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A Review on Natural Diuretics

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ABSTRACT

Pathological conditions like backache, prostatitis, sciatica, kidney stones, bladder ache, lymphatic swelling, scalding urine, gonorrhea, skin eruptions, Premenstrual Syndrome, water retention, and obesity can be treated by Diuretic Agents. There are many synthetic diuretic drugs which cure the disease at faster rate but as time goes the excessive use of these drugs shows unwanted toxic effect. This is good reason as they might offer Natural diuretics are herbs for reputed treatment of above diseases. There are a number of studies on herbs reporting significant diuretic effects on their folklore claim. The aim of this article was to review these studies and identify which extracts promote diuresis (which we assessed on terms of urine excreted and urinary sodium excretion) and also to identify the research needed area. We identified number of genus and species reporting diuretic effects. *Xylopia aethiopica* (dunal)and *Alepidea amatymbica* eckl. & zeyh, *Steganotaenia araliacea* hochst, *Carissa edulis* (forssk) vahl, *Oxystelma esculentum, Tylophora indica, Centratherum anthelminticum* (l.) kuntze, *Opuntia ficus indica* (l.) mill., *Spergularia purpurea* pers., *Spilanthes acmella* murr., *Raphanus sativus*var nigra l., *Lagenaria siceraria*(mol.) standl, *Equisetum bogotense* tea (platero herb).However, there the number of studies is limited and we recommend that further studies be conducted to confirm reported effects.

Keywords: - Natural diuretics, Diuretic effect, urine excreted and urinary sodium excretion.

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INTRODUCTION

India has a rich cultural heritage of traditional medicines which chiefly comprised the two widely flourishing systems of treatments i.e. Ayurvedic and Unani systems since ancient times. The crude drugs being always available easily in abundance, comparatively cheaper, with negligible side effects and have frequently been prescribed to patients of all age groups. The multiple therapeutic action and uses of these drugs are sufficiently described in classical literature on indigenous medicines in many medicinal plant books and pharmacopoeias [1, 2].

Diuretics are drug which increase the formation of urine and thus remove excess extra cellular water from oedematous tissue. They act either by increasing the glomerular filtration rate (or) by decreasing the rate of reabsorption of fluid from the tubules. Drugs that induce diuresis are known as diuretics. Diuretic compounds that stimulate the excretion of water potentially. It is useful in many disorders including most of those exhibiting oedema such as congestive heart diseases, nephritis, toxemia of pregnancy. 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 [3].

Plant medicine was commonly used for traditional treatment of some renal diseases and a lot of plants have been reported to show significant diuretic activity [4]. Many investigators have demonstrated that studies of herbal plant used in traditional medicine as diuretics have increased recent years [5] and might be a useful tool in the treatment of hypertension. Hypertension is considered one of the main and dangerous complications of diabetes mellitus.

Plants may serve as the alternative sources for the development of new diuretic agents due to their biological activities. Several plants used for the treatment of decreases indifferent systems of traditional medicine have shown diuretic activity when tested on animal models. Therefore the present study, review the following plants been shown to exhibit diuretic activity, for example *Xylopia aethiopica* and *Alepidea amatymbica* [6], *Steganotaenia araliacea* hochst [7] and *Carissa edulis* (forssk) vahl [8]etc. work completed on some diuretic plants.

ANNONACEA AND APIACEAE

XYLOPIA AETHIOPICA (Dunal) AND *ALEPIDEA AMATYMBICA*Eckl. & Zeyh

Alepidea amatymbica (Annonacea) is a erect robust perennial herb to 2m in height with hollow grooved stems and a rhizomatous rootstock; leavesmostly basal on petioles up to 200mm long, with a few stalk less clasping stem leaves; glossy green on upper surface with prominent venation on lower surface; lamina lanceolate to cordate; 300 - 100 × 20 - 75mm, with dentate margin, each tooth terminating in a long bristle; flowers(Jan-Mar) white, borne in heads 10 - 20mm in diameter. the latter white to pale yellow above, olive green on lower surface[9].

Ethnobotany and Pharmacological action

Used generally in traditional medicine to treat colds, coughs, rheumatism, wounds, and to wash divining bones[10]. *In vitro* vasorelaxation (rat aorta; dose 0,1mg/ml) and *in vivo* diuretic activity (IG; rat; dose 50.0mg/kg) have been demonstrated for hexane/ethyl acetate extracts of fresh rhizome[6].

***Xylopia aethiopica* (Dunal)**

X. aethiopica (Apiaceae) is popularly called "African or spice tree seed". It is a tree up to 18 metres high and with a girth up to 70 cm. The bark slash is white in colour, very fragrance when fresh, and thick fibrous. They range in size from 14 – 15 cm. in length and 5 – 6 cm wide. The fruits are in clusters; they are long slender, cylindrical and slightly constricted[11].

Ethnobotany and Pharmacological action

The fruit of *Xylopia aethiopica* (XA) is used as a cough remedy, as a carminative, and as a post-partum tonic. Other medicinal uses are for stomach ache, treatment of bronchitis, biliousness and dysentery [12].The fruit has been shown to have antimicrobial action against gram positive and negative bacteria and *Candida albicans* Strain- SC5314[13]. The species is reported to treat bronchitis, stomach-aches, dysenteric conditions, febrile pains and rheumatism [14].

Diuretic activity [6]

Bioassay techniques are used for screening of hypotensive and diuretic activity of medicinal plants. The preliminary bioassay-directed phytochemical study, reported for the first time cardiovascular and diuretic effects of isolates from *Alepidea amatymbica* and *Xylopia aethiopica* diterpenoids: xylopic acid, kaurenoic/ dihydro-kaurenoic acids and some of their derivative effects could be summarized as systemic hypotensive and coronary vasodilator effects, and cardiac bradycardia. In addition to the cardiovascular effects, distinct diuretic and natriuretic effects were found. No carbonic anhydrase inhibition was detected.

Active dose: - 50 mg/kg b.w Kaurene derivatives extracts of kaurenederivatives of *Xylopia aethiopica* and *Alepidea amatymbica.*

APIACEAE

***STEGANOTAENIA ARALIACEA* HOCHST**

Steganotaenia araliacea hochst (Apiaceae) is a small to deciduous tree, 4-8 m; closely associated with rocky ridges and outcrop in hot, dry bushed. Main stem is smooth, yellow green to yellow grey color. Leaves pinnately compound, crowded at end of branches; entire leaf to

250 mm long, serrated margin; fresh glossy green above, slightly paler below. Flowers very small, pale yellow to greenish white. Fruit obovate, dry capsules with two distinct wing, splitting to release seeds; pale yellow to reddish brown [15].

Ethnobotany and Pharmacological action

Steganotaenia araliaceae stem-bark extract has found use as rodent poison, insect repellant and as a diuretic agent in man [16, 17].

Diuretic activity [7]

The water, methanol and ethanol stem-bark extracts of *Steganotaenia araliacea* was studied for diuretic activity and toxicological effect on several tissues in male Wister albino rats. All the extracts cause increase urine elimination and increase in Na+, K+ and Cl+ excretion as compared to normal saline. The ethanol preparation gave the highest diuretic activity among the extracts and the histopathological examination reveals it cause damage to vital organs. The toxic effects on vital organs are a drawback to its recommendation for use as a diuretic agent.
Active dose: - 20 mg/kg body weight (b.w.)

APOCYNACEAE

***CARISSA EDULIS* (FORSSK) VAHL**

Carissa edulis (forssk) vahl (Apocynaceae) is a scrambling shrub, often climbing into adjacent vegetation, or small spiny evergreen tree, 2-5m. Leaves are opposite dark fresh green above, paler below. Flowers white tinged with purple and 18 mm long. Fruits almost rounded to oval containing white latex; purple to black when ripe [15].

Traditional uses and Pharmacological action

These include the treatment of chest complaints [18], rheumatism [19], headache, gonorrhoea, syphilis, rabies and as a diuretic [20, 21].Anti-viral Activity [22] reported from aqueous extract of root.

Diuretic activity [8]

The diuretic activity of the different extracts of *Carissa edulis* in a dose range of 50–1000 mg/kg was assessed orally in rats. The root bark maceration extract showed no effect on the urine output while root bark soxhlet extract produced a significant increase in urine output at a dose of 1000 mg/kg. The root wood maceration and root wood soxhlet extracts produced a significant increase in urine output at a dose of 50 mg/kg. Urinary electrolyte excretion was also affected by the extracts.

Active dose: - 50-1000 mg/kg body weight (b.w.)

