

## NE PHROTECTIVE PLANTS: A REVIEW

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Received: 29 June 2011, Revised and Accepted: 18 Aug 2011

## ABSTRACT

According to WHO report, over 80 % of the world population depends on traditional medicine for their primary health care needs. Exploration of traditional medicine is a mysteriously interesting yet, scientifically significant and economically important task of ethnobotanists. The people of India are well acquainted with a large number of indigenous medicinal plants than the natives of any other countries. Herbs are the principal form of medicine in India and they are becoming popular throughout the world. An ethnomedicinal survey was undertaken to compile information of medicinal plants to cure nephrotoxicity/kidney problems from traditional healer in khandesh region. The investigation revealed that about 61 plant families have potential to cure renal diseases. This includes 143 species of ethnomedicinally important nephroprotective plants in Maharashtra and 78 species found in khandesh region. Thus, information generated from the present study deals about 85% medicinal plant as diuretic activity, 10 % medicinal plant used in burning urination and 6.3% medicinal plants against stone formation. It is evident from this study that renal damage curing natural products are usually comprises in leaves 30% , root 22 % , seed 18 % , fruit 15 % pod 10 % ,Bark 8 % ,gum 5 % and whole plant 2 % . The variation in the mode of action and method of preparation is noted. Ninety percent data shows about 75% plants have reputation and repeatedly used by a number of researchers. This is followed by 13% and only 2% have folkloric reputations which are not yet exploited experimentally. It is either in form of paste, juice, powder or decoction. In this study, the most dominant family is Euphorbiaceae. The leaves are most frequently used in the treatment of nephrotoxicity than rest of aerial plant. Such review is not available in literature. This review provides comprehensive account on nephroprotective indigenous plants.

**Keywords:** Nephrotoxicity, Nephroprotective plants, Medicinal plants, Khandesh region

## INTRODUCTION

Demand for medicinal plants is increasing in both developing and developed countries. Research on medicinal plants is one of the leading areas of research globally. However, there is a need to pay closer attention to the issue of bioactivity-safety evaluation and conservation of medicinal plants. Kidney failure is one of the most common diseases in India. The world health organization recognizes four major groups of renal failure according to the predominant involvement of corresponding morphologic component. i) Glomerular diseases, ii) Tubular diseases, iii) Interstitial diseases and iv) Vascular diseases. Also two major stages viz. a) Acute renal failure - is a syndrome characterized by rapid onset of renal dysfunction, chiefly oliguria or anuria, and sudden increase in metabolic waste-product in the blood and secondly b) Chronic renal failure - is a syndrome characterized by progressive and irreversible deterioration of renal function due to slow destruction of renal parenchyma eventually terminating in death. Many plants have been used for the treatment of kidney failure in traditional system of medicine throughout the world. Indeed along with dietary measures, plant preparation formed the basis of the treatment of the disease until the introduction of allopathic medicine. Ethnomedicinal plants can be used to help forestall the need for dialysis by treating the causes and effect of renal failure, as well as reducing the many adverse effect of dialysis (Yarnell et al., 2007) though; there are few chemical agents to treat acute renal failure. Studies reveal that synthetic nephroprotective agents have adverse effect besides reduce nephrotoxicity, Various environmental toxicant and clinically useful drugs, acetaminophen and gentamicin, can cause severe organ toxicities through the metabolic activation to highly reactive free radical (Adeneye et al., 2008) Right from its beginning, the documentation of traditional knowledge, especially medicinal uses of plants, has provided many important drugs of modern day. The herbalist / local vaidyas still practice herbal medicines. Several herbal drugs act as good non-specific cytoprotective. In view of this background, it is thought worthwhile to evaluate the indigenous plants which could be useful as adjuvant as nephroprotective. This helps to decrease the potential nephrotoxicity of drugs like gentamicin, cisplatin, cyclosporine, Carbon tetrachloride. etc. (Qarawi et al., 2008, Khan et al., 2009). Further it was conceptualized that such native plants would be useful, at least as adjuvant in the treatment of different kind of degenerative disease of kidney. (Meena et al., 2009) Such type of observations also recorded

in own laboratory using herbal formulation. The knowledge of these medicines is age old. The use of herbs is the cheapest way for cure of various health disorders. (Bhattacharjee, 1998, Kirtikar and Basu,1995, Khare,2007).

This review attempts to portray the discovery and development of medicine from galenic to genomics, with a focus on the potential and role of medicinal plants. Ayurveda is a traditional Indian medicinal system being practiced for thousands of years (Chopra et al., 1994) Ethnobotanical studies are often significant in revealing locally important plant species especially for the discovery of crude drug (Jain et al., 1991). Considerable research on pharmacognosy, chemistry, pharmacology and clinical therapeutics has been carried out on native medicinal plants. Traditional knowledge driven drug development can follow a reverse pharmacology path and reduce time and cost of development. In Indian system of medicine several herbal remedies has been tried for the treatment of kidney failure since the time of Charka and Sushruta. New approaches to improve and accelerate the joint drug discovery and development process are expected to take place mainly from innovation in drug target elucidation and lead structure discovery. (Pushpagandan and Kumar, 2005) Traditional knowledge will serve as a powerful search engine and most importantly, will greatly facilitate intentional, focused and safe natural products research to rediscover the drug discovery process. Therefore, search of nephroprotective herbs from medicinal plants has become important and need of the day. Location and study area - Geographically, Maharashtra is located in the center of North and south side of India and is the 3<sup>rd</sup> largest state with a geographical area 307690 sq kms and lies between 16°40' to 22°10'N latitude and 72°56' to 80°09' E longitude. Western border of it is linked with Arabian Sea having 825 sq kms lengths 750 sq kms long. Eastern side is connected to Madhya Pradesh, 1875 sq kms long southern border is attached to Andhra Pradesh and Karnataka and 1725 sq kms long Northern border is linked with Gujarat and Madhya Pradesh. Maharashtra is distributed into 35 districts and 303 tahsils. There are four different regions of Maharashtra viz. hands, marathwada, vidharbha and kokan. Khandesh region of Maharashtra was divided into three districts i.e. Jalgaon, Nandurbar and Dhule is situated on Satpura plateau at 20 ° 8' and 22 ° 7' North latitude, 73°42' and 76° 28' east longitude. Nandurbar district is bounded by Dhule in south, Gujrat and MP in West and North, MP and Dhule in Eastern side (Patil, 2003). Geographical map of three district is illustrated in figure1. Periodical surveys

were made for search of new traditional herbal medicines in village of khandesh region local traditional healers having practical knowledge of plant in medicine were interviewed in Nandurbar, Dhule and Jalgaon district. These district are inhabited by Bhills, Garits, kokanis , mavschis , valvis , pawras , tribs. Regular visits were planned during the period of 2007-2009. The

information was collected from local traditional healers and aboriginal people of these districts through intensive interviews according to method suggested by (Chopda and Mahajan et al.,2009) The gathered data was verified by Ethenomedicinal plants uses as nephroprotective care in khandesh region of Maharashtra. (Gupta et al., 2004 and Tayade and Patil, 2006)

