



Original Article

Some Medicinal and Aromatic Plants from the Districts of West Bengal Used in the Treatment of Kidney Stones Along With Their Status

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India is the largest producer of Medicinal and Aromatic plants and as such is known as the "Botanical garden of the World". These Medicinal and Aromatic plants have tremendous potential in having natural therapeutic values against various diseases. Medicinal plants are easily available, cheaper and possess no toxicity as compared to the modern (allopathic) drugs. Preparation of standardized dose and dosage regimen may play a critical role in the remedy of various kidney diseases. Medicinal plants have been known from time immemorial and are highly known all over the world as a rich source of therapeutic agents for the prevention of various ailments. Today a large number of people suffer from various kidney ailments like stone, urinary calculi and other related diseases like Urinary calculi, Urinary tract stone, Renal Calculi, Nephrolithiasis, Ureterolithiasis and Urolithiasis. In the present article, an attempt has been made to emphasis on kidney stones that can be treated from the Medicinal plants obtained from the state of West Bengal.

Keyword: Medicinal plants, kidney, kidney stones, diseases.

1. INTRODUCTION

Nature has blessed our country with a huge wealth of Medicinal plants. Plants have been used in traditional healthcare system from the centuries immemorial. The WHO has listed 20000 medicinal plants throughout the world in which contribution of India is 15-20%.¹ In the

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last few years more than 13000 plants have been studied for the various diseases and ailments they may cure. Kidney ailments are also major disorders prevailing all over the world. The excessive usage of synthetic drugs, results in higher incidence of adverse drug effects, so these facts have motivated humans to return to natural resources for safe remedies. According to many, the World Health Organization's Canberra conference held in 1976 is responsible for the promotion of the concept of 'Traditional' medicines for the developing countries. The indigenous systems of medicines, under practice in India for centuries, make use of many Medicinal herbs in namely Ayurveda, Siddha, Unani, and many other indigenous systems. India is world's 12th mega diversity centres with 47,000 plant species and is divided into 20 agro-eco zones.² There are many important plant resources, which provide various kinds of drugs and medicines for various ailments in our country. It is estimated that 80 per cent of the population of developing countries relies on traditional plant based medicines for their health requirements as per WHO, thus these have become acceptable medicines for many reasons that include easy availability, lesser side effects, low prices, environmental friendliness and long term curative property. As long as the natural resources present in the earth is available to scientific inquiry, this tradition of medicinal plant exploration is likely to continue for centuries to come.³ The present review article deals with some plants from the state of West Bengal that is used to treat kidney stones. Many modern methods are available to treat kidney stones ranging from medicines to surgical techniques; allopathic medicines are costly so the best alternative is medicinal plants. A kidney stone is a solid substance occurring in the kidney when materials that are usually found in the urine become highly concentrated. It may stay in the kidney or travel down the urinary tract. These stones vary in size. It is a

very painful condition. Small stones may pass on its own, causing little or no pain where as a larger stone may get struck up along the urinary tract and can block the flow of urine, causing severe pain or bleeding. Kidney stones are one of the most common disorders of the urinary tract. The stones are composed of calcium oxalate and phosphorus. On the basis of their location, kidney stones are known as Urinary calculi (Mineral deposits that can form a blockage in the urinary system. Urinary calculi are the solid particles in the Urinary System which may cause pain, nausea, vomiting, hematuria and causes chills and fever due to secondary infection), Urinary tract stone, renal calculi (commonly it is caused of blood in the urine, which causes pain in the abdomen, flank or groin. Renal calculi is formed due to the supersaturated of urine with salt and minerals such as calcium oxalate, ammonium magnesium phosphate, uric acid and cysteine. Men are more commonly affected than women.), Nephrolithiasis (It is a condition in which hard masses form within the urinary tract. These stones form crystals that separate out of the urine. It occurs when the urinary concentration of crystal forming substances is high or the substance that inhibits the stone formation e.g. citrate is low), Ureterolithiasis (It is caused by the formation or presence of calculus or calculi in one or both ureters) and Urolithiasis (It is the formation of urinary calculi which are calculi formed or located anywhere in the urinary system). Kidney stone are known as renal calculi and also sometimes as urinary calculi. They are aggregates of crystals formed in the kidneys. Kidney stones normally leave the body via urine stream, and many stones are formed without causing symptoms. Stones of the order of at least 2-3 millimetres can cause barrier of the ureter. It is basically a hard mass developed from crystals separating out from the urine within the urinary tract. Generally, urine contains chemicals that prevent or

inhibit the crystals from the urinary tract. Since the crystals are tiny enough to travel through the urinary tract and pass out of the body through urine unnoticed. Quite often a stone is caused by infection in the urinary tract known as struvite or infection stone. Another type of stone is uric acid stones, are a bit less common, and cysteine stones which are rare. Kidney stones are composed of inorganic and organic crystals mixed with proteins. Crystallization and subsequent lithogenesis takes place with many solutes in the urine. Calcareous stones are the most common nephritis. Then there is Urinary calculi, composed of hard mineral masses lodged anywhere in the urinary tract. The urinary tract consists of organs which filter blood to remove urine that is excreted from the body i.e. kidneys, ureter, bladder and urethra. The stones initially develop in the kidney travel to other parts of the urinary tract where they may become trapped in smaller tubes e.g. bladder stones, ureteric stones and kidney stones. Calcium oxalate kidney stones are the most common type of kidney stones. Oxalate is naturally found in many foods, including fruits (grapes, guava, strawberries and tangerines), legumes, beans, beets, green peppers, spinach, brinjal, tomato, peanuts, peanut oils, nuts, seeds, grains, wheat brans, cocoa, chocolate and even tea, salts, lots of meat, soft drinks, milk. Some examples of foods that contain high amounts of oxalate include peanuts, rhubarb, spinach, beets, sweet potatoes and chocolate. These foods must be avoided. Timely treatment of kidney stones can prevent severe complications such as kidney failure. Though treatment of kidney stone is revolutionized by the development of non-invasive methods of stone disruption but the patients many a times prefer non-surgical procedures in the absence of suitable medical therapy for such stone disorders, it is important to search for some new or less known medicinal plants. The State of West Bengal is

on the eastern side of India, stretching from the Himalayas in the north to the Bay of Bengal.

2. EXPERIMENTAL

Extensive field work was carried out for the process of collection and identification in which different district of the state of West Bengal was visited for survey work which was based on the total area of all the blocks south. The state has a total area of 88,752 square kilometers. ⁴ It lies between 23° 00' N latitude to 87° 00' E longitude. West Bengal's climate varies from tropical savanna in the southern portions to humid subtropical in the north. The southern part of West Bengal can be divided into two regions: The Gangetic plain and the littoral Mangrove forests of the Sundarban. The vegetation of the western part of the state has similarities with the plants of the Chota Nagpur plateau in the adjoining state of Jharkhand with respect to floristic characters. ⁵ The distribution of vegetation in northern part of West Bengal for example, the foothills of the Himalayas, the Dooars, are densely wooded with Sal and other tropical evergreen trees. However, above an elevation of 1,000 meters, the forest becomes predominantly subtropical. In Darjeeling, which is above 1,500 meters (4,900 ft), temperate-forest trees such as Oaks, Conifers, and Rhododendrons predominate. ⁶ Occurring under each district and the various plant specimens were thus collected and recorded. Tribal people along with local Vaidyas, Hakims, and Shamans were consulted regarding the commonly used medicinal plants. As a confirmation to the uses of these medicinal plants the earlier published literatures of Gupta and Chadha(1995), Mukherji (2000), Prakash and Singh (2001), Choudhary *et al* (2008), Gomes *et al*(2010) and Kumar and Nautiyal (2013), were consulted. Spot identification was carried out for the species which were easily identifiable and growing in the area. The plant species which were not identified

were collected and identified with Herbarium from the Central National Herbariums Type Section of BSI, Shibpur, Howrah, and West Bengal. A documented Central national Herbarium of the species collected was prepared for further research work; these were then marked and preserved in West Bengal State Council of Science and Technology, Bikash-Bhavan.

3. RESULTS AND DISCUSSION

In the present study, 48 species of Medicinal plants have been identified which are directly used by the local people .It consists of, 1 species each from Zingiberaceae, Bromeliaceae, Oxalidaceae, Sapindaceae, Arecaceae, Dioscoraceae, Papilionaceae, Moraceae, Asclepiadaceae, Violaceae, Acanthaceae, Apocynaceae, Convolvulaceae, Rubiaceae, Moringaceae, Scrophulariaceae, Solanaceae, Gentianaceae, Combretaceae, Zygophyllaceae, Typhaceae; 2 species each from Asteraceae, Euphorbiaceae, Basellaceae, Crassulaceae, Cucurbitaceae, Loranthaceae; 3 species from Rutaceae and Fabaceae; 4 species from Poaceae and 5 species from Amaranthaceae. Apart from using these plants they have also detailed knowledge about the availability and local distribution of these plants. All the 48 species of recorded Medicinal plants are presented above in Table 1 along with the family they belong to, their local names, and parts utilized. From the collected data, it is obvious that West Bengal has a rich source of Medicinal and Aromatic plants of which many are utilized for treating kidney stones. In majority of cases, they used leaves and bark of different species, roots, stems, and whole plant parts. A lot of the vital information about these Medicinal and Aromatic plants were also obtained from the local as well as tribal people including local Vaidyas, Shamans and Hakims etc. Further we see that the plants like *Bridelia retusa* (L.) Spr. From Euphorbiaceae,

Cardiospermum halicacabum L. from Sapindaceae, *Erythrina variegata* L. from the family Papilionaceae, *Hybanthus enneaspermus* (L.) Muell from the family of Violaceae, *Morinda citrifolia* L. belonging to Rubiaceae, *Premna latifolia* Roxb. From the family of Poaceae, *Swertia bimaculata* (Sieb. and Zucc.) Hook.f. & Thoms. ex Clarke from the family of Gentianaceae, *Terminalia chebula* (Gaertn.) Retz. from the family of Combretaceae, *Loranthus falcatus* L.f. from the family of Loranthaceae, *Tribulus terrestris* L. from the family Zygophyllaceae are very sparse but *Swertia bimaculata* (Sieb. and Zucc.) Hook.f. & Thoms. ex Clarke from the family of Gentianaceae is threatened. The need of the hour is to protect the above mentioned species of plants from extinction and preserve them for futuristic use both as medicine and to balance the biodiversity and ecosystem. Since these 9 species pictured below can be preserved by tissue culture , micropropagation techniques, gene banking amongst others.



Fig 1: *Erythrina variegata* L.



Fig 2: *Bridelia retusa* (L.) Spr.



Fig 3: *Cardiospermum halicacabum L.*



Fig 7: *Terminalia chebula Retz.*



Fig 4: *Hybanthus enneaspermus (L.) Muell.*



Fig 8: *Tribulus terrestris L.*



Fig 5: *Morinda citrifolia L.*



Fig 9: *Loranthus falcatus L.f.*



Fig 6: *Swertia bimaculata (Sieb. and Zucc.) Hook.f. & Thoms. ex Clarke*



Fig 10: *Premna latifolia Roxb*

4. CONCLUSION

The traditional knowledge system in India is fast disappearing. So there is an urgent need for identifying and recording all ethnobotanical data's and information among the diverse ethnic communities in the country. ⁷

There are many traditional systems of medicine in the world, each with their own philosophies and origin like Tibetan traditional medicine, which are practiced locally in their country of origin; whereas others like Ayurvedic and Chinese traditional medicines are increasingly used in many different areas of the world. World Health Organization has shown great interest in documenting the use of medicinal plants from the tribals residing in various parts of the world. Many developing countries have started increasing their activities with respect to the documentation of the ethnomedical data along with a significant increase in scientific research regarding medicinal plants. Once these local ethnomedical preparations are evaluated in the proper scientific manner and validated can be utilized for the benefit of mankind. It is thus our duty to establish, cultivate and culture these eco-friendly medicinal plants for the removal of human suffering and miseries from kidney diseases.⁸ As evident from the above discussion, nature is the best answer to the question for a solution to all diseases for mankind. Medicinal plants play a vital role in kidney diseases. The adverse effect of the modern medicine has already diverted the attention of the people towards medicines obtained from natural resources. If properly validated, their use to treat various kidney diseases can significantly gain acceptability and awareness among the people. Health care systems are becoming more and more expensive; therefore we have to introduce herbal medicine systems in our health care. Thus, it becomes quite obvious from the above ethnobotanical studies that tribal knowledge regarding medicinal plants is important not just for the tribal people but also for the entire human race.

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Table 1: Medicinal plants from West Bengal used to treat kidney stones

SI No	Name	Family	Local name	Parts used	Disease used for
1.	<i>Aerva javanica</i> (L.) Juss. Ex Schult	Amaranthaceae	albishalyakaran i	Seed heads	Kidney stones
2.	<i>Aerva lanata</i> (L.) Juss. Ex Schult	Amaranthaceae	Chaya	Leaves	Kidney stones
3.	<i>Ageratum conyzoides</i> L.	Asteraceae	Uchanti/ Dochunty	Root juice	Anti-lithiatic, renal calculi
4.	<i>Amaranthus caudatus</i> (L.)	Amaranthaceae	Ramdana	Leaves	Removes kidney stones
5.	<i>Amaranthus viridis</i> L.	Amaranthaceae	Bon notey	Whole plant	Cures kidney stones
6.	<i>Amomum subulatum</i> Roxb.	Zingiberaceae	Alaichi	Seeds	Along with seeds of nelon used to remove kidney stones
7.	<i>Ananas comosus</i> (L.) Merr	Bromeliaceae	Anaras	Ripe fruits	Removes renal calculi
8.	<i>Arachis hypogaea</i> L.	Fabaceae	Chinebadam	Seeds	Removes kidney stones
9.	<i>Baliospermum montanum</i> Willd.)Muell.-Arg	Euphorbiaceae	Dantigaacha/danti	Roots, leaves, seeds	Removes kidney stones
10.	<i>Basella alba</i> L.	Basellaceae	Puin sak (Sada)	Whole plant	Cures kidney stones
11.	<i>Basella rubra</i> L.	Basellaceae	Puin sak (Lal)	Whole plant	Used against kidney stones
12.	<i>Biophytum ensitivum</i> (L.) DC.	Oxalidaceae	Jhalai	Whole plant	Decoctions used against lithiasis
13.	<i>Bridelia retusa</i> Spr.	Euphorbiaceae	Gayo	Leaf	Used against kidney stone formation
14.	<i>Bryophyllum pinnatum</i> (Lamk.) Oken	Crassulaceae	Patharkuchi	Whole plant	Removes kidney stones
15.	<i>Cardiospermum halicacabum</i> L.	Sapindaceae	Shibjhul/ Lataphatki	Root	Used against kidney stones
16.	<i>Celosia cristata</i> L.	Amaranthaceae	Moragful	Seeds	Used to renal stones
17.	<i>Citrus aurantifolia</i> Swingle	Rutaceae	Kaghzilebu,	Fruits	Used against urinary stones
18.	<i>Citrus medica</i> L.	Rutaceae	Baranimbu	Fruit	Used against renal
19.	<i>Cocos nucifera</i> L.	Arecaceae	Narkel	flowers	Removes kidney stones
20.	<i>Cucumis sativus</i> L.	Cucurbitaceae	Sosha, Khira	Seeds	Treats renal calculi
21.	<i>Cucurbita pepo</i> L.	Cucurbitaceae	Kumra.	Leaves, fruits	renal stone

22.	<i>Dendrophthoe alcata</i> (L.f.) Etting	Loranthaceae	Baramanda	& seeds Bark & Leaves	prevention Treats renal calculi Used against urinary calculi	45. <i>Terminalia chebula</i> Retz. & Willd.	Combretaceae	Haritaki	Fruit	Used to removes renal stones
23.	<i>Nioscorea bulbifera</i> L.	Dioscoreaceae	Kham alu	Rhizomes	Used against renal calculi	46. <i>Tribulus terrestris</i> L.	Zygophyllaceae	Gokshure	roots & fruits	Used against renal calculi
24.	<i>Lolichos biflorus</i> L.	Fabaceae	Gahat	Seeds	Used against kidney stones	47. <i>Trigonella foenum- graecum</i> L.	Fabaceae	Methi	Seeds	Removes kidney stones
25.	<i>Eclipta alba</i> Hassk.	Asteraceae	Kesuti	Whole plant	Used against kidney stones	48. <i>Typha elephantina</i> Roxb.	Typhaceae	Hogla	Rhizomes	Used against renal stones
26.	<i>Eleusine indica</i> Gaertn	Poaceae	Katli ghash	Seeds	Treats renal calculi	6. REFERENCES				
27.	<i>Erythrina variegata</i> L.	Papilionaceae	Madar	Barks & Roots	Used to dissolve kidney stones	1. Gupta R. and Chadha K.L. Medicinal and aromatic plants in India. In: Gupta, R. & Chadha, K.L. editors. Advances in horticulture: medicinal and aromatic plants. New Delhi: Malhotra Publishing House; 1995, pp. 44.				
28.	<i>Ficus racemosa</i> L.	Moraceae	jogyadumur/ Pipal	Stem barks	Used against kidney stones	2. Prakash A. and Singh K.K. 2001. Observation on some threatened plants and their conservation in Rajaji National Park, Uttaranchal. India. J Econ Tax Bot 2001; 25 (2): 363-366.				
29.	<i>Hemidesmus indicus</i> (L.) Schult.	Asclepiadaceae	Anantamul	Roots	Used to treat kidney stones	3. Kumar, N. and Nautiyal, S. 2013. An Inventory of Medicinal Wealth of Jhil-Mil Jheel Conservation Reserve. Int J Herb Med. 2013; 1 (2): 1-8.				
30.	<i>Hybanthus emeaspermus</i> (L.) Muell	Violaceae	Nunbora	Whole plant, roots	Given against renal calculi	4. Registrar Genera & Census Commissioner, India. Retrieved 26 January 2012. Area, population, decennial growth rate and density for 2001 and 2011 at a glance for West Bengal and the districts: provisional population total paper 1 of 2011: West Bengal".				
31.	<i>Hygrophila schulli</i> (Buch. Ham.) M. Ret. et. S.M.Almeida	Acanthaceae	Kulekhara	Roots, seeds	Dissolves kidney stones	5. Mukherji, S.J. College Botany Vol. III: (chapter on Phytogeography). Calcutta: New Central Book Agency. 2000; 345-365.				
32.	<i>Ichnocarpus rutescens</i> (L.) R.Br	Apocynaceae	Antamul, Dudhilata	Roots	Given against renal calculi	6. "Natural vegetation". West Bengal. Suni System (P) Ltd. Retrieved 31 October 2006.				
33.	<i>Imperata cylindrica</i> (L.) Raeusch	Poaceae	Siru	Fresh roots	Treats kidney stones	7. Choudhary K., Singh M. and Pillai U. Ethnobotanical Survey of Rajasthan - An Update. Am-Eu J of Bot 2008; 1 (2): 38-45.				
34.	<i>Ipomoea batatas</i> (L.) Lamk.	Convolvulaceae	Misti alu, Sakarkand alu	Tubers	Given against renal calculi	8. Gomes A, Das R., Sarkhel S., Mishra R., Mukherjee S., Bhattacharya S. and Gomes A. Herbal and Herbal constituents active against snake bite. Ind J of Exp Bio 2010; 48: 865-878.				
35.	<i>Kalanchoe pinnata</i> (Lamk.) Pers.	Crassulaceae	Patharkuchi	Leaves	Extracts are used to dissolve kidney stones					
36.	<i>Loranthus falcatus</i> L.f.	Loranthaceae	Baramanda	Barks & Leaves	Removes renal calculi					
37.	<i>Morinda citrifolia</i> L.	Rubiaceae	Ai, Ach, surang, bartundi	Roots, leaves, fruits	Treats renal stones					
38.	<i>Moringa oleifera</i> Lamk.	Moringaceae	Sajna	Roots	Removes renal calculi					
39.	<i>Murraya koenigii</i> (L.) Spr.	Rutaceae	Katneem, curry patta	Leaves	Removes kidney stones					
40.	<i>Premna latifolia</i> Roxb.	Poaceae	Kash	Roots	Used to treat renal calculi					
41.	<i>Saccharum spontaneum</i> L.	Poaceae	Kash	Roots	Removes renal calculi					
42.	<i>Scoparia dulcis</i> L.	Microphulariaceae	Mithapata	Whole plant	Used against kidney stones					
43.	<i>Solanum surattense</i> (Burm.) F.	Solanaceae	Kantikari	Whole plant/ leaf	Removes kidney stones					
44.	<i>Swertia bimaculata</i> Sieb. and Zucc.	Gentianaceae	Bhale chirowto	Whole plant	Removes urinary calculi					

Conflict of Interest

There is no conflict of interest regarding the paper between the authors.