

## *International Journal of Research in Pharmacy and Science*

### **A Comprehensive Review on Herbal Remedies of Diuretic Potential**

Dixit Praveen K\*, Mittal Suchita

Jaipur College of Pharmacy, RIICO Institutional Area, Sitapura, Jaipur, Rajasthan-302022

#### **ABSTRACT:**

Herbal medicines derived from plant extracts are being progressively more utilized to treat a variety of clinical diseases, though relatively little knowledge about their mode of action is available. There is increasing interest in the health and wellness benefits of herbs and botanicals. This is with good reason as they might offer a natural safeguard against the development of certain conditions and be a putative treatment for some diseases. One such area may be the lowering of blood pressure in those where it is elevated. One class of clinical medicines used to lower blood pressure are known as diuretics and work by increasing the excretion of urine from the body as well as the amount of sodium in urine. There are a growing number of studies purporting diuretic effects with traditional medicines. Any substance that tends to increase the flow of urine, which causes the body to get rid of excess water, is known as diuretic drugs. Substances that induce "diuresis," or the removal of fluids from the body through urination, are considered diuretics. These agents were widely explored in Indian ancient system of medicine. Diuretics increase the rate of urine outflow and sodium excretion and are used to adjust the volume and composition of body fluids in a variety of clinical situations including hypertension, heart failure, renal failure, nephritic syndrome and cirrhosis. The aim of this review is to abridge the work on diuretics of herbal origin.

**KEYWORDS:** Diuretics, Mechanism of action of diuretics, Herbal sources

#### **\*Corresponding author:**

Praveen K. Dixit, Lecturer

Department of Pharmacology

Jaipur College of Pharmacy

ISI-15, RIICO Institutional Area, Sitapura, Jaipur, Rajasthan-302022

Email- [pharmindia.praveen87@gmail.com](mailto:pharmindia.praveen87@gmail.com)

Contact: 07737246077

## **TABLE OF CONTENTS:**

1. Introduction
2. Figure showing mechanism of action of Diuretics
3. List of herbal sources possessing Diuretic activity
4. Description of few plant sources
5. Conclusion
6. References

### **1. INTRODUCTION:**

Knowledge of herbs has been handed down from generation to generation for thousands of years. Herbal drugs constitute a major part in all traditional systems of medicines<sup>1</sup>. Numerous types of herbs have been well recognised and catalogued by botanist from the high ranges of the Himalayan tract up to the sea-shores of Kanyakumari<sup>2</sup>. According to WHO nearly 80 % of the global population still rely upon the herbal drugs for their primary health care. There has been an increase demand for the pharmaceutical products from the natural origin in all over the world because of their lesser side effects as compare with the modern system of medicine. Ayurveda, literally meaning the "science of life and longevity" in ancient Sanskrit, is the one of the oldest healing system of India, based on lifestyle, diet and herbs. Ayurvedic herbal medicines mainly based on plants enjoy a respective position today, especially in the developing countries, where modern health services are limited<sup>3</sup>.

Diuretics are drugs that increase the rate of urine flow, sodium excretion and are used to adjust the volume and composition of body fluids in a variety of clinical situations. Drug-induced diuresis is beneficial in many life-threatening disease conditions such as congestive heart failure, nephritic syndrome, cirrhosis, renal failure, hypertension, and pregnancy toxemia<sup>4</sup>. These also play an important role in hypertensive patients, pulmonary congestion, this decreases cardiac work load, oxygen demand, plasma volume, thus decreasing blood pressure & also treat the acute and chronic renal failure, hypercalciuria, cirrhosis of liver<sup>5</sup>. Most diuretic drugs have the adverse effect on quality of life including impotence, fatigue, and weakness. 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 Anti-Diuretic Hormones<sup>6</sup>.

## 2. FIGURE SHOWING MECHANISM OF ACTION OF DIURETICS

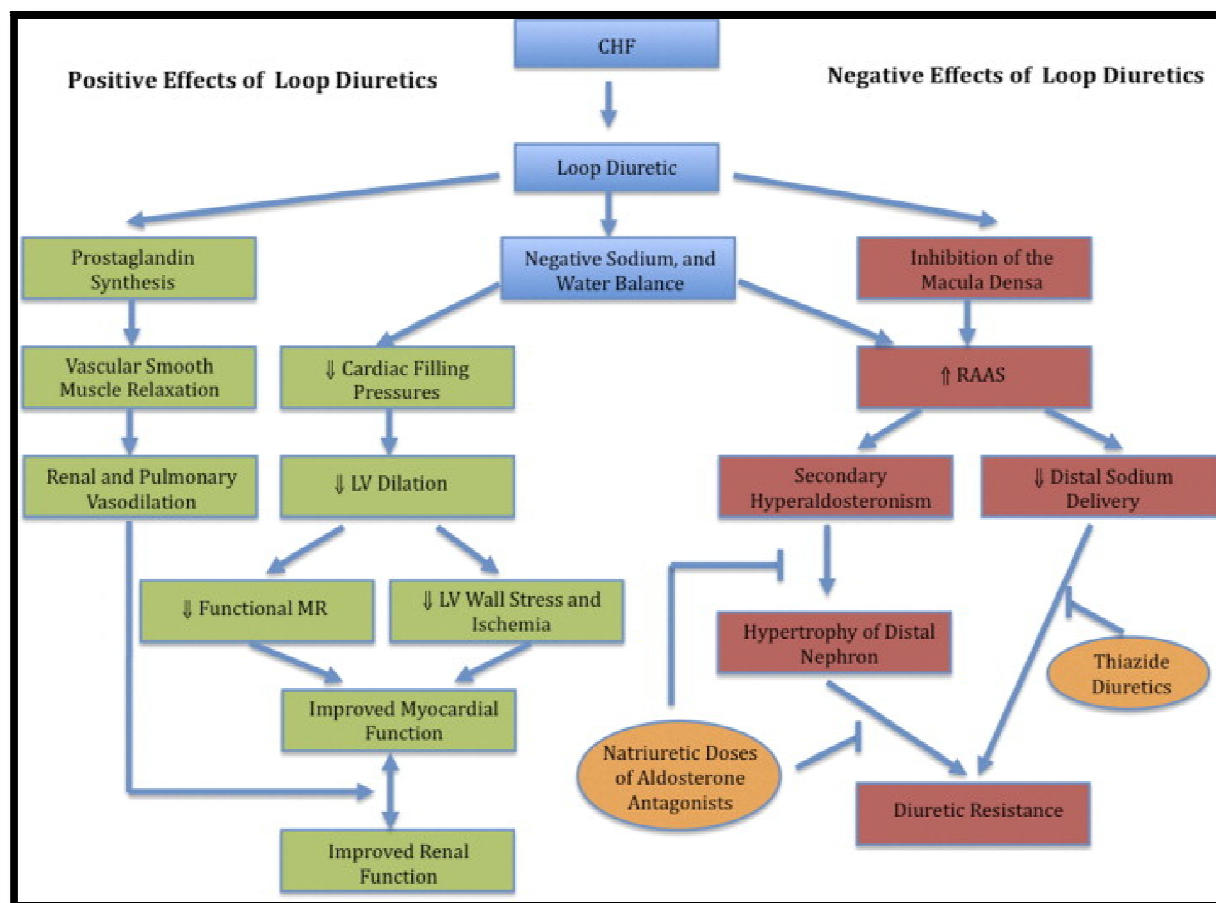


Fig.2: Mechanism of Diuretic drugs<sup>7</sup>.

## 3. LIST OF HERBAL SOURCES POSSESSING DIURETIC ACTIVITY:

S. No	Botanical Name & Family	Part Used	Extract Used	References
1.	<i>Alocasia macrorrhiza</i> Linn. Araceae	Leaves	Ethanollic	8
2.	<i>Acacia suma</i> (Roxb) Fabaceae	Barks	Aqueous	9
3.	<i>Abelmoschus moschatus</i> Medikus Malvaceae	Leaves	Petroleum ether, Chloroform, Alcohol	10
4.	<i>Abutilon indicum</i> Linn Malvaceae	Seeds	Aqueous	11
5.	<i>Acacia sinuate</i> Mimosaceae	Pods	Ethanollic and methanollic	12
6.	<i>Avicennia officinalis</i> L. Avicenniaceae	Leaves	Methanollic	13