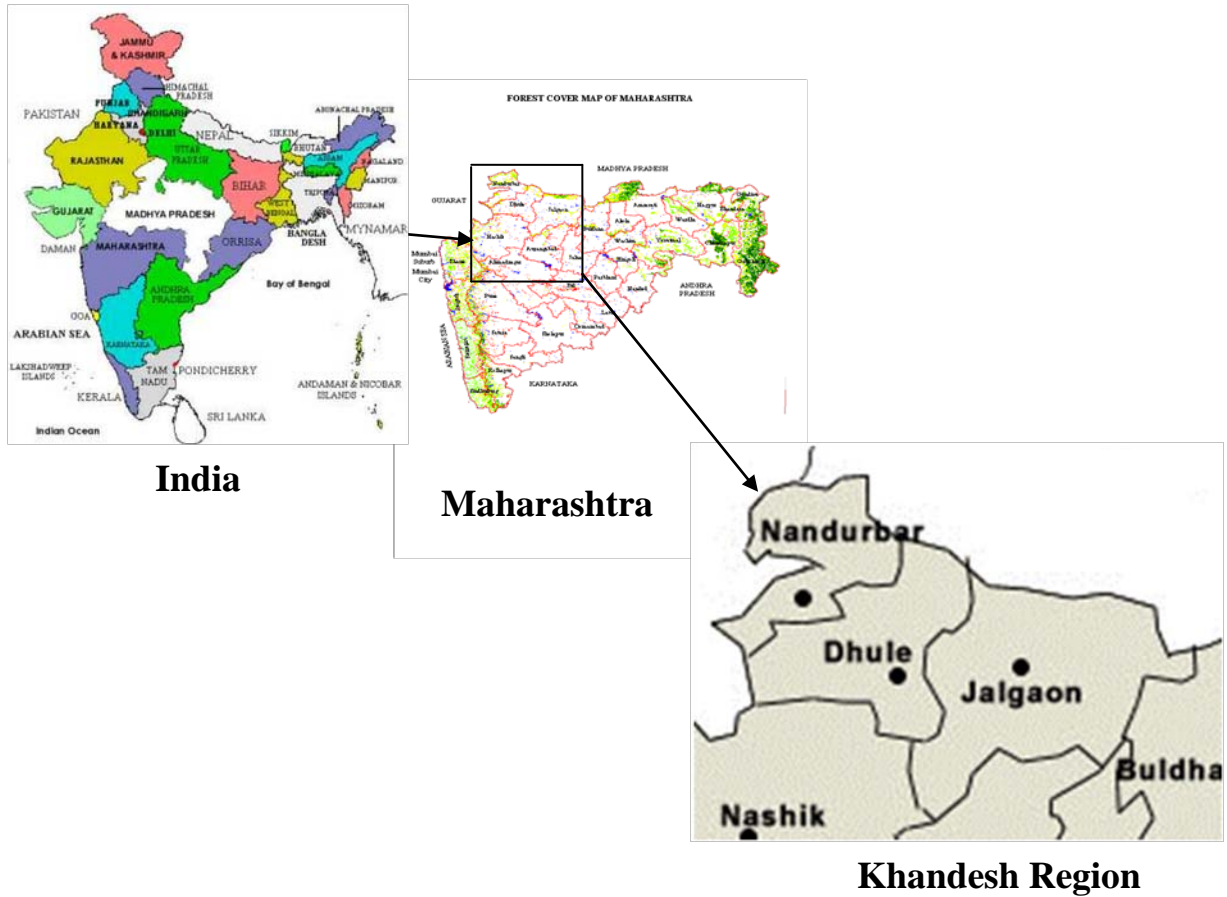


Fig. 1: Location of Study area (Jalgaon District, Maharashtra, India)



Photo plate 1: Conversations with traditional practitioner about nephroprotective plants, Village-1 Chinchpura



Photo plate 2 Conversations with traditional practitioner about nephroprotective plants along with Villagers and author, Village-2 Boritanda

### Observations

Table 1: Indigenous plants of Maharashtra State belonging to used against Kidney disorders

Sr. No	Name of plants	Family	V. Name	Part use	Main Active Principle	Rep. Freq
1.	<i>Abelmoschus esculentus L</i>	Malvaceae	Bhendi	fr, s, rt	Carotene, folic acid, thiamine riboflavin, tocopherol palmitic acid	M
2.	<i>Abrus precatorius L</i>	Leguminosae	Gunja	rt, l	Glucoside, Alkaloid,	M
3.	<i>Abutilon indicum L</i>	Malvaceae	Atibalaa	rt, b	Asparagines, Mucilage, Tannin, alkaloids	L
4.	<i>Acacia arabica (Willd)</i>	Leguminosae	Babul	l	Tannin, Flavonoid	L
5.	<i>Acacia catechu L</i>	Mimosaceae	Khair	b	Flavonoid, Tannin	H
6.	<i>Acacia sinuate (Lour) Merrill</i>	Mimosaceae	Cikakai	p, b	Saponin, Flavonoid, Tannin	M
7.	<i>Achilla millefolium L</i>	Compositae	Gandana	wp	Alkaloid, Essential oil	L
8.	<i>Achyranthes aspera L.</i>	Amaranthaceae	Aghada	r b	Alkaloids, saponin, Tannin Oil	M
9.	<i>Adiantum Lunulatum Burm</i>	Polypodiaceae	Hansraj	l	Flavonoids, terpenoids, Tannin, Volatile oil	L
10.	<i>Aerva lanata L Juss</i>	Amaranthaceae	Kupuri madhuri	wp	Amyrin, campensterol, $\beta$ -sitosterols, flavonoides, glycoside	H
11.	<i>Alangium salvifolium Wang</i>	Alanglaceae	Ankol	b	Alkaloids, Akoline Lamarkine,	H
12.	<i>Allium cepa L.</i>	Liliaceae	Onian	bu	Essential oil orgnic sulphide Flavonoid, phenolic acid	H
13.	<i>Amaranthus spinosus L.</i>	Amaranthaceae	Kateli-chaulai	rt	Alkanes, Quinoline, sterols	M
14.	<i>Anogeissus latifolia (Roxb)</i>	Combretaceae	Dhavara	b, rt	Tannins, calcium, gum, Qurecetin	M
15.	<i>Anona Squamosa L</i>	Annonaceae	Custard apple	l, s	Alkaloid Aminoacids, camphor, anonaine	H
16.	<i>Apium graveolens L.</i>	Umbelliferae	Ajmoda	rt	Volatile oil, Flavonoids, Alkaloid	H
17.	<i>Arachis hypogaea L</i>	Fabaceae	Mung-phali	s	Vit e, Flavonoid, Tannins	H
18.	<i>Arctium lappa L.</i>	Compositae	Great Burdock	rt	Flavonoid Hexasaccharide, tannin volatile oil	L
19.	<i>Asclepias syriaca L.</i>	Asclepiadaceae	Mohari	rt	Glucol, asclepiadin	L
20.	<i>Asparagus racemosus Willd</i>	Liliaceae	Shatavari	rt	Oil, saponin	H
21.	<i>Atropa belladonna L.</i>	Solanaceae	Belladonna	rt	Alkaloid, Tanin, starch,	M
22.	<i>Azadirachta indica L</i>	Meliaceae	Nimb	l	Alkaloid, steroid, a. acid Azardin, Resin, tannine, fixed oils	H
23.	<i>Bacopa monnieri L</i>	Scrophulariaceae	Brahmni,	l	Essential oil, Alkaloid	M
24.	<i>Balanites roxburghii L</i>	Balanitaceae	Hingol	rt, fr	Steroidal Saponin, Amino acid	H
25.	<i>Baliospermum montanum Willd</i>	Euphorbiaceae	Danti	rt, l, s	Phorbol esters, Terpenoid, Flavonoids, hydrocarbon, sitoserol, D-glucoside	L
26.	<i>Bambusa bamboo Von</i>	Arundinaceae	Bamboo	l	Cholin, betain, Nuclease, Urease,	H
27.	<i>Bambusa nutans L</i>	Arundinaceae	Bamboo	l	Cholin, betain, Nuclease, Urease,	H
28.	<i>Barleria prionitis Linn.</i>	Aceanthaceae	Kate-Koranti	fl, l	Essential oil, Flavonoid Glycoside, $\beta$ -sitosterol	M
29.	<i>Basella alba L</i>	Basellaceae	Indian spinach	l	Iodine, fluorine, carotenoids Flavonoid	H
30.	<i>Benincasa</i>	Cucurbitaceae	White gourd	fr, s	Glucoge, mannitol $\beta$ -sitosterol, protene	M

31.	<i>hispidia (Thunb)Cogn</i> <i>Boerhavia diffusa L.</i>	Nyctaginaceae	Punarnava	wp	Flavonoid,Alkaloids,triactantanol,hentriacontane, $\beta$ .sitoste rol	H
32.	<i>Boswellia serrata roxb</i>	Burseraceae	Dhupali, Salai	g	Tanins,pentosans,lignin,holocellulose, $\beta$ -sitosterol	M
33.	<i>Brassica oleracea L</i>	Brassicaceae	Cabbage	l	Essentnl, aminoacid	L
34.	<i>Butea monosperma Lam</i>	Fabaceae	Palash	l	GlucosideButine,proteolytic lipolytic enzyme,Flavonoid	H
35.	<i>Cajanus cajan L millsp</i>	Fabaceae	Tuvar	l,s	Amino acid,galactosid	M
36.	<i>Carica papaya L.</i>	Caricaceae	Papaya	fr	Alkaloid,papain enzymes.	L
37.	<i>Cardiospermum halicacabum L.</i>	Sapindaceae	Kanphuti	rt,l	Alkaloid, $\beta$ -sitostero.l	H
38.	<i>Cassia absus L.</i>	Caesalpiniaceae	Ran Kulith	s,l	Alkaloid,Sitosterol,Glucoside.	M
39.	<i>Cassia fistula L.</i>	Caesalpiniaceae	Bahava	l .po	glycoside ,Tannin,Flavonoid.	L
40.	<i>Chelidonium majus L.</i>	Papaveraceae	Celandine	fl	Alkaloids, Flavonoids	L
41.	<i>Cocos nucitera L</i>	Areaceae	Coconut	fr,s,l	Saccharose sorbitol alcohol,ketones	M
42.	<i>Commiphora mukul Engl</i>	Burseraceae	Guggal	g	Guggulsterone,Flavonoid.	H
43.	<i>Cordia dichotoma Forst</i>	Boraginaceae	Bhoker	fr	Alkaloid,Tannin	H
44.	<i>Curculigo orchoidesGaertn</i>	Amaryllidaceae	Kalimusli	rt	Saponine,curculigo,phenolicglycoside	H
45.	<i>Cynodon dactylon Pers</i>	Gramineae	Durva	rt	$\beta$ -ionone,2-propionic4-hydroxybenzoic	M
46.	<i>Cyperus rotundus L</i>	Cyperaceae	Nagermotha	rh	Essentialoil,cyperene,cyperol,starch $\beta$ -sitosterol	H
47.	<i>Datura metal L</i>	Solanaceae	Datura	l,fl	Alkaloid,scopolamine,hyposcymine,atropin,vitC	M
48.	<i>Daucus carota L</i>	Umbelliferae	Carrot	rt ,l	Oil, carotol essential oil,Flavones	L
49.	<i>Demostachya bipinnata L</i>	Compositae	Kush	rt	Alkaloid,Terpenoid	H
50.	<i>Desmodium gangeticum L</i>	Fabaceae	Salpan	rt	Alkaloids	M
51.	<i>Digitalis Purpurea L</i>	Scrophulariaceae	Hrutpatri	l	Glycosides,flavonoids,saponin	H
52.	<i>Dolichos biflorus L</i>	Leguminosae	Kulith	s	Urease,lectin carbohydrate	L
53.	<i>Elettaria cardamomum Maton.</i>	Zingiberaceae	Chhoti Elaichi	s	Palmitic acid	M
54.	<i>Ficus religiosa L</i>	Moraceae	Piple	b, l	Arabinose,mannose,glucose $\beta$ -sitosterol D-glucoside	H
55.	<i>Foeniculum vulgareMill</i>	Apiaceae	Saunf	s, fl	Oil, Methyl Chavicol, Limonene Essential oil	H
56.	<i>Gossypium arboretum L.</i>	Malvaceae	Cotton	l	Betaine,choline,Salicylic acid.	M
57.	<i>Gymnema sylvestrer(Retz)R.Br</i>	Asclepiadaceae	Gudmar	l,wp	Saponine,I-V,gymnemic acid	H
58.	<i>Haldina cordifolia(Roxb)</i>	Rubiaceae	Haldu	b,tr	Oleoresin,essential oil,cellulose, $\beta$ sitosterol	H
59.	<i>Helianthus annus L.</i>	Compositae	Sunflower	s & rt,l	Albumin.globulin,glutelin, $\beta$ sitosterol	H
60.	<i>Hemidesmus indicus L.</i>	Asclepiadaceae	Anant mule	rt l s	Essential oil,Steroid,saponin,esine tannine	M
61.	<i>Hibiscus sabdariffa L.</i>	Malvaceae	China Rose	l	Organic acid anthocyanin vitamin C	M
62.	<i>Holarrhena antidysentrica L.</i>	Apocynaceae	Kala-Kuda	b,s	Alkaloids, tannin, Triterpene,	H
63.	<i>Humulus lupulns L.</i>	Cannabidaceae	Hop	fr	Volatileoil,polyphenolic,Tannin Aspargin	L
64.	<i>Hygrophila auriculata K.Schum.</i>	Acanthaceae	Neermali	rt,l	Fattyoil,alkaloid,calcium,phosphate,K,CL	M
65.	<i>Jasminum grandiflorum L.</i>	Oleaceae	Chameli	l	Alkaloid,Salicylicacid,essencial oil,Ascorbic acid Glucoside	L
66.	<i>Lawsonia inermis L.</i>	Lythraceae	Mehandi	rt,l,s	2-hydroxy-1,4naphthquinoneFlavonoid, $\beta$ sitosterol	H
67.	<i>Leptadenia reticulataW.&amp;A</i>	Asclepiadaceae	Jivanti	rt	Stigma sterol,tocopherol	H
68.	<i>Linum usitatissimum L.</i>	Linaceae	Aalsi	rt,s	fixed oil protene wax,resin,sugar glycoside	H
69.	<i>Mangiiifera indica L.</i>	Anacardiaceae	Mango Plant	l	Flavonoid Phenolic acidVitamin ABCD	H
70.	<i>Menta arvensis L.</i>	Labiatae	Podina	l	Essentialoil,carvones	M
71.	<i>Mesua ferrea L.</i>	Guttiferae	Nagkesarah	s	Palmitic,stearic,oleic linoleic	L
72.	<i>Michelia champaca L.</i>	Magnoliaceae	Champa	l, wp	Essentialoil fatty oil	M
73.	<i>Mimosa pudica L.</i>	Leguminosae	Lajalu	l,rt	Alkaloids,Mimosine	H
74.	<i>Momordica dioica Roxb ex willd</i>	Cucurbitaceae	Jangali karelaa	rt	Glycoside,saponin	L
75.	<i>Moringa oleifera Lam</i>	Moringaceae	Drumstick tree	rt,l,s	Carotene,nicotinic acid,ascorbic acid,amino acid	M
76.	<i>Mucana pruriens L.</i>	Leguminosae	Khajkuiri	s, rt	,Calcium,phosphorus,iron,sulphur,alkaloids	M
77.	<i>Mucuna adans L</i>	Leguminosae	Khaj-Kuiri	s, rt	Calcium,glucoside alkaloids $\beta$ sitosterol	M
78.	<i>Murraya Koenigii L</i>	Rutaceae	Karry patta	rt,l	Oil,b-caryophyllene,b-gurjunene,b-Carbazol,Alkaloid	L
79.	<i>Musa paradiciaea L</i>	Scistaminaceae	Banana	s	Albumin,globulin,glutelin,proteoses	H
80.	<i>Nelumbium nucifera gaertn</i>	Nelumbonaceae	Lotus	rh, s, l & fr	Alkaloids,nuciferine ,protene sugar, vitamin	H
81.	<i>Nerium indicumMill</i>	Apocynaceae	Kaner	rt,l	Glycoside Digitoxigenin	L
82.	<i>Nyctanthus arboterresris L</i>	Oleaceae	Parijat	l	Oil,manitol,tannin, $\beta$ sitosterol	M
83.	<i>Ocimum basillicum L.</i>	Labiatae	Sweet Basil	l, rt & s	Essentialoil,methylcinnamate,eugenol, alkaloid,Flavonoid	H
84.	<i>Ocimum canum L</i>	Labiatae	Sathra	s	Essential oil,Eugenol, $\beta$ sitosterol	H
85.	<i>Ocimum Sanctum L</i>	Labiatae	Tulasi	l,rt	Eugenol,metho,ether,carvacol	H
86.	<i>Orchis latifolia L</i>	Orchidaceae	Salam	wp	Volatile oil,loroglosin,Glucoside	M
87.	<i>Orza sativa L</i>	Gramineae	Chawal	s	Alkaloid,orilineprotene fat carbohydrate	H

88.	<i>Ougeinia oojeinensis (Roxb) Hochr</i>	Fabaceae	Dandan	b	Dimethoxy isoflavone homoferreiri	M
89.	<i>Paederia foetida L</i>	Rubiaceae	Hirenwel	rt, l	Essential oil, Alkaloids, foetida	H
90.	<i>Pandanus odoratissimus L</i>	Pandanaceae	Ketek	l	Essential oil, Methyl ether Phenylethyl alcohol	L
91.	<i>Pedaliium murex L</i>	Pedaliaceae	Bada gokhru	s, l	Alkaloid, fatty oil, resin	M
92.	<i>Phaseolus mungo L</i>	Leguminosae	Green gram	s	2.8% ash, Oil	M
93.	<i>Phyllanthus niruri L</i>	Euphorbiaceae	Bhui awala	s	Alkaloid, Flavonoids, Phyllanthin, hypophyianthin	H
94.	<i>Phyllanthus urinaria L</i>	Euphorbiaceae	Valaitisaunf, Muhuri	s	Alkaloid, Flavonoid-quercetin, astragaline,	H
95.	<i>Phyllanthus reticulatus Pair</i>	Euphorbiaceae	Jarmala	l	Tannic acid	M
96.	<i>Pimpinella anisum L.</i>	Umbelliferae	Rajanigandha	s	Volatile oil, flavonoid, Sterol	M
97.	<i>Piper nigrum L</i>	Piperaceae	Blak piper	s	Piperin, piperidine alkaloid, chavicine essential, oil	H
98.	<i>Saccharum officinarum L</i>	Poaceae	Suger cane	s, rt	Phenol, Glycolic acid	M
99.	<i>Santalum album L.</i>	Santalaceae	Safed Chandan	rt, w	Santalbic acid, palmitic acid, olic acid	H
100.	<i>Saraca indica L</i>	Leguminosae	Ashok tree	l, s, b	Tannin, catechol, sterol, glycoside	M
101.	<i>Securinega leucopyrus Muell-Arg</i>	Euphorbiaceae	Hartto	l	Alkaloids, free triterpene, steroids Tannin	L
102.	<i>Solanum indicum L</i>	Solanaceae	Dorli	wp	Alkaloid, enzymes	H
103.	<i>Solanum surattense burn</i>	Solanaceae	Katali Kattay	fr, fl	Glucoside, solasodine, solasonine	H
104.	<i>Solanum xantocarpum schrad &amp; Wendell</i>	Solanaceae	Kateringani	rt	carpenterol, Glucoside, Alkaloid, solanocarpine	L
105.	<i>Solena amplexicaulis Lam</i>	Umbelliferae	Gomathi, Tawgaula	rt	Alkaloid, Glycoside, Steroid	M
106.	<i>Sorghum vulgare L</i>	Graminae	Jawar	s	Glucoside, Dhurin	M
107.	<i>Sphaeranthus indicus L</i>	Compositae	Gorkhmundi	l, fl	Alkaloid, sphaeranthine, essential oil	L
108.	<i>Tamarindus indica L</i>	Caesalpiniaceae	Imli	rt, f	Tartaric acid, citric acid, maleic acid, flavonoid, glycosides	L
109.	<i>Tectona grandis L</i>	Verbenaceae	Teak	wp	Calcium, phosphate, silica ammonium mg	M
110.	<i>Tephrosia purpurpa L</i>	Fabaceae	Sarphomka	l	Tephrosin, rotenone	M
111.	<i>Terminalia chebula Retz</i>	Combrataceae	Hirda	s	Palmitic stearic oleic linoleic, Astrigent, tannic acid	M
112.	<i>Tribulus terrestris L</i>	Zygophyllaceae	Chota Gokeru Khusha	wp	Saponine, Diosgenine, gitogenine, flavonoids, Alkaloid.	H
113.	<i>Urtica dioica L</i>	Urticaceae	Guelder Rose	rt	Flavonoids, amines, steroids, phenols	H
114.	<i>Vernonia antheimintica Willid</i>	Asteraceae	Kalijira	fr	Amino acid, linoleic, myristic, oleic, palmitic	L
115.	<i>Vitis vinifera L</i>	Vitaceae	Wine grape	fr	Thiamine, niacin, biotin, tocoferol	M
116.	<i>Withania somnifera L dunal</i>	Solanaceae	Ashwagandha	ft	Alkaloids, steroids, reducing suger, glycosides	H
117.	<i>Zingiber officinale (Rose)</i>	Scitamineae	Ginger	rh	Essential oil, volatile oil	M
118.	<i>Zizyphus xylopyrus L</i>	Rhamnaceae	Kath ber	l	Alkaloid, zizipine	L

Rep. – reported, Freq – frequency, rt- Root, l- Leaves, rt & b - Root & Bark, g - Gum, w - Weed, fl- Flower, s- Seed, po-Pods, fr- Fruit, wp - Whole plant, H : High, M : Moderate, L : least

**Table 2: Indigenous plants used against burning micturation**

Sr. No.	Name of Plant	Family	V. Name	Part use	Active principle	Rep. Freq
1	<i>Andropogon muricatus Retz.</i>	Graminae	Kalavala	l, fl	Essential oil	M
2	<i>Boerhavia diffusa L.</i>	Nyctaginaceae	Punarnava	wp	Alkaloids, triacontanol, $\beta$ -sitosterol, glucose, fructose	H
3	<i>Bombax ceiba L.</i>	Bombacaceae	Salmali	fr	Tannins, $\beta$ -sitosterol, D-glucoside.	M
4	<i>Clitoria terneata L.</i>	Papilionaceae	Aparajita	rt	Teraxeron, glucoside, oligosaccharide	H
5	<i>Cordia dichotoma Forst</i>	Boraginaceae	Bhoker	fr	Tannin, Flavonoid, Saponin.	L
6	<i>Desmodium gangeticum L</i>	Leguminosae	Lapeta, chik	rt	Alkaloid, Gangetin.	L
7	<i>Glycerrhiza glabra L</i>	Leguminosae	Bahava, Gambhari	Rt	Volatile oil, esragole, anethole.	M
8	<i>Gmeliana arborea (Roxb)</i>	Verbenaceae	Jivanti	fr, l	Volatile oil, suger	H
9	<i>Leptadenia reticulata W. &amp; A</i>	Asclepiadaceae	Gokarna, Bibli	rt	Stigma sterol, tocopherol	L
10	<i>Mallotus philippinensis (Muell)</i>	Euphorbiaceae	Kamla	fr	Rottlerin, Isorottlerin, resin, wax	M
11	<i>Phyllanthus neruri L</i>	Euphorbiaceae	Bhuiamla	wp	Phyllanthin, hypo Phyllanthin,	M
12	<i>Raphanus sativus L</i>	Cruciferae	Radish	l	Essential oil, Glucoside, enzyme, methylmercaptane	H
13	<i>Rosa damascene (Mill)</i>	Rosaceae	Rose	fl	Essential oil	H
14	<i>Rumex vesicularis L</i>	Polygonaceae	Chukra	s	Glucoside, resin, Tannine	M
15	<i>Terminalia paniculata (Aruna)</i>	Combretaceae	Sal dhaval	b	$\beta$ -sitosterol, triterpene, carboxylic acid glucoside, dimethyl ellagic acid	M

Rep. – reported, Freq – frequency, rt- Root, l- Leaves, rt & b - Root & Bark, g - Gum, w - Weed, fl- Flower, s- Seed, po-Pods, fr- Fruit, wp - Whole plant, H : High, M : Moderate, L : least



Table 3: Indigenous plants used to eradicate kidney stone formation

Sr. No.	Name of Plant	Family	V. Name	Part use	Active principle	Rep. Fre.
1	<i>Aerva Lanata L.</i>	Amaranthaceae	Kupruri	fl	$\alpha$ -amyrin, campesterol, $\beta$ -sitosterol & $\beta$ -sitosteryl, palamitate, chrysin & four flavonoid glycosides	L
2	<i>Baliospermum Montanum Willd.muell-Arg</i>	Euphorbiaceae	Danti	rt, l, s	Phorobl esters, diterpene, hydrocarbon, $\beta$ -stioosterol, D-glucoside	M
3	<i>Bridelia retusa Sprang</i>	Euphorbiaceae	Ftthar fode	l	Tannin,oil	M
4	<i>Commiphora Mukul (Hookexstocks )</i>	Burseraceae	Gugal	g	Guggulsterone-E, Z, Guggulsteron I-VI cholesterol, seasamin camphorene, cambrane A-etc	M
5	<i>Coriandrum Salivum L. Crataeva Religoea Buch,Ham</i>	Umbelliferae Capparidaceae	Dhaniya Varun	l, fr b, l	Flavonoid,Glycoside,Fixed oil. Linalool, linalyl acetate, thymol, $\beta$ -caryphyllene $\alpha$ -pinene borneol, limonene, $\beta$ -pheliandrene, citranellol	H M
7	<i>Datura Metel L.</i>	Solanaceae	White datura	l, fl	Alkaloids, scopolamine, hyposcymine, Atropin, vita C	M
8	<i>Dolichosbiflorus L.</i>	Fabaceae	Kulith	s	Urease, lectin carbohydrate N-acetyl glucosamine, N- $\beta$ . Glycosidically	L
9	<i>Eclipta alba L.</i>	Asteraceae	Bhrangarajah,	wp	Thiophene, petroleum ether, tertheinyl aldehyde $\beta$ -sitosterol	L
10	<i>Murraya Koenigii L.</i>	Rutaceae	Kurry patta	l	Oil, b-caryophyllene, b-gurjunene, b-elemene & b-phellandrene	L

