfunction in Western Uganda. Afr Health Sci. 2005;5(1):40-9.
- [14] Kelly K. History of medicine. New York: Facts on file; 2009. pp. 29-50.

- [15] Magalion, S.A., Sanderson, K.R. Absolute diversification rates in angiosperm clades. *Evolution*, 55 (9): 1762-1780. 2001. <https://doi.org/10.1111/j.0014-3820.2001.tb00826.x>
- [16] MahbuburRahman, A. H. M and IsmotAraParvin. 2014. M Study of Medicinal Uses on Fabaceae Family at Rajshahi, Bangladesh. *Research in Plant Sciences*, 2014 2 (1), pp 6-8.
- [17] Manyam BV, Dhanasekaran M and Hare TA. 2004. Neuroprotective effects of the antiparkinson drug Mucunapruriens. *Phytother Res*. 2004 Sep;18(9):706-12.
- [18] Newman DJ and Cragg GM. 2012. Natural products as sources of new drugs over the 30 years from 1981 to 2010. *J Nat Prod*. 2012 Mar 23;75(3):311-35.
- [19] Patel, DKSK, Prasad, R Kumar, and S Hemalatha. 2012. An overview on antidiabetic medicinal plants having insulin mimetic property. *Asian Pac J Trop Biomed*. 2012 Apr; 2(4): 320–330.
- [20] Pedersen Ole, AmeenahGurib-Fakim, Hussein Subratty and Anne Adsersen. 1999. Pharmacological Properties of Seven Medicinal Plants of the Rubiaceae from Mauritius. *Pharmaceutical Biology*. Volume 37, 1999 - Issue 3. Pages 202-207
- [21] Petrovska, Biljana Bauer. 2012:Historical review of medicinal plants' usage. *Pharmacogn Rev*. 2012 Jan-Jun; 6(11): 1–5. doi: 10.4103/0973-7847.95849. PMID: PMC3358962
- [22] Rahman MA, Mossa JS, Al-Said MS, Al-Yahya MA. 2004. Medicinal plant diversity in the flora of Saudi Arabia 1: a report on seven plant families. *Fitoterapia* 75: 149–161.
- [23] Stojanoski N. Development of health culture in Veles and its region from the past to the end of the 20<sup>th</sup> century. *Veles: Society of science and art*. 1999:13–34.
- [24] Taylor, Leslie. 2005: Differences and Similarities of drugs and Medicinal plants. In. *The Healing Power of Rainforest Herbs (Chapter-2)*. Square One Publishers, Inc.
- [25] Tucakov J. *Healing with plants – phytotherapy*. Beograd: Culture; 1971. pp. 180–90.
- [26] Tucakov J. *Pharmacognosy*. Beograd: Institute for text book issuing in SR. Srbije; 1964. pp. 11–30.
- [27] WHO 1999. *Monographs on selected medicinal plants*. Vol. 1.
- [28] Wiart C. *Etnopharmacology of medicinal plants*. New Jersey: Humana Press; 2006. pp. 1–50.