7.	<i>Asparagus racemosus</i> Liliaceae	Roots	Aqueous	14
8.	<i>Barleria prionitis</i> Linn Acanthaceae	Flower	Aqueous	15
9.	<i>Benincasa hispida</i> Cucurbitaceae	Fruit rind	Chloroform	16
10.	<i>Boerhaavia Diffusa</i> Nyctaginaceae	Stem and leaves	Alcoholic	17
11.	<i>Cynodon dactylon</i> Graminae	Root stalk	Aqueous	18
12.	<i>Cocos nucifera</i> Arecaceae	Husk	Aqueous and alcoholic	19
13.	<i>Costus speciosus</i> Linn. Zingiberaceae	Rhizomes	Aqueous and alcoholic	20
14.	<i>Centella asiatica</i> Mackinlayaceae	Leaves	Methanolic and ethanolic	21
15.	<i>Cleome rutidosperma</i> D.C. Capparidaceae	Whole plant	Aqueous	22
16.	<i>Cerbera odollam</i> Gaertn Apocynaceae	Roots	Methanolic	23
17.	<i>Derris trifoliata</i> Lour Leguminosae	Aerial parts	Ethanol	24
18.	<i>Hygrophila auriculata</i> (Schum) Heine Acanthaceae	Whole plant	Alcoholic	25
19.	<i>Holarrhena antidysenterica</i> Apocynaceae	Seeds	n-hexane, butanol, aqueous	26
20.	<i>Kigelia pinnata</i> Bignoniaceae	Bark	Aqueous	27
21.	<i>Lepidium sativum</i> Cruciferae	Dried seeds	Aqueous and methanol	28
22.	<i>Lagenaria siceraria</i> Cucurbitaceae	Fruit	Juice extract and methanol	29
23.	<i>Mimusops elengi</i> Sapotaceae	Bark	Ethyl acetate, ethanol and water	30
24.	<i>Musa paradisiaca</i> L Musaceae	Roots	Methanolic	31
25.	<i>Mimosa pudica</i> Linn. Fabaceae	Leaves	Aqueous	32
26.	<i>Mangifera indica</i> L. Anacardiaceae	Bark	Ethyl acetate, ethanol and water	33
27.	<i>Morinda citrifolia</i> (Linn) Rubiaceae	Fruit	Juice	34
28.	<i>Macrotyloma uniflorum</i> Fabaceae	Seeds	Ethanol	35
29.	<i>Nicandra Physalodes</i> Solanaceae	Leaves	Alcoholic and aqueous	36

30.	<i>Nothosaerva brachiata</i> Wight Amaranthaceae	Roots	Aqueous and ethanol	37
31.	<i>Pseudarthria viscida</i> L. Fabaceae	Aerial part	Ethanolic	38
32.	<i>Phyllanthus fraternus</i> Web Euphorbiaceae	Aerial part	Methanolic	39
33.	<i>Raphanus sativus</i> Brassicaceae	Bark	Aqueous	40
34.	<i>Ruta graveolens</i> L. Rutaceae	Leaves	Hot water infusion	41
35.	<i>Rumex vesicarius</i> . Linn Polyganaceae	Aerial parts	Ethanolic	42
36.	<i>Salvia officinalis</i> L. Labiatae	Leaves	Methanolic	43
37.	<i>Spilanthes acmella</i> Compositae	Leaves	Petroleum ether, chloroform and alcohol	44
38.	<i>Sesbania grandiflora</i> Linn Leguminosae	Flower	Aqueous and methanol	45
39.	<i>Solanum surattense</i> burm Solanaceae	Whole plant	Alcoholic and aqueous	46
40.	<i>Withania coagulans</i> Dunal Solanaceae	Fruit	Aqueous	47

#### 4. DESCRIPTION OF FEW PLANT SOURCES:

##### ***Abelmoschus moschatus* Medikus<sup>10</sup>**

The diuretic activity of Petroleum ether, Chloroform, Alcohol extract of *Abelmoschus moschatus* Medikus was studied and the activity was compared with furosimide as standard. The alcoholic extract exhibited significant diuretic activity as evidenced by increased total urine volume and the urine concentration of Na<sup>+</sup>, K<sup>+</sup> and Cl<sup>-</sup>.

##### ***Barleria prionitis* Linn<sup>15</sup>**

Diuretic and Natriuretic activities were carried out by administration of normal saline along with the treatment modules. The volume of urine (in ml) and the Na<sup>+</sup> and K<sup>+</sup> content in the urine were measured. The extract at 100 and 200 mg / kg, produced significant diuresis and increased sodium elimination but not potassium.

***Boerhaavia Diffusa***<sup>17</sup>

The extracts were administered to experimental rats orally at doses of 150 & 300mg/kg of alcoholic extracts of stem and leaves of *Boerhaavia diffusa* (AEBD) and 200 & 400mg/kg of leaves of *Anisochilus carnosus* (AEAC). Furosemide was used as a standard drug at a dose of 20mg/kg in the present study. The diuretic effect was evaluated by measuring urine volume, sodium and potassium content in urine.

***Cynodon dactylon***<sup>18</sup>

Oral administration of the aqueous extract of root stalk of *Cynodon dactylon* at a dose of 100mg, 250mg, 500mg, 750mg/kg body weight shows diuretic activity which can be quantified in experimental rats.

***Cleome rutidosperma D.C.***<sup>22</sup>

The diuretic activity was tested in rats at 400 and 600 mg/kg, orally and compared with furosemide (20 mg/kg, intraperitoneally) as the standard. The extract was found to possess significant dose dependent diuretic activity.

***Kigelia pinnata***<sup>27</sup>

Different concentrations of KP (250mg/kg, 500mg/kg) were orally administered to hydrated rats & their urine output was immediately measured after 5 hours of treatment. Furosemide (10mg/kg) was used as reference drug while normal saline (0.9%) solution was used as control. KP exhibited dose dependent diuretic property.

***Mimosa pudica Linn***<sup>32</sup>

The control group was given 0.9% NaCl, the 3 test groups were treated with aqueous extract of leaves of *M. pudica* in the doses of 100, 200 and 400 mg/kg respectively, and the standard group received furosemide. The aqueous extract of *M. pudica* leaves at 100 mg/kg p. o. showed significant diuretic activity with increased electrolytes excretion.

## **5. CONCLUSION**

India has a rich collection of medicinal plants distributed in different geographical and ecological conditions widespread in the country. Plants have been used since ancient times for the treatment of

various diseases and disorders. The few herbal plants have been discussed which are previously explored by the various researchers for their Diuretic activity. By this review, it can be concluded that in the core of the nature there are so many plants which possess potent diuretic activity. Herbal medications are free from side effects and toxicity unlike the allopathic medicines. The current review projected to provide an overview of knowledge adjoining the herbal medicines used as diuretics.

## **6. REFERENCES:**

1. Srivastav S, Singh P, Mishra G, et al. *Achyranthes aspera*-An important medicinal plant: A review. *Journal of Natural Product and Plant Resources*. 2011; 1(1): 1-14.
2. Gautam RK, Dixit PK, Mittal S. Herbal Sources of Antidepressant Potential: A Review. *International Journal of Pharmaceutical Sciences Review and Research*. 2013; 18(1): 86-91.
3. Gupta VK, Arya V. A review on potential diuretics of Indian medicinal plants. *Journal of Chemical and Pharmaceutical Research*. 2011; 3(1): 613-620.
4. Vanamala U, Elumalai A, Eswaraiah MC, et al. An Updated Review on Diuretic Plants-2012. *International Journal of Pharmaceutical & Biological Archives*. 2012; 3(1): 29-31.
5. Kumar BNS, Swamy BMV, Swamy A, et al. A Review on Natural Diuretics. *Research Journal of Pharmaceutical, Biological and Chemical Sciences*. 2010; 1(4): 615-634.
6. Sharma V, Verma P. *Convolvulus arvensis* - L. root extracts increase urine output and electrolytes in rats. *International Journal of Pharmaceutical Research & Development*. 2011; 3(3): 193-197.
7. Felker G. M. , Mentz R. J. Diuretics and Ultrafiltration in Acute Decompensated Heart Failure *Journal of the American College of Cardiology*.2012; 59(24) :2145–2153.
8. Mubeen US, Misra V, Banerjee S. Laxative and diuretic property of ethanolic extracts of leaves of *Alocasia macrorrhiza* Linn. on experimental albino rats. *International Research Journal of Pharmacy*. 2012; 3(2): 174-176.
9. Sumanta M, Rabinarayan P, Suresh P, et al. Studies on Diuretic and Laxative activity of *Acacia suma* (Roxb) barks. *International Journal of Research in Ayurveda and Pharmacy*. 2010; 1(2): 510-514.
10. Christina AJM, Muthumani P. Phytochemical investigation and Diuretic activity of *Abelmoschus moschatus* Medikus. *International Journal of Pharmaceutical and Chemical Sciences*. 2012; 1(4): 1311-1314.

11. Balamurugan G, Selvarajan S, Balakrishnan D, et al. Diuretic activity of *Abutilon indicum* linn (sweet) seed extract. *Journal of Herbal Medicine and Toxicology*. 2010; 4(1): 49-52.
12. Ramya Krishna PS, Lavanya B, Siresha P, et al. Comparative study of *Acacia nilotica* and *Acacia sinuata* for diuretic activity. *Der Pharmacia Sinica*. 2011; 2(6): 17-22.
13. Hossain MH, Howlader MSI, Dey SK, et al. Evaluation of Diuretic and Neuropharmacological Properties of the Methanolic Extract of *Avicennia officinalis* L. leaves from Bangladesh. *International Journal of Pharmaceutical and Phytopharmacological Research*. 2012; 2(1): 2-6.
14. Kumar MC, Udupa AL, Sammodavardhana K, et al. Acute toxicity and diuretic studies of the roots of *Asparagus racemosus* Willd in rats. *West Indian Medical Journal*. 2010; 59(1): 3-6.
15. Musale SB, Jagtap VA, Patil MS, et al. Diuretic activity of *Barleria prionitis* Linn Flower extract. *International Journal of Drug Discovery and Herbal Research*. 2011; 1(1): 20-21.
16. Jayasree T, Kishore KK, Vinay M, et al. Diuretic effect of chloroform extract of *Benincasa hispida* rind (pericarp) in sprague-dawley rats. *International Journal of Applied Biology and Pharmaceutical Technology*. 2011; 2(2): 94-99.
17. Venkatesh P, Dinakar A, Senthilkumar N. Evaluation of Diuretic activity of an Alcoholic extracts of *Boerhaavia diffusa* and *Anisochilus carnosus* in rats. *International Journal of Drug Development & Research*. 2012; 4(4): 239-242.
18. Shivalinge Gowda KP, Satish S, Mahesh CM, et al. Study on the Diuretic Activity of *Cynodon dactylon* root stalk Extract in Albino Rats. *Research Journal of Pharmacy and Technology*. 2009; 2(2): 338-340.
19. Baheti AM, Rathi BS, Khandelwal KR, et al. Diuretic activity of *Cocos nucifera* husk in rats. *Journal of Natural Remedies*. 2006; 6(1): 35-37.
20. Dubey S, Verma VK, Sahu AK, et al. Evaluation of Diuretic activity of aqueous and alcoholic rhizome extract of *Costus speciosus* Linn. in wistar albino rats. *International Journal of Research in Ayurveda and Pharmacy*. 2010; 1(2): 648-652.
21. Chitralla R, Salomi KR, Nagarjuna S, et al. Diuretic activity of methanolic and ethanolic extracts of *Centella asiatica* leaves in rats. *International Research Journal of Pharmacy*. 2011; 2(11): 163-165.
22. Bose A, Gupta JK, Dash GK, et al. Diuretic and antibacterial activity of *Cleome rutidosperma* D.C. *Indian Journal of Pharmaceutical Sciences*. 2007; 69(2): 292-4.



23. Rahman MDA, Paul P, Rahman AA. Antinociceptive, Antibacterial and Diuretic Activities of *Cerbera odollam* Gaertn roots. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 2011; 2(3): 16-23.
24. Mamoon SA, Azam MG. Diuretic activity and brine shrimp toxicity of *Derris trifoliata* Lour. International Journal of Pharmacy & Life Sciences. 2011; 2(9): 1029-1032.
25. Hussain MS, Ahmed KHFN, Ansari MZH. Preliminary Studies on Diuretic effect of *Hygrophila auriculata* (Schum) Heine in rats. International Journal of Health Research. 2009; 2(1): 59-64.
26. Khan A, Bashir S, Gilani AH. An *in vivo* study on the diuretic activity of *Holarrhena antidysenterica*. African Journal of Pharmacy and Pharmacology. 2012; 6(7): 454-458.
27. Sharma UK, Sharma US, Singh A, et al. Diuretic activity of *Kigelia pinnata* bark extract. Journal of Pharmacology Research. 2010; 1(2): 17-20.
28. Patel U, Kulkarni M, Undale V, et al. Evaluation of Diuretic activity of aqueous and methanol extracts of *Lepidium sativum* Garden Cress (Cruciferae) in rats. Tropical Journal of Pharmaceutical Research. 2009; 8(3): 215-219.
29. Ghule BV, Ghante MH, Yeole PG, et al. Diuretic activity of *Lagenaria siceraria* fruit extracts in rats. Indian Journal of Pharmaceutical Sciences. 2007; 68(6): 817-819.
30. Katedeshmukh RG, Shete RV, Otari KV, et al. Acute toxicity and diuretic activity of *Mimusops elengi* extracts. International Journal of Pharma and Bio Sciences. 2010; 1(3): 1-6.
31. Jha U, Shelke TT, Oswal RJ, et al. Diuretic effect of methanolic extract of *Musa paradisiaca* L root in rats. Der Pharmacia Lettre. 2011; 3(4): 404-407.
32. Sangma TK, Meitei UD, Sanjenbam R, et al. Diuretic property of aqueous extract of leaves of *Mimosa pudica* Linn. on experimental albino rats. Journal of Natural Products. 2010; 3: 172-178.
33. Devi MSS. Acute toxicity and diuretic activity of *Mangifera indica* L. Bark extracts. International Journal of Pharmacy and Biological Sciences. 2011; 2(3): 141-146.
34. Shenoy J, Pai PG, Shoeb A, et al. An evaluation of diuretic activity of *Morinda citrifolia* (Linn) (noni) fruit juice in normal rats. International Journal of Pharmacy and Pharmaceutical Sciences. 2011; 3(2): 119-121.
35. Ravishankar K, Priya PSVV. Evaluation of diuretic effect of ethanolic seed extracts of *Macrotyloma uniflorum* and *Cucumis melo* in rats. International Journal of Pharmacy and Biological Sciences. 2012; 3(3): 251- 255.

36. Devi P, Meera R, Muthumani P, et al. Evaluation of Alcoholic and Aqueous Extracts of *Nicandra Physalodes* Leaves for Diuretic Activity. International Journal of Pharmaceutical & Biological Archives. 2010; 1(4): 331-334.
37. Madhavan V, Goswami P, Murali A, et al. Diuretic activity studies on the root of *Nothosaerva brachiata* Wight in Wistar rats. Spatula DD. 2012; 2(3): 181-186.
38. Saravanan C, Shantha Kumar S, Anandan R, et al. Anti-inflammatory and Diuretic effect of plant extracts of *Pseudarthria viscid* (L.) weight and Arn. International Journal of Research in Ayurveda and Pharmacy. 2010; 1(2): 506-509.
39. Biradar K, Khavane K, Payghan S, et al. Evaluation of Diuretic activity of *Phyllanthus fraternus* Web aerial parts on albino rats. International Journal of Pharmaceutical & Biological Archives. 2010; 1(4): 389-392.
40. Vargas R, Perez RM, Perez S, et al. Antirolithiatic activity of *Raphanus sativus* aqueous extract on rats. Journal of Ethnopharmacology. 1999; 68(1-3): 335-8.
41. Jayakody JRAC, Ratnasooriya WD, Fernando WANA, et al. Diuretic activity of leaves extracts of hot water infusion of *Ruta graveolens* L. in rats. Journal of Pharmacology and Toxicology. 2011; 6(5): 525-532.
42. Rao KNV, Sunitha Ch, Banji D, et al. Diuretic activity on different extracts and formulation on aerial parts of *Rumex vesicarius*. Linn. Journal of Chemical and Pharmaceutical Research. 2011; 3(6): 400-408.
43. Bhadoriya U, Tiwari S, Sharma P, et al. Diuretic activity of extract of *Salvia officinalis* L. Asian Journal of Pharmacy & Life Science. 2011; 1(1): 24-28.
44. Yadav R, Yadav N, Kharya MD, et al. Preliminary studies on diuretic effect of *Spilanthes acmella* leaves extracts in rats. International Journal of Pharmacy and Pharmaceutical Sciences. 2011; 3(3): 245-247.
45. Eswaraiyah MC, Elumalai A, Nikhitha M, et al. Evaluation of Diuretic Activity of Aqueous and Methanol extracts of *Sesbania grandiflora* Linn in rats. International Journal of PharmTech Research. 2012; 4(2): 835-838.
46. Patil Suhas A, Sambrekar Sudhir N. Diuretic potential of whole plant extract of *Solanum surattense* Burm in experimental rats. International Journal of Pharmaceutical and Chemical Sciences. 2012; 1(4): 1380-1386.

47. Dabheliya J, Khan SA, Joshipura M, et al. Diuretic potential of aqueous extract of fruits of *Withania coagulans* Dunal in experimental rats. International Journal of Pharmacy and Pharmaceutical Sciences. 2010; 2(4): 51-53.