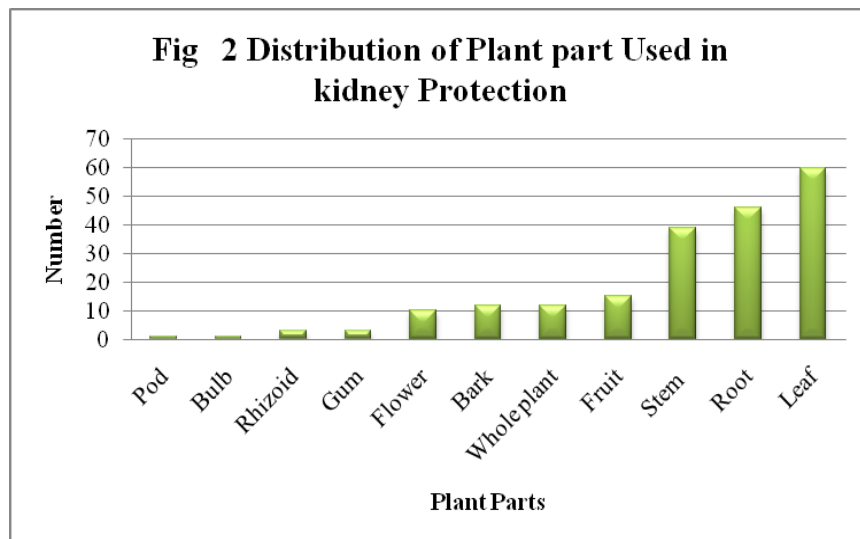
Rep. – reported, Freq – frequency, rt- Root, l- Leaves, rt & b - Root & Bark, g - Gum, w -Weed ,fl- Flower,s- Seed, po-Pods, fr- Fruit , wp - Whole plant, H : High , M : Modrate , L : least

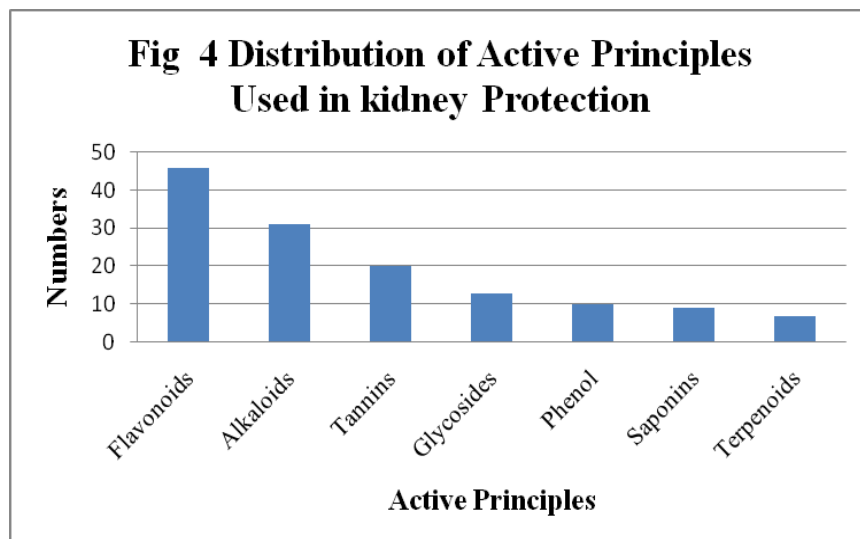
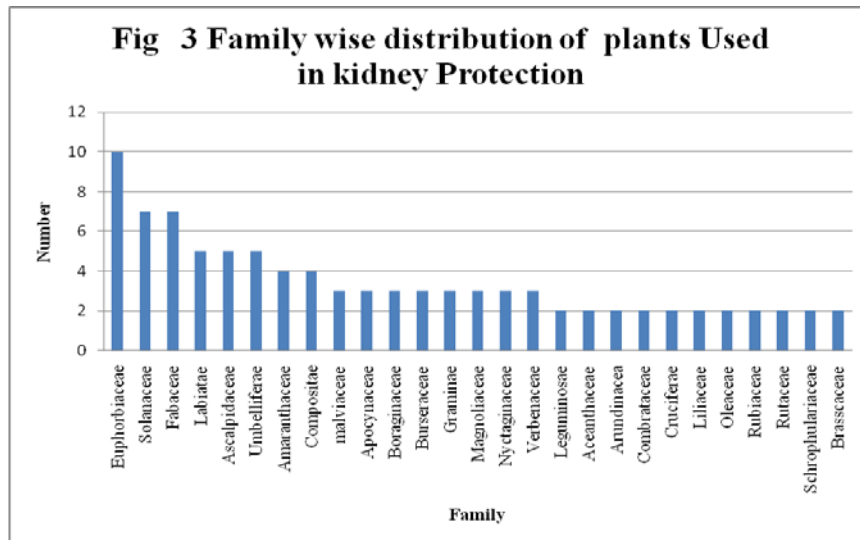
Table 4: Nephroprotective plants of Khandesh Region

Sr. No.	Name of Plant	Family	V. Name	Part use	Active principle	Rep. Fre.
1.	<i>Abutilon indicum L</i>	Malvaceae	Atibalaa	rt,b	Asparagines,Mucilage,Tannin, alkaloids	L
2.	<i>Acacia arabica(Willd)</i>	Leguminosae	Babul	l	Tannin,Flavonoid	L
3.	<i>Achyranthes aspera L.</i>	Amaranthaceae	Aghada	r b	Alkaloids,saponin,Tannin Oil	M
4.	<i>Allium cepa L.</i>	Liliaceae	Onian	Bu	Essential oil orgnic sulphideFlavonoid,phenolic acid	H
5.	<i>Andropogon muricatus Retz.</i>	Graminae	Kalavala	l , fl	Essential oil	M
6.	<i>Anona Squamosa L</i>	Annonaceae	Custard apple	l,s	AlkaloidAminoacids,camphor,anonaine	H
7.	<i>Arachis hypogaea L</i>	Fabaceae	Mung-phali	S	Vit e,Flavonoid,Tannins	H
8.	<i>Asclepias syriaca L.</i>	Asclepiadaceae	Mohari	Rt	Glucol, asclepiadin	L
9.	<i>Asparagus racemosus Willd</i>	Liliaceae	Shatavari	Rt	Oil,saponin	H
10.	<i>Azadirachta indica L</i>	Meliaceae	Nimb	L	Alkaloid ,steroid, Azardin, Resin,tannine,fixed oils	H
11.	<i>Bacopa monnieri L</i>	Scrophulariaceae	Brahmmi	L	Essential oil,Alkaloid	M
12.	<i>Barleria prionitis Linn.</i>	Aceanthaceae	Kate-Koranti	fl , l	Essential oil,Flavonoid Glycoside, $\beta$ -sitosterol	M
13.	<i>Basella alba L</i>	Basellaceae	Indian spinach	L	Iodine,fluorine,carotenoidsFlavonoid	H
14.	<i>Boerhavia diffusa L.</i>	Nyctaginaceae	Punarnava	Wp	Alkaloids,triactanol, $\beta$ sitosterol,glucose,fructose	H
15.	<i>Bombax ceiba L.</i>	Bombacaceae	Salmali	Fr	Tannins, $\beta$ -sitosterol,D-glucoside.	M
16.	<i>Brassica oleracea L</i>	Brassaceae	Cabbage	L	Essentintl, aminoacid	L
17.	<i>Butea monosperma Lam</i>	Fabaceae	Palash	L	GlucosideButine,proteolytic lipolytic enzyme,Flavonoid	H
18.	<i>Cajanus cajan L Millsp</i>	Fabaceae	Tuvar	l,s	Amino acid,galactosid	M
19.	<i>Carica papaya L.</i>	Caricaceae	Papaya	fFr	Alkaloid,papain enzymes.	L
20.	<i>Cassia absus L.</i>	Caesalpiniaceae	Ran Kulith	s,l	Alkaloid,Sitosterol,Glucoside.	M
21.	<i>Cassia fistula L.</i>	Caesalpiniaceae	Bahava	l .po	Glycoside ,Tannin,Flavonoid.	L
22.	<i>Clitoria terneata L.</i>	Papilionaceae	Aparajita	Rt	Teraxeron,glucoside,oligosaccharide	H
23.	<i>Commiphora mukul Engl</i>	Burseraceae	Guggal	G	Guggulsterone,Flavonoid.	H
24.	<i>Cordia dichotoma Forst</i>	Boraginaceae	Bhoker	Fr	Alkaloid, Tannin	H
25.	<i>Crataeva Religoea Buch,Ham</i>	Capparidaceae	Varun	b, l	Linalool, linalyl acetate, thymol, $\beta$ -caryphyllene $\alpha$ -pinene borneol, limonene, $\beta$ -pheliandrene, citranellol	M
26.	<i>Curculigo orchoidesGaertn</i>	Amaryllidaceae	Kalimusli	Rt	Saponine,curculigo,phenolicglycoside	H
27.	<i>Cynodon dactylon Pers</i>	Gramineae	Durva	Rt	$\beta$ -ionone,2-propionic4-hydroxybenzoic	M
28.	<i>Cyperus rotundus L</i>	Cyperaceae	Nagermotha	Rh	Essentialoil,cyperene,cyperol,starch $\beta$ -sitosterol	H
29.	<i>Datura metal L</i>	Solanaceae	Datura	l,fl	Alkaloid,scopolamine,hyposcymine,atropin,vitaC	M
30.	<i>Daucus carota L</i>	Umbelliferae	Carrot	rt,l	Oil, carotol essential oil,Flavones	L
31.	<i>Dolichos biflorus L</i>	Leguminosae	Kulith	S	Urease,lectin carbohydrate	L
32.	<i>Ficus religiosa L</i>	Moraceae	Piple	b, l	Arabinose,mannose,glucose $\beta$ -sitosterol D-glucoside	H
33.	<i>Gmeliana arborea(Roxb)</i>	Verbenaceae	Jivanti	fr, l	Volatileoil,suger	H
34.	<i>Gossypium arboretum L.</i>	Malvaceae	Cotton	L	Betaine,choline,Salicylic acid.	M
35.	<i>Gymnema sylvestrer(Retz)R.Br</i>	Asclepiadaceae	Gudmar	l,wp	Saponine,I-V,gymnemic acid	H
36.	<i>Helianthus annus L.</i>	Compositae	Sunflower	s & rt,l	Albumin.globulin,glutelin, $\beta$ sitosterol	H
37.	<i>Hemidesmus indicus L.</i>	Asclepiadaceae	Anant mul	rt l s	Essential oil,Steroid,saponin,esine tannine	M
38.	<i>Hibiscus sabdariffa L.</i>	Malvaceae	China Rose	L	Organic acid anthocyanin vitamin C	M
39.	<i>Holarrhena antidysentrica</i>	Apocynaceae	Kala-Kuda	b,s	Alkaloids, tannin, Triterpene,	H

40.	<i>Hygrophila auriculata</i> K.Schum.	Acanthaceae	Neermali	rt,l	Fattyoil,alkaloid,calcium,phosphate,K,CL	M
41.	<i>Jasmiun grandiflorum</i> L.	Oleaceae	Chameli	L	Alkaloid, essencial oil,Ascorbic acid Glucoside	L
42.	<i>Leptadenia reticulata</i> W.&A	Asclepiadaceae	Jivanti	Rt	Stigma sterol,tocopherol	H
43.	<i>Leptadenia reticulata</i> W.&A	Asclepiadaceae	Gokarna,	Rt	Stigma sterol,tocopherol	L
44.	<i>Linum usitatissimum</i> L.	Linaceae	Aalsi	rt,s	fixed oil protene wax,resin,sugar glycoside	H
45.	<i>Mangiiifera indica</i> L.	Anacardiaceae	Mango Plant	L	Flavonoid Phenolic acidVitamin ABCD	H
46.	<i>Menta arvensis</i> L.	Labiatae	Podina	L	Essentialoil,carvones	M
47.	<i>Pichelia champaca</i> L.	Magnoliaceae	Champa	l, wp	Essentialoil fatty oil	M
48.	<i>Mimosa pudica</i> L.	Leguminosae	Lajalu	l,rt	Alkaloids,Mimosine	H
49.	<i>Momordica dioica</i> Roxb ex willd	Cucurbitaceae	Jangali karelaa	Rt	Glycoside,saponin	L
50.	<i>Moringa oleifera</i> Lam	Moringaceae	Drumstick tree	rt,l,s	Carotene,nicotc acid,ascorbic acid,amino acid	M
51.	<i>Mucana pruriens</i> L.	Leguminosae	Khajkuiri	s , rt	,Calcium,phosphorus,iron,sulphur,alkaloids	M
52.	<i>Murraya Koenigii</i> L	Rutaceae	Karry patta	rt,l	Oil,b-caryophyllene,b-gurjunene,b-Carbazol,Alkaloid	L
53.	<i>Musa paradiciaea</i> L	Scistaminaceae	Banana	S	Albumin,globulin,glutelin,proteoses	H
54.	<i>Nelumbium nucifera</i> gaertn	Nelumbonaceae	Lotus	rh, s, l & fr	Alkaloids,nuciferine ,protene sugar, vitamin	H
55.	<i>Nerium indicum</i> Mill	Apocynaceae	Kaner	rt,l	Glycoside Digitoxigenin	L
56.	<i>Nyctanthus arboterresris</i> L	Oleaceae	Parijat	L	Oil,manitol,tannin, βsitosterol	M
57.	<i>Ocimum Sanctum</i> L	Labiatae	Tulasi	l,rt	Eugenol,methol,ether,carvacol	H
58.	<i>Paederia foetida</i> L	Rubiaceae	Hiranwel	rt, l	Essential oil, Alkaloids,foetida	H
59.	<i>Phaseolus mungo</i> L	Leguminosae	Green gram	S	2.8%ash,Oil	M
60.	<i>Phllanthus neruri</i> L	Euphorbiaceae	Bhuiamla	Wp	Phyllanthin,hypo Phyllanthin,	M
61.	<i>Phyllanthus niruri</i> L	Euphorbiaceae	Bhui awala	S	Alkaloid,Flavonoids, Phyllanthin,,hypophyianthin	H
62.	<i>Pimpinella anisum</i> L.	Umbelliferae	Rajanigandha	S	Volatile oil,flavonoid,Sterol	M
63.	<i>Raphanus sativus</i> L	Crucifereae	Radish	L	Essentialoil,Glucoside,enzyme,methylmercaptane	H
64.	<i>Rosa damascene</i> (Mill)	Rosaceae	Rose	Fl	Essential oil	H
65.	<i>Saccharum officinarum</i> L	Poaceae	Suger cane	s,rt	Phenol,Glycolicacid	M
66.	<i>Santalum album</i> L.	Santalaeae	Safed Chandan	rt , w	Santalbic acid ,palmitic acid, olic acid	H
67.	<i>Solanum indicum</i> L	Solanaceae	Dorli	Wp	Alkaloid,enzymes	H
68.	<i>Solanum xantocarpum</i> schr&Wendell	Solanaceae	Kateringani	Tr	carpsterol,Glucoside,Alkaloid,solanocarpine	L
69.	<i>Sorgham vulagare</i> L	Graminae	Jawar	S	Glucoside, Dhurin	M
70.	<i>Sphaeranthus indicus</i> L	Compositae	Gorkhmundi	l,fl	Alkaloid,sphaeranthine,essential oil	L
71.	<i>Tamarindus indica</i> L	Caesalpiniaceae	Imli	rt,f	Tartaric acid,citricacid maleicacid flavonoid,glycosides	L
72.	<i>Tectona grandis</i> L	Verbenaceae	Teak	Wp	Calcium,phosphate,silica ammonium mg	M
73.	<i>Tephrosia purpurpa</i> L	Fabaceae	Sarphonka	L	Tephrosin,rotenone	M
74.	<i>Terminalia chebula</i> Retz	Combrataceae	Hirda	S	Palmitic stearic oleic linoleic,Astringent,tannic acid	M
75.	<i>Terminalia paniculata</i> (Arjuna)	Combretaceae	Sal dhaval	B	β-sitosterol,triterpene,carboxylic acid glucoside,dimethyl ellagic acid	M
76.	<i>Tribulus terrestris</i> L	Zygophyllaceae	Chota Gokeru	Wp	Saponine,Diosgenine,gitogenine,flaonoids,Alkaloid.	H
77.	<i>Vernonia antheimintica</i> Willid	Asteraceae	Kalijira	Fr	Amino acid,linoleic myristic, oleic,palmitic	L
78.	<i>Withania somnifora</i> L dunal	Solanaceae	Ashwagandha	Ft	Alkaloids,steroids,reducing suger, glycosides	H

Rep. – reported, Freq – frequency, rt- Root, l- Leaves, rt & b - Root & Bark, g - Gum, w -Weed ,fl- Flower,s- Seed, po-Pods, fr- Fruit , wp - Whole plant, H : High , M : Modrate , L : least





**Table 5: Relative frequencies of plants used in nephroprotection on the basis of literature**

High	Modrate	Least
39.58%	37.5%	22.9%

## CONCLUSION

It is aimed to record medicinal folk-lore for curing nephrotoxicity that exist in threatening stage. In India ayurvedic referred system of medicines several, herbal drugs and are prescribed for reducing renal damage and to avoid kidney related complication. These can be immense value in combating renal damage. In this paper, we have attempted to use our best endeavors of indigenous herbs to alternative medicine of renal damage. On going through various studies on treatment of kidney disorders, it seems that herbal plants play unique role as medicine. There is no synthetic drug which relieves fully insufficiency of kidney. But indigenous plant possesses tissue rejuvenator property which is any way unavoidable. Table 1 summarizes a list of plants of Maharashtra, Family Euphorbiaceae, Leguminosae are mostly used as burning urination Table 2. A plant used to eradicate kidney stone formation is given in Table 3. Table 4 summarizes a list of plants of khandesh region with respect to name, vernacular name, family, part used and active ingredients. This may perhaps be the reason why in numerous cases, which synthetic medicines fails, indigenous system of medication succeed (Madhukkal et al., 2009). He worked on fifteen medicinal plants,

their active principle and more emphasized on renal physiology. The present investigation comprises 143 species of ethnomedicinally important plants of Maharashtra and 78 species from khandesh region out of which around 61 families used to cure kidney diseases. Table 5 summarizes relative frequencies of plants used in nephroprotection.

Tribal people furnished valuable information regarding traditional uses of local plants like *Dolichos biflorus*, *Achyranthes aspera*, *Andropogon muricatus*. The native tribe of village namely Chinchpura and Boritanda told us and without any hesitation use of these plants as nephroprotective. (photo plate 1 and 2) to treat kidney problem. The information generated from the present study according to table 1, 2 & 3. Euphorbiaceae - 9.83% and leguminaceae- 9.83% was the most commonly used family and rest of the data is as follows solanaceae- 6.55%, labiateae- 6.33%, asclepiadaceae- 4.91%. Phytochemical ranking of active principle is, flavonoid > alkaloid > tannin > glycosides > phenol > saponin > terpenoids. Among all the plant parts maximally leaves are used in nephroprotective plant. On the basis of information received from local tribes, we have formulated and developed herbal formulation



to validate the claim of thesis. Data on nephroprotective plants is prepared as *Achyranthes aspera*, ( leaves) *Bauhinia racemosa* (stem bark) *Tiphrozea purpura* (root) *Tectona grandis* ( seed) *Tribulus terrestris* ( leaves) *Andropogon muricatus* (root) *Dolichos biflorus*, (seed) using a gentamicin induce nephrotoxicity model, this herbal formulation gave 75% protection in rat. Ethnomedicinally important plants used by traditional people needs to be evaluated for proper phytochemical analysis, level of toxicity. Extraction and isolation along with few clinical trials phytochemical examination of these plants may lead to development of potential bio-product in the treatment of disease and disorders of renal disease, this could help in creating mass awareness about conservation of such plants to promote ethno- medico-botany knowledge within the region, besides contributing to the preservation of such medicinally important species before they are extinct. Method reported queries with different local herbalists in different seasons and comparison with the plant species which are used in the treatment of renal damage is crucial and valuable.

#### ACKNOWLEDGEMENT

The authors are grateful to the local traditional healers in the khandesh region for sharing their knowledge on herbal medicine. We also thank Dr. D.A. Patil, P.G. Department of Botany, Dr. P. R. Ghogrey Science College, Dhule and Dr. G. S. Chaudhari, Department of Botany, Moolji Jaitha College, Jalgaon for the identification of plants.

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