



A REVIEW ON HERBAL PLANTS USED AS DIURETICS

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ABSTRACT: Diuretics are defined as any substance that increases urine flow and thereby water excretion. In today's sedentary lifestyle a number of health difficulties are faced which include heart failure, high blood pressure, liver disease and some types of kidney diseases etc. Diuretics are prescribed to treat these health problems. Herbs have been a highly esteemed source of medicines since ancient history. Plants and phytoconstituents are a rich source of active principles which acts as lead compounds for the synthesis of newer drugs. Researchers are contributing their work by finding new entities for new diseases emerging in the world. But when side effects are concerned, they cannot be reduced but they can be controlled with

traditional herbal medicine. Some of the plants which have been used since ages as diuretic agents are *Foeniculum vulgare*, *Cocculus hirsutus*, *Hibiscus sabdariffa*, *Lepidium sativum*, *Cichorium intybus*, *Phyllanthus sellowiansus*. This review article is based on the various herbal plants used traditionally as diuretics and the chemical constituents of the plant promoting diuresis.

Keywords: Diuretics, Herbal Medicine, Alkaloids, Flavonoids, Saponins, Extract.

INTRODUCTION

Herbal drugs have gained importance and popularity in recent years because of their safety, efficacy and cost effectiveness. The Traditional Medicine like Ayurvedic, Siddha and Unani are based on the use of plant materials. The association of medical plants with other plants in their habitat also influences their medicinal values in some cases. One of the important and well documented uses of plant product is their uses as Diuretic agents [1, 2]. Diuretic is defined as any substance that increases urine flow and thereby water excretion. Diuretics are among the most commonly used drugs and the majority act by reducing sodium chloride reabsorption at different sites in the nephron [3, 4]. They reduce the volume of extracellular fluid, enhance the urinary excretion of sodium chloride and maintain adequate urinary volume in severe traumatic injuries or reduce the concentration of toxic agent in the urine to minimize renal damage [5].

Some herbal diuretics produce diuresis by inhibiting the release of ADH (anti diuretic hormone) or by inhibiting the action of ADH on the uriniferous tubules [6,7]. Diuresis in the body is regulated by ADH. ADH is secreted by neurohypophysis. Pulmonary veins regulate the rate of ADH release, which depends on body hydration [8]. According to the ayurvedic test, approximately 120 plants have diuretic property due to which natural medicines have recently gained importance and popularity [9].

USES OF DIURETICS

Natural diuretics are not effective as synthetic, they can be used for, lowering high blood pressure, edema, congestive heart failure and liver cirrhosis. These drugs can also be used for treating kidney disorders such as kidney stones. There are many natural herbs which increases sodium excretion and urination, thereby reducing water retention and lowering blood pressure. The efficacy and safety are more with herbals when compared to conventional diuretic drugs [10, 11].

HERBAL PLANTS HAVING DIURETIC PROPERTY

Allium sativum

Allium sativum, commonly known as garlic, belongs to the family Liliaceae and genus *Allium*. Plant part used: Whole plant. Garlic is used as carminative, expectorant and disinfectant in the treatment of pulmonary conditions. The purified garlic fractions bring about a suppressive dose dependent effect on sodium-potassium ATPase. Therefore, it may cause diuresis by increasing the volume of urine [12, 13].



Figure no 1 *Allium sativum*

Alangium salvifolium

Alangium salvifolium belonging to family Alangiaceae. Plant part used: roots. It is used in the treatment of inflammation, hemorrhage, an antidote for several poisons and also for its diuretic activity [14]. Studies have shown that presence of flavonoids, alkaloids, steroids justify its diuretic activity [15].



Figure no 2 *Alangium salvifolium*

Coriandrum sativum

Coriandrum sativum, also known as coriander belonging to family Umbelliferae. Plant part used: fruits. [16] It is traditionally used for its healing properties, hypertension, diuretic. It contains flavonoids, caffeic acid, lactones, coumarins and carotenoids. The presence of these constituents in the aqueous extract of coriander justifies its diuretic property [17, 18].