ASCLEPIADACEAE (MILKWEED FAMILY)

OXYSTELMA ESCULENTUM

Oxystelma esculentum(Asclepiadaceae) is a glabrous straggler or twining herb; latex milky, leaves linear-lanceolate, 5-8× 0.5-1 cm, glabrous, mucronate, base round; flower purplish or pinkish violet in axillary long peduncled racemes; follicle ovoid-lanceolate, 5× 2cm, inflated, seeds ovate with silky coma[23].

Ethnobotany and Pharmacological action

In Indian traditional medicine, a decoction of the plant is used as a gargle and mouthwash in the treatment of sore throat and aphthous ulcers [24]. Antimicrobial activity [25] from methanol extract is reported;Antibacterial activity of the crude leaf extracts of Oxystelma esculentum tested against some isolated human pathogenic bacterial strains[26]; Antineoplastic and Antioxidant activities from methanol extract is reported [27].

Diuretic activity [28]

The diuretic activity of methanol extract of *Oxystelma esculentum* aerial parts was studied in male Wister albino rats at 5h and 24h intervals. The results indicate that 200 and 400 mg/kg methanol extract is an effective hypernatraemic, hyperkalaemic, hypercalcemic and hyperchloremic diuretic, which supports the traditional claim about the *Oxystelma esculentum* being used as a diuretic.

Active dose: - 200 and 400 mg/kg body weight (b.w.)

ASCLEPIADACEAE

TYLOPHORA INDICA

Tylophora indica (Asclepiadaceae) is climbing shrub; latex watery. Leaves ovate- oblong, thick, pubucent below, acute, truncate or cordate at base. Flowers greenish- yellow[29].

Ethnobotany and Pharmacological action

It is used in the treatment of emetic, cathartic, expectorant, diaphoretic, asthma, whooping cough, dysentery [30]. The anti-allergic effect was reported [31]. Hepatoprotective Activity of Alcoholic and Aqueous Extracts of Leaves of *TylophoraIndica* (Linn.) in Rats was reported[32].

Diuretic activity [33]

Aqueous and alcoholic extracts of *Tylophora indica* leaves were tested for diuretic activity in rats.Present study showed that the aqueous and alcoholic extracts of *Tylophora indica* leaves possess good diuretic activity. Ethanol is most effective in increasing urinary electrolyte concentration of all the ions i.e Sodium, Potassium and Chloride followed by chloroform and aqueous extracts while other extract did not show significant increase in urinary electrolyte concentration.

Active dose:- 100 mg/Kg body weight (b.w.)

ASTERACEAE

***CENTRATHERUM ANTHELMINTICUM* (L.) KUNTZE**

Centratherum anthelminticum (l.) kuntze (Asteraceae)is a small to medium deciduous tree, 4-8; Closely associated with rocky ridges and outcrops in hot, dry bushveld. Stem upright, straight and smooth with 250 mm diameter, yellow to green colour, bark peel off thin, papery flakes. Leaves pinnately compound, entire, leaflets ovate to broadly elliptic, tapering apex, margin serrated, fresh glossy green above, slightly paler below. Flower pale yellow to greenish white. Fruit obovate pale to yellow reddish brown[15].

Ethnobotany and Pharmacological action

The seeds have a hot sharp taste, acrid, astringent to the bowels, anthelmintic and cure ulcers. The seeds are used as purgative, for asthma, kidney troubles and hiccough, applied in inflammatory swelling, remove blood from liver, good for sores and itching of the eyes.The seeds are also credited with tonic, stomachic, and diuretic properties [34, 35].

Antihyperglycemic activity from the seeds of *Centratherum anthelminticum* [36]; Analgesics and antipyretic activity[37]etc are reported.

Diuretic activity [38]

In the present study petroleum ether, chloroform and alcohol extracts of *Centratherum anthelminticum* (L.) Kuntze seeds were tested for diuretic activity. The study revealed that the chloroform and alcohol extracts of *C. anthelminticum* seeds posses a potent diuretic activity. The chloroform and alcohol extracts of *C. anthelminticum* seeds may be acting like potassium sparing diuretic.

Active dose:- 200 mg/kgbody weight (b.w.)

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CACTACEAE

OPUNTIA FICUS INDICA (L.) MILL.

Opuntia ficus indica (l.) mill. (Cactaceae) is general succulent shrub or tree like cactus, with stem made up of flattened oblong or elliptical segments or joints, 30-50 cm long, usually spine less. Flowere yellow or bisexual. Friuts purple or red when ripe, about 5-10 cm long, oblong shaped, containing soft, whitish juicy pulp and many seeds[39].

Ethnobotany and Pharmacological action

This plant is also used in folk medicine as: emollient, moisturizing, cicatrizant, hypocholesterolemic, hypoglycemic agent and in gastric mucosa diseases [40, 41].Effect of lyophilized cladodes on experimental ethanol-induced ulcer in rat is reported[42]. Effect of *Opuntia ficus-indica* (L.) Mill. Cladodes in the Wound-Healing Process was reported[43]; Anti inflammatory activity was also reported [44].

Diuretic activity [45]

15% infusion of *O*. *ficus indica* cladodes, flowers and fruits, respectively (5 ml/100 g b.w.) were used to study Acute and chronic diuretic activity and the activity on fructose-induced hyperuricemia. The results show that *O*. *ficus indica* cladode, fruit and flower infusions significantly increase diuresis. This effect is more marked with the fruit infusion and it is particularly significant during the chronic treatment. The fruit infusion shows also antiuric effect. The changes in the diuresis may occur as a consequence of the polar drug compounds such as flavonoid glycosides [46-49] and ascorbic acid [50, 51].

Active dose:- 5 ml/100 g

CARYOPHYLLACEAE

SPERGULARIA PURPUREA PERS.

Spergularia purpurea Pers.(Caryophyllaceae)is an herbaceous annual plant.Stem with 2-25 cm, recumbent-patulous, fairly slender. Plant glabrous or pubescent -glandular towards the top.Leaves in rosette, firm not fleshy, 8-40 mm long, linear, sometimes mucronate or acuminate, longer than wide.Flowers rose-purple, small (3-4.5 mm). Fruit capsule much shorter than or equal to calyx length, seeds not winged, finely granular[52].

Ethnobotany and Pharmacological action

For many years, the water extract of the whole plant has been traditionally used by Moroccan population against many diseases, like diabetes[53]. The aqueous extract of SP

exhibits a cholesterol and body weight-lowering activities in both normal and severe hyperglycemic rats [54].

Diuretic activity [55]

The chronic diuretic effect of the water extract of the whole plant of *Spergularia purpurea* (SP) were studied at different doses. The oral administration of flavonoids obtained from Spergularia purpurea exhibited antihypertensive and diuretic actions. Glomerular filtration rate showed a significant increase after administration of flavonoids and the flavonoid administration induced a significant increase of urinary electrolytes elimination.
Active dose:- 100- 400mg/kg body weight (b.w.)

COMPOSITAE

SPILANTHES ACMELLA MURR.

Spilanthes acmella Murr. (Compositae) is an annual or short-lived perennial herb, 20–60 cm tall, cylindrical hairy stem and simple ovate opposite leaves without stipules. The flowers are yellow. This herb is found in India, Sri Lanka and other tropical countries [56].

Ethnobotany and Pharmacological action

The cold infusion of the flowers of *Spilanthes acmella* has potent diuretic activity and the ability to dissolve urinary calculi. The flowers are chewed or used in the form of a tincture for toothache and to stimulate flow of saliva [56]. It is also recommended for paralysis of the tongue and in stammer and sore mouth in children [57]. Further, the flowers are used locally against itching and psoriasis [56].

Cold water extract of *S. acmella* flowers possess antinociception activity against persistent pain and antihyperalgesic activity, possibly by inhibiting prostaglandin synthesis, interrupting nociception transmission, and exerting antihistamine activity[58].

Diuretic activity [59]

This study examined the diuretic potential of *Spilanthes acmella* flowers using Cold Water Extract. The result showed that the highest dose of flowers tested possesses strong diuretic activity when given orally in single dose. The urine was slightly acidified and strongly suggests that the CWE is acting as a loop diuretic. Loop diuretics are the most powerful of all diuretics and these inhibit the Na+/K+/Cl− co-transporter system in the thick ascending loop of the nephron, thereby increasing natriuresis and kaleuresis [60,61,62]. The diuretic activity of the CWE may be attributed to its alkaloids.

Active dose: 1500 mg/kg body weight (b.w.) of CWE

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CRUCIFERAE

*RAHANUS SATIVUS*VAR NIGRA L.

Raphanus sativus var *nigra* L., (Cruciferae) commonly known as 'rabano negro'.Is the erect herb with napiform roots. Leaves in a rosette, radical, lyrate. Flowers pink or white in racemes. Fruit cylindrical, globous at base [63].

Ethnobotany and Pharmacological action

Investigations of the tubercle of *R. sativus* revealed the presence of cysteine-rich peptides with substantial antifungal activity against several fungal species [64].Roots diuretics, used in urinary troubles, piles and gastrodynia. Fresh leaf juice is given in urinary complaint. Roots are given as diuretic and also in piles. It is given as blood purifier. The seeds are used in menstrual problem[63].

Diuretic activity [65]

The aqueous extract of the bark of *Raphanus sativus* was tested for its Antiurolithiatic and diuretic activity. The extract shown significant decrease in the weight of stones and increase in the 24 h urine volume as compared to the control. The observed diuretic activity seems effective in preventing the deposition of calculi [66].

Active dose: - Diuretic activity and urolithiatic activity-140 mg/kg body weight (b.w.). of the aqueous extract

CUCURBITACEAE

LAGENARIA SICERARIA(MOL.) STANDL.

Lagenaria siceraria(mol.) standl. (Cucurbitaceae) is a large climbing or trailing herbs with bifid tendrils, eaves 5- lobed. Flowers large, white, solitary. Fruits woody, bottle shaped. The plant is known as bottle gourd, is a common fruit vegetable used through out the India [63].

Ethnobotany and Pharmacological activity

Fruit pulp used in diuretic, cooling and Antibilious[29].Methanol extract of fruit of *Lagenaria siceraria* was reported to posses Anti hepatotoxicity activity [67], Fruit also reportes antioxidant activity[68], Hypolipidemic activity and antihyperlipidemic activity effects in normocholesterolemic and triton induced hyperipidemic rats were observed [69].

Diuretic activity[70]

Vaccum dried juice extract and methanol extract of the fruits of *Lagenaria siceraria* Mol. have been evaluated for its diuretic activity in albino rats. The both extracts found to be active in renal system of rats and showed dose dependent increase in excretion of electrolyte which result in dose dependent diuretic activity.

Active Dose- 100-200 mg/ kg body weight (b.w.)

EQUISETACEAE

EQUISETUM BOGOTENSE TEA (PLATERO HERB)

Equisetum bogotense (Equisetaceae) grow from the Central region to the South of Chile (Coquimbo to Aysen). Herb 0.1-1.5 m tall, colonial form underground stem above ground stem delicate, slender, jointed, and green. Leaves reduced to toothed sheath surrounding each node, Spore cases borne at top of stem in small cones about 2 cm long; produced on and off all year [71].

Ethnobotany and Pharmacological action

The species are used in traditional medicine of Chile because of their diuretic effect [72] and also for their ability to polish metals and to cleanse teeth, due to the high content of silica [73]. Extracts from *E. giganteum* and *E. bogotense* have been demonstrated to have diuretic activity in laboratory animals [74-76].

Diuretic activity [77]

The diuretic activity of *Equisetum bogotense* was evaluated in 25 healthy volunteers by means of their water balance. Daily diuretic dose of *Equisetum bogotense* infusion determined for healthy volunteers was 10.7 mg/kg of body weight. At this dose, the preparation was confirmed as a mild diuretic, with no adverse reactions in subjects.
Active dose: - 10.7 mg/kg of body weight (b.w.)

FABACEAE

ERYTHRINA INDICA LAM

Erythrina indica lam (Fabaceae) is a tree, bark armed with conical prickles. Leaves 3-foliolate, leaflets rhomboid ovate, thin coriaceous, base deltoid, acuminate. Flowers bright red on leafless branches, in dense stout racemes. Sepals 5. Petals5, papilionaceous corolla. Stamens 10, alternately longer and shorter. Ovary one celled, many ovuled. Pod torulose[29].

Ethnobotany and Pharmacological action

It is used traditionally for the treatment of liver trouble, joint pain, dysentery, convulsion, as a diuretic, laxative and an anthelmintic [78-80].Antiulcer Activity of Methanol Extract of *Erythrina indica* Lam. leaves [81].

Diuretic activity[82]

The diuretic activity of Ethanol, Chloroform and Ethyl acetate extract of leaves of *Erythrina indica* Lam was studied. Due to the presence of flavonoids, carbohydrates and glycosides in all the three extracts (Ethanol, Chloroform and Ethyl acetate) all these extracts showed increase in urine volume and also the concentration of Na^+, K^+ and Cl^- in urine. It was previously reported that the flavonoid glycosides are endowed with diuretic activity [83]. Therefore the diuretic activity of *Erythrina indica* may be due to the presence of flavonoids in all the three extracts.

Active Dose:- 250 mg/Kg body weight (b.w.)

FABACEAE

RETAMA RAETAM

Retama raetam (Fabaceae) isa shrub that grows to about 3 m tall and may reach 6 m across. Plants are grey green with slender, drooping branches. The leaves, which are very small (about 5 mm long) and narrow (only 1 mm wide), are quickly dropped and the plant remains leafless for most of the year. Flowers are 8–10 mm long, white and pea-like, appearing close to the stems in clusters of 3–15. Kidney-shaped seeds, which are about 6.5 mm long and may be yellow, green, brown or black in color [84].

Ethnobotany and Pharmacological action

Diuretic activity andhypoglycemic activity. The fruits are considered as toxic and provoke hallucinations. Ingestion of plant produce an abortion and some time lead to poisoing and death [85]. It has been recently proven experimentally the underlying mechanism of this pharmacological effect has been hypothesized as inhibition of renal glucose reabsorption [86].

Diuretic activity [86]

The aqueous extract of aerial parts of *Retama raetam* (RR) was studied to examine diuretic effect at the dose of 5 mg/kg/h in normal rat. The acq extract increase the diuresis associated with an elevation of GFR and significant reduction of urinary osmolarity without affecting plasma urea levels, urine pH, plasma osmolarity and hematocrite. The diuretic

properties of RR extract could be due to active principles such as flavonoids, saponins and other organic compounds [87].

Active dose: - 5 mg/kg/h body weight (b.w.)

LOGANEACEAE

STRYCHNOS POTATORUM LINN.

Strychnos potatorum Linn. (Loganeaceae) is an medium sized deciduous tree having height upto 12 meters. Leaves are simple, opposite, elliptic, acute, 15x6.25 cm, glabrous, shining. Flowers are White fragrant, axillary cymes. Friuts are ovoid or globose, glabrous berries, black when ripe[63].

Ethnobotany and Pharmacological action

In traditional medicine, seeds are used as a stomachic, a demulcent, an emetic, against diabetes, diarrhea, and gonorrhea and are also applied successfully in eye troubles. Seeds are rubbed into a fine paste with buttermilk and given internally for a week and are said to be effectual in long-standing and chronic diarrhea. Seeds are also good for liver and kidney complaints, and are used as a potent diuretic. Powder of the seeds is given internally in irritation of the urinary organ and in gonorrhea[88, 89].

Antiulcerogenic activity is reported from the seeds of *Strychnos potatorum*Linn [90]; Anti diarrhoeal activity was reported [91].

Diuretic activity [92]

Methanol extract of *Strychnos potatorum* Linn. seeds (SPSE) was evaluated for its diuretic activity in Wistar albino rats. The extracts caused a significant and dose-dependent diuretic activity, with an effective hypernatraemic, hyperchloremic and hyperkalaemic diuretic.
Active dose: - 600 mg/kg body weight (b.w.)

LYTHRACEAE

LAGERSTROEMIA REGINAE

The *Lagerstroemia reginae (Lythraceae*) commonly known as Pride of India or Queens Crape Myrtle. It is deciduous trees up to 2m height with smooth grayish bark. Leaves elliptic oblong. Flowers purple, in large panicles. Capsules ellipsoid. The shrub is cultivated in Indian gardens for its attractive foliage and flowers[63].

Ethnobotany and Pharmacological action

Bark decoction is treatment for diarrhea. Roots have been used for stomach ailments. Old leaves and ripe fruits have greater glucose lowering effect. Flowers and leaves used to facilitate bowel movements. Decoction of fruits or roots gargles for aphthas stomatitis. Whole plant excluding roots shows antiviral activity and hypotensive effect in dogs 7-9[93- 95].

Diuretic activity [96]

The aqueous extract ofLeaves of *Lagerstroemia reginae* was evