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## Medicinal plants as potent diuretic: A review

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### REVIEW ARTICLE

### ABSTRACT

Medicinal plants have been in use as sources of medicine throughout the world. In fact, several these are now can be important chemical substances with potential therapeutic effects have been discovered. The demand for plant-based medicines is ever growing day by day as they crude or processed products from plants have less or no adverse effects. Herbal medicines as the major remedy in traditional system of medicine have been used in medical practices since antiquity. Herbal medicines possess large number of plant derived chemical entities, products and active substances which have been proved highly effective and efficacious in vast number of diseases. So many researchers have been done with refer to the diuretic properties of several important medicinal plants, in the present review potential medicinal plants used as diuretic for different associated ailments in experimental and clinical studies will be covered.

**Keywords:** Diuretic, Medicinal Plants.

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## INTRODUCTION

Medicinal plants can be important sources of unknown chemical substances with potential therapeutic effects. Besides, the World Health Organization has estimated that over 75% of the world's population still relies on plant-derived medicines, usually obtained from traditional healers, for basic health-care needs (Farnsworth et al., 1985).

Herbal medicines are currently in demand and their popularity is increasing day by day. The use of herbal medicine is becoming popular due to toxicity and adverse effects of allopathic drugs. This led to sudden increase in the number of herbal drug manufactures (Verma and Singh, 2008).

Drug-induced diuresis is beneficial in many life-threatening disease conditions such as congestive heart failure, nephrotic syndrome, cirrhosis, renal failure, hypertension, and pregnancy toxemia (Agunu et al., 2005).

Diuretics play an important role in situations of fluid overload, like acute and chronic renal failure, hypercalciuria, cirrhosis of liver, and also as an

antihypertensive agent. Diuretics relieve pulmonary congestion and peripheral edema. These agents are useful in reducing the syndrome of volume overload, including orthopnea and paroxysmal nocturnal dyspnoea. They decrease plasma volume and subsequently venous return to the heart (preload). This decreases cardiac workload, oxygen demand and plasma volume, thus decreasing blood pressure (Hoeland et al., 2000).

One of the earliest strategies for the management of hypertension was to alter Na + balance by restriction of salt in the diet. Recent studies suggested a complex set of interrelationships exists among the cardiovascular system, the kidneys, the central nervous system (Na<sup>+</sup>, appetite, thirst regulation) and the tissue capillary beds (distribution of extracellular fluid volume), so that perturbation at one of these sites can affect all the remaining sites. A primary law of the kidneys is that Na + excretion is a steep function of mean arterial blood pressure (MABP) such that small increase in MABP cause marked increase in Na + excretion (Guyton, 1991).

Further, Diuretic agents having antihypertensive effects were used alone and had greater efficacy than all other

antihypertensive drugs (Meera et al., 2009). Thus, diuretics play an important role in hypertensive patients.

A number of diuretics like mannitol, thiazides, furosemide, and ethacrinic acid are used in practice (Singh et al., 1991). Most diuretic drugs have the adverse effect on quality of life including impotence, fatigue, and weakness.

Still there is a need for more effective and less toxic diuretic. Many indigenous drugs have been claimed to

have diuretic effect in traditional medicine but they were not properly investigated. Naturally occurring diuretics include caffeine in coffee, tea, and cola, which inhibit Na<sup>+</sup> reabsorption and alcohol in beer, wine and mixed drinks, which inhibit secretion of ADH (Agus and Goldberg, 1971; Stookey, 1999). Several plant derived chemical entities have proved to be more efficacious and safe. Following is the list of different experimental and clinical studies in the same which will be beneficial for further studies and trials.

#### Plant diuretics

S. No.	Plant	Plant Part used	Extract studied	Model	References
1	<i>Abutilon indicum</i>	Seed	Aqueous	Rat	Balamurugan et al. (2010)
2	<i>Achyranthes aspera</i>	Seed	Aqueous	Goat	Jahan et al. (2002)
3	<i>Anethum graveolens</i>	Fruit	Ethanolic	Dog	Maharan et al. (1991)
4	<i>Anogiessus latifolia</i>	Leaves	Aqueous & Methanolic	Rat	Hemamalini et al. (2011)
5	<i>Artemisia thuscula</i>	-	Infusion	Rat	Benjumea et al. (2005)
6	<i>Barleria prionitis</i>	Flower	Aqueous	Rat	Musale et al. (2011)
7	<i>Benincasa hispida</i>	Pericarp (Fruit Rind)	Chloroform	Guinea-pig	Jayasree et al. (2011)
8	<i>Benincasa hispida</i>	Pericarp (Fruit Rind)	Chloroform	Rat	Jayasree et al. (2011)
9	<i>Bidens odorata</i>	Aerial part	Aqueous	Rat	Camargo et al. (2004)
10	<i>Boerhaavia verticillata</i>	-	Ethanol & aqueous	Rat	Bajpai and Ojha (2000)
11	<i>Camellia sinensis</i>	Immature Leaves & Buds	Black Tea	Rat	Ratnasooriya et al. (2009)
12	<i>Capparis divaricata</i>	Leaves	Ethanolic	Rat	Kondawar et al. (2011)
13	<i>Carica papaya</i>	Fruit	Methanolic	Rat	Hemamalini and Varma (2007)
14	<i>Carissa edulis</i>	Root bark, Root wood	Aqueous	Rat	Nedi et al. (2004)
15	<i>Carthamus tinctorius</i>	Seed	Ethanolic	Rat	Wasim et al. (2011)
16	<i>Cassythia filiformis</i>	Aerial parts	Aqueous & Alcoholic	Rat	Sharma et al. (2009)
17	<i>Centratherum anthelminticum</i>	Seed	Alcoholic & chloroform	Rat	Koti and Purnima (2008)
18	<i>Cerasus avium</i>	Fruit Stalks	Powder in Capsule	Human	Hooman et al. (2009)
19	<i>Cichorium intybus</i>	Seed	Ethanolic	Rat	Wasim et al. (2013)
20	<i>Cleome rutidosperma</i>	Whole Plant	Aqueous	Rat	Bose et al. (2007)

21	<i>Clerodendron viscosum</i>	Aerial parts	Methanolic	Mice	Khatry et al. (2005)
22	<i>Coriandrum sativum</i>	Fruit	Crude extract	Rat	Jabeen et al. (2009)
23	<i>Coriandrum sativum</i>	Seed	Aqueous	Rat	Aissaoui et al. (2008)
24	<i>Costus pictus</i>	Aerial parts	Aqueous	Rat	Meléndez-Camargo et al. (2006)
25	<i>Cuscuta reflexa</i>	Aerial parts	Aqueous & Alcoholic	Rat	Sharma et al. (2009)
26	<i>Cynodon dactylon</i>	Rhizome	Aqueous	Rat	Sadki et al. (2010)
27	<i>Cynodon dactylon</i>	Root stalk	Aqueous	Rat	Gowda et al. (2009)
28	<i>Daucus carota</i>	Fruit	Ethanollic	Dog	Maharan et al. (1991)
29	<i>Diospyros melonoxylon</i>	Leaves	Aqueous & Chloroform	Rat	Devi et al. (2010)
30	<i>Elettaria cardamomum</i>	Fruit	Cardamom crude extract	Rat	Gilani et al. (2008)
31	<i>Erica multiflora</i>	Flower	Aqueous	Rat	Sadki et al. (2010)
32	<i>Eruca sativa</i>	Seeds	Ethanollic	Dog	Maharan et al. (1991)
33	<i>Erythrina indica</i>	Leaves	Ethanollic, Chloroform & Ethyl acetate	-	Jesupillai et al. (2008)
34	<i>Erythrina indica</i>	Root & bark	Aqueous & Methanollic	Rat	Patil et al. (2011)
35	<i>Euphorbia thymifolia</i>	Whole Plant	Ethanol	Rat	Kane et al. (2009)
36	<i>Gmelina arborea</i>	Whole Plant	Methanollic	Rat	Sravani et al. (2011)
37	<i>Helicanthus elastica</i>	Whole plant	Methanollic	Rat	Jadhav et al. (2010)
38	<i>Hygrophila auriculata</i>	Whole Plant	Alcoholic	Rat	Hussain et al. (2009)
39	<i>Lagenaria siceraria</i>	Fruit	Dried fruit juice, Methanollic	Rat	Ghule et al. (2007)
40	<i>Lepidium sativum</i>	Seed	Aqueous & Ethanollic	Rat	Patel et al. (2009)
41	<i>Mangifera indica</i>	Bark	Aqueous, Ethyl acetate, Alcoholic	Rat	Shree Devi (2011)
42	<i>Mimosa pudica</i>	Leaves	Aqueous	Rat	Sangma et al. (2010)
43	<i>Mimusops elengi</i>	Bark	Alcoholic	Rat	Koti and Ashok (2010)
44	<i>Mimusops elengi</i>	Bark	Ethyl acetate, Ethanollic & Aqueous	Rat	Katedeshmukh et al. (2010)
45	<i>Morinda citrifolia</i>	Fruit	Juice	Rat	Shenoy et al. (2011)
46	<i>Nicandra physalodes</i>	Leaves	Aqueous & alcoholic	Rat	Devi et al. (2010)
47	<i>Nyctanthes arbotristis</i>	Flower	Infusion	Rat	Ratnasooriya and Jayakody (2005)
48	<i>Opuntia ficusindica</i>	Prickly pear fruit	Aqueous	Rat	Bisson et al. (2010)

49	<i>Orthosiphon stamineus</i>	Leaves	Methanolic	Rat	Arafat et al. (2008)
50	<i>Oxystelma esculentum</i>	Whole plant	Aqueous, Pet. ether, Chloroform & Methanolic	Rat	Devang and Indermeet (2011)
51	<i>Palicourea coriacea</i>	-	Ethanolic	Rat	Freitas et al. (2011)
52	<i>Pavetta indica</i>	Leaves	Petroleum ether & Methanolic	Rat	Ramamoorthy et al. (2010)
53	<i>Phyllanthus fraternus</i>	Arial parts	Methanol	Rat	Kalyani et al. (2010)
54	<i>Physalis alkekengi</i>	Fruit	Ethanolic	Rat	Ghufran et al. (2013)
55	<i>Pistia stratiotes</i>	Leaf	Chloroform & Methanolic	Rat	Pallavi et al. (2011)
56	<i>Platycladus orientalis</i>	Leaves	Aqueous & alcoholic	Rat	Ranju et al. (2011)
57	<i>Plectranthus amboinicus</i>	Leaves	Aqueous & Ethanolic	Rat	Patel et al. (2010)
58	<i>Plectranthus amboinicus</i>	Leaves	Ethanol	Rat	Palani et al. (2010)
59	<i>Polyporus umbellatus</i>	Fungus	<i>n</i> -Hexane & <i>n</i> -butanol	Rat	Zhao et al. (2009)
60	<i>Rubus idaeus</i>	Fruit	Methanolic	Rat	Zhang et al. (2011)
61	<i>Rumex abyssinicus</i>	Rhizome	Aqueous & Methanolic	Mice	Mekonnen et al. (2010)
62	<i>Rungia pectinata</i>	Leaves	Hydro alcoholic	Rat	Swain et al. (2008)
63	<i>Rungia repens</i>	Leaves	Hydro alcoholic	Rat	Swain et al. (2008)
64	<i>Smilax canariensis</i>	-	Infusion & Methanolic	Rat	Abdala et al. (2008)
65	<i>Spilanthus acmella</i>	Flower	Cold water	Rat	Ratnasooriya et al. (2004)
66	<i>Spilanthus acmella</i>	Leaves	Petroleum ether, Chloroform & Alcoholic	Rat	Yadav et al. (2011)
67	<i>Spondias pinnata</i>	Bark	Chloroform, Methanolic & Petroleum ether	Rat	Mondal et al. (2009)
68	<i>Steganotaenia araliacea</i>	Stem bark	Aqueous & Alcoholic	Rat	Agunu et al. (2005)
69	<i>Strychnos potatorum</i>	Seed	Methanolic	Rat	Biswas et al. (2001)
70	<i>Taraxacum officinale</i>	Fresh leaf	Hydro- Alcoholic	Human	Clare et al. (2009)
71	<i>Tectona grandis</i>	Leaves	Aqueous	Rat	Kore et al. (2011)
72	<i>Thespesia populnea</i>	Bark	Aqueous, Ethanolic, Chloroform, & Ethyl acetate	Rat	Parthasarathy et al. (2010)
73	<i>Trianthema portulacastrum</i>	Leaves	Hydro alcoholic	Rat	Karim et al. (2011)

74	<i>Tropaeolum majus</i>	-	Hydro alcoholic & Infusion	Rat	Junior et al. (2009)
75	<i>Tylophora indica</i>	Leaves	Aqueous & Alcoholic	Rat	Meera et al. (2009)
76	<i>Viscum articulatum</i>	Whole plant	Methanolic	Rat	Jadhav et al. (2010)
77	<i>Withania aristata</i>	-	Infusion & Methanolic	Rat	Martín-Herrera et al. (2007)
78	<i>Withania coagulans</i>	Fruit	Aqueous	Rat	Dabheliya et al. (2010)
79	<i>Wrightia tinctoria</i>	Leaves	Aqueous & Alcoholic	Rat	Sathianarayanan et al. (2011)

## CONCLUSION

Diuretics are used to treat a number of cardiovascular and renal related disorders. Allopathic medicines do not have a safe role in this regard. Many indigenous drugs have been claimed to have diuretic effect in traditional medicine but they were not properly investigated. Naturally occurring diuretics are more safe and efficacious. Several plant derived chemical entities have proved to be more efficacious and safe. It remains for the modern scientists to give scientific validation for the herbs claimed for therapeutic activity to make use of herbal potential in a more productive way. In the above review paper, validation of these herbs most of them have been mentioned in classical literature as diuretic, and further, they are economically feasible, safe and efficacious and will be beneficial for further studies and clinical trials.

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