Figure no 3 *Coriandrum sativum*

Cocculus hirsutus

Cocculus hirsutus belonging to family Menispermaceae. Plant part used: roots. It is reported from India, Myanmar, Nepal and Pakistan. The aqueous extract of aerial parts of the plant showed significant diuretic activity [19].



Figure no 4 *Cocculus hirsutus*

Foeniculum vulgare

Foeniculum vulgare, also known as fennel belonging to family Umbelliferae. It is used as diuretic, stimulant, digestant. Phytochemical screening of the extract showed the presence of flavonoids, sterols, coumarins and volatile oils [20].



Figure no 5 *Foeniculum vulgare*

Glycyrrhiza glabra

Glycyrrhiza glabra, also known as liquorice belonging to family Fabaceae. Plant part used: roots. The primary active ingredient, Glycyrrhizin constitutes of 10-25% of liquorice root extract.. It is used as an antioxidant, anti-fungal, anti -bacterial, anti -malarial, anti- viral and also as a diuretic [21].



Figure no 6 *Glycyrrhiza glabra*

Lepidium sativum

Lepidium sativum, also known as garden cress belonging to family Brassicaceae. Plant part used: leaves. The main constituents are flavonoids, coumarins, glycosides, sterols and alkaloids. The aqueous and methanolic extracts of the plant increases the sodium excretion whereas the excretion of potassium is increased by aqueous extract only [22].



Figure no 7 *Lepidium sativum*

Mangifera indica

Mangifera indica, a species of mango belonging to family Anacardiaceae. It is found in the wild in India and cultivated varieties have been introduced to other warm regions of the world. Diuretic activity in rats was studied using ethyl acetate, ethanol and water extract. The aqueous extracts show best diuretic effect when compared to other extracts [23].

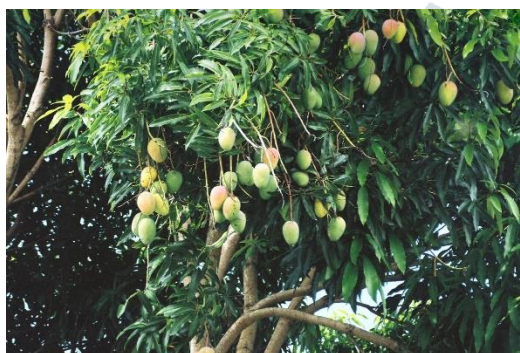


Figure no 8 *Mangifera indica*

Mimosa pudica

Mimosa pudica, also known as sensitive plant, sleeping plant belonging to family Mimosaceae. Plant part used: roots. The species is native to South America and Central America. The plant is used as diuretic, anti-allergic, antiparasitic, analgesic, antipyretic [24]. The diuretic activity of ethanolic root extract of *Mimosa pudica* in albino rats was evaluated [25]. The diuretic activity of different extracts was evaluated by using Lipschitz test [26].



Figure no 9 *Mimosa pudica*

Pongamia pinnata

Pongamia pinnata is a medium sized evergreen tree belonging to family Fabaceae. Plant part used: leaves. It is rich in flavonoids and furoflavones whose presence justifies its diuretic activity. Hence, its use as a diuretic in the folklore medicine is justified [27].



Figure no 10 *Pongamia pinnata*

Rosmarinus officinalis

Rosmarinus officinalis, also known as rosemary, belonging to family Labiatae. It is used as a folklore medicine in the treatment of urinary ailments. Its decoction is used as a traditional medicine in the treatment of urine retention as diuretic. It contains triterpenoids, volatile oil, caffeic acids, rosmarinic acids, chlorogenic acids. As triterpenoid and rosmarinic acids are associated with diuretic activity, presence of these compounds justifies it as a diuretic [28].



Figure no 11 *Rosmarinus officinalis*

Taraxacum officinale

Taraxacum officinale, commonly known as dandelion, belonging to family Asteraceae. Plant part used: whole plant. Its leaves have been used for hundreds of years to treat liver, gallbladder, kidney and joint problems. In experimental research on mice, high amounts of an aqueous extract have been shown to have diuretic activity [29].



Figure no 12 *Taraxacum officinale*

Fumaria officinalis

Fumaria officinalis is a plant belonging to family Papaveraceae. The phytochemical characteristics showed that the entire plant contains alkaloids, flavonoids, amino acids, saponins. It has been used widely for the treatment of skin diseases, hypertension, diuretic. [30]



Figure no 13 *Fumaria officinalis*

Origanum vulgare

Origanum vulgare is a plant belonging to family Lamiaceae. Plant part used seed. It has been used widely as anticonvulsant, expectorant, pain reliever, anticough, antidiarrhea, anti-inflammatory, diuretic, anti-urinary tract infection.[31].



Figure no 14 *Origanum vulgare*

Hypericum perforatum

Hypericum perforatum is a plant belonging to family Hypericaceae. Plant part used seed. It has been widely used as pain reliever, astringent, expectorant, diuretic.[32].



Figure no 15 *Hypericum perforatum*

Petroselinum crispum

Petroselinum crispum is a bright green plant belonging to family Apiaceae, cultivated in the tropic, sub-tropic and temperate regions. Plant part used roots it has been used as a powerful diuretic.[33].



Figure no 16 *Petroselinum crispum*

Hibiscus sabdariffa

Hibiscus sabdariffa is a plant belonging to family Malvaceae, commonly known as Roselle. It is said to have diuretic and antipyretic effects. The leaves showed diuretic, emollient, sedative and refrigerant. The flowers contain gossypetin, glycoside hibiscin and anthocyanin. These have diuretic effects, decreasing blood viscosity, reducing blood pressure.[34].



Figure no 17 *Hibiscus sabdariffa*

Brassica juncea

Brassica juncea is a plant belonging to family brassiaceae, commonly known as Mustard. Plant part used seed. It is widely used as Anticancer, anti-diabetic, diuretic, analgesic, emetic activity.[35].



Figure no 18 *Brassica juncea*

Cichorium intybus

Cichorium intybus is a worldwide grown plant belonging to family Asteraceae commonly known as chicory. In traditional medicine, this plant is used as diuretic, anti-inflammatory, digestive, cardiotoxic and liver tonic.[36].



Figure no 19 *Cichorium intybus*

Croton macrostachyus

Croton macrostachyus is a folk medicine belonging to family Euphorbiaceae. Traditionally used for treating a number of disorders, including oedematous conditions.[37].



Figure no 20 *Croton macrostachyus*

Phyllanthus sellowianus

Phyllanthus sellowianus is a plant belonging to the family Euphorbiaceae is used widely as a hypoglycaemic and diuretic agent in South American folk medicine.[38].



Figure no 21 *Phyllanthus sellowianus*

Gomphrena celosioides

Gomphrena celosioides belongs to the Amaranthaceae family It is used in the treatment of various skin diseases. In Brazil, it has been employed to treat infectious and renal diseases as well as respiratory and gastrointestinal disorders.[39].



Figure no 22 *Gomphrena celosioides*

Basella alba

Basella alba is a perennial plant of the Basellaceae and is known by various common names, including Malabar Spinach, Indian spinach. It is cultivated widely in many parts of the world. The leaves and stems are consumed as food and used in medicine. [40].



Figure no 23 *Basella alba*

Lagopsis supina

Lagopsis supina is a well-known traditional Chinese medicine belonging to family Lamiaceae and it has been used as an agent for diuresis in China for centuries. [41].



Figure no 24 *Lagopsis supina*

CONCLUSION

The present review provides the importance of herbal plants as diuretics. These Herbal plants are rich in useful phytoconstituents, which serves as medicinal drug for the treatment of hypertensive patients. Herbal medicines are in great demand in the developing countries because of their active medicinal activities, safety and efficacy. Herbal medicines have lesser side effects compared to conventional drugs. By this review, it can be concluded that there are plenty number of plants possessing diuretic activity. Thus, plants are the best natural sources with less adverse effects and better results and can be used as a diuretic.

REFERENCES

1. Chauhan C et al. Germination, emergence, and dormancy of *Mimosa pudica*. *Weed Biology and Management* 2009; 9(1): 38-45.
2. Barar FSK. Textbook of pharmacology. New Delhi: S Chand; 2002: 298.
3. Macpherson G, ed. Black's Medical Dictionary. (40th edn). London: A&C Black, 2002.
4. Glen R Hansen. Diuretic drugs: Remington's The science and practice of pharmacy (20th edn). Lippincott Williams and Wilkins: 1344-1353.
5. Daniel A Koechel. Diuretics: John H Block, John M Beale, Jr. Wilson and Griswold's textbook of Organic medicinal and pharmaceutical Chemistry. (11th edn), Lippincott Williams and Wilkin's; 2004: 596-619.
6. BNF 46, September 2003, British Medical Association, Royal Pharmaceutical Society of Great Britain: 66-69.
7. Rang H.P, Dale M.M, Ritter J.M. Pharmacology. (4th edn), Churchill Livingstone: 351-368.
8. Tripathi KD. Essentials of Medical Pharmacology. (5th edn), Jaypee Brothers Medical Publishers, New Delhi; 2005: 388-390.
9. Edwin KJ. Diuretics. Laurence L Bruton, John S Lazo, Keith L Parker, Goodman and Gilman's The pharmacological basis of therapeutics. (2nd edn). Mc Graw Hill Medical Publishing Division, 2000: 437-467.
10. Wright C J et al. Herbal medicines as diuretics, a review of the scientific evidence. *Journal of Ethnopharmacology*, 2007; 114(1):1-31.
11. M.H. Rosner, R. Gupta, D. Ellison, and M.D Okusa. Physiological basis of diuretic action. *European Journal of Internal Medicine*, 2006: 9-19.
12. Pantoja C V et al. Purification and bioassays of a diuretic and natriuretic fraction from garlic (*Allium sativum*). *Journal of Ethnopharmacology*, 2007; 70:35-40.
13. S. Tiwari, B. Sirohi, A. Shukla and P. Begonia. Phytochemical screening and diuretic activity of *Allium sativum* steroidal and triterpenoid saponin fraction, 2012; 3(9): 3354-3361.
14. Rajamanickam V, Rajasekharan A, Darliquine S, Jesupalli M, Sabitha R. Diuretic activity of *Alangium salvifolium*. *The Internet Journal of Alternative Medicine*, 2009; 8(1).
15. Kumar B, Vijayvergia R. Phytochemical evaluation and quantification of primary metabolites of *Alangium salvifolium*. *International Journal of Pharmaceutical Sciences*, 2010: 1-3.
16. Jabeen Q, Bashir S, Lyoissi B, Gilani A. *Coriander* fruit exhibits blood pressure lowering and diuretic activities. *Journal of Ethnopharmacology*, 2009; 122(1): 123-130.
17. Abderahim Aissouri, Jaoud El-Hilaly, Zafar H Israli, Bocdiaa Lyoussi. Acute diuretic effect of an aqueous extract of *Coriandrum sativum*. *Journal of Ethnopharmacology*, 2008; 115(1): 89-95.
18. Rassem HHA, Nour AH, Yumus RM. Techniques for extraction of essential oils from plants: A review. *Australian Journal of Basic and Applied Sciences*. 2016: 117-127.
19. De Wet, Struweg M, B.E. Taxonomic notes on the genus *Cocculus* in southern Africa. 2014: 99-104.
20. Somayeh Sadrefozalayi, Farah Farokhi. Effect of the aqueous extract of *Foeniculum vulgare* (fennel) on the kidney. *AJP* 2014: 110-117.
21. N Kayande, P Kushwah, Evaluation of diuretic activity of *Glycyrrhiza glabra*. *Pharma tutor*, 2014: 167-170.
22. Jabeen A, Rani S, Ibrahim M, Mohammad AS. A review on *Lepidium sativum*. *Indo Am J Pharm Sci* 2017; 4:2223-7
23. Shree Devi MS. Acute toxicity and diuretic activity of *Mangifera indica* bark extracts. *International Journal of Pharma and Bio sciences*, 2011; 2(3): 141-146.
24. Sangmai T K et al. Diuretic property of aqueous extract of leaves of *Mimosa pudica* on experimental animals. *Journal of Natural product*, 2010; 3:173-178.
25. Kalabharathi HI, Shruthi SL, Vaibhavi PS, Pushpa VH, Satish AM, Mohammad Sibghatullah. Diuretic activity of ethanolic root extract of *Mimosa pudica*. *Journal of Clinical and Diagnostic Research*, 2015: 9-12.
26. A Bagel, DS Rathore, V. Gupta. Evaluation of diuretic activity of different extracts of *Mimosa pudica*, 2013: 1223-1225.

27. Nagarantha PKM, Prabha T, Vikram BS. Diuretic activity of *Pongamia pinnata* leaf extracts. *Research Journal of Pharmacognosy and Phytochemistry*, 2009: 185-187.
28. Ram P Rastogi, Mehrotra BN. *Compendium of Indian Medicinal Plants*. Central Drug Research Institute: 731.
29. Blumenthal M, Goldberg A, Brinckmann J. *Herbal Medicine: Expanded Commission E Monographs*. Newton, MA: Integrative Medicine Communications, 2000: 78
30. Al-Snai AE Lemna minor: Traditional uses, chemical constituents and pharmacological effects- A review. *IOSR Journal of Pharmacy* 2019; 9(8): 6-11.
31. Bahmani, Mahmoud. and Khaksarian, Mojtaba. and Rafieian-Kopaei, Mahmoud. and Abbasi, Naser. (2018) Overview of the Therapeutic Effects of *Origanum vulgare* Based on Iran's Ethnopharmacological Documents. *Journal of Clinical and Diagnostic Research*, 12 (7).
32. Bahmani, Mahmoud. and Khaksarian, Mojtaba. and Rafieian-Kopaei, Mahmoud. and Abbasi, Naser. (2018) Overview of the Therapeutic Effects of *Hypericum perforatum* Based on Iran's Ethnopharmacological Documents. *Journal of Clinical and Diagnostic Research*, 12 (7).
33. Agyare, C., Appiah, T., Boakye, Y.D., Apenteng, J.A, Petroselinum crispum: A Review Medicinal Spices and Vegetables from Africa: Therapeutic Potential Against Metabolic, Inflammatory, Infectious and Systemic Diseases (2017): 527-547.
34. Islam MM. Food and Medicinal Values of Roselle (*Hibiscus sabdariffa* L. Linne Malvaceae) Plant Parts: A Review. *Open J Food Sci*. 2019; 1(1): 1003.
35. Kidwai M and MK. Effect of Mancozeb on Mustard (*Brassica juncea* L.): An In-vitro study. *Trop plant Res*. 4(1),2017, 55-61.
36. Fan H, Chen J, Lv H, Ao X, Wu Y, Ren B, Li W. 2017. Isolation and identification of terpenoids from chicory roots and their inhibitory activities ,243:1009–1017.
37. Alfred Maroyi, "Ethnopharmacological Uses, Phytochemistry, and Pharmacological Properties of *Croton macrostachyus* Hochst. Ex Delile: A Comprehensive Review", *Evidence-Based Complementary and Alternative Medicine*, vol. 2017, Article ID 1694671: 17.
38. Eloziia, N., Kumar, N., Kothiyal, P., Deka, P., & Nayak, B. K. (2017). A review on antidepressant plants. *Journal of Pharmacy Research*, 11(5), 382-96.
39. Newman DJ, Cragg GM. Natural products as sources of new drugs over the nearly four decades from 01/1981 to 09/2019. *J Nat Prod* 2020; 83: 770-803.
40. Divya, J., Anil Kumar, and Ravi Kumar. "Evaluation of diuretic and sedative activity for ethanolic leaves extract of *Basella alba* L. var *Rubra*." *World Journal of Current Medical and Pharmaceutical Research* (2020): 74-84.
41. Liu, Zhiyong, et al. "Diuretic and antidiuretic activities of ethanol extract and fractions of *Lagopsis supina* in normal rats." *BioMed Research International* (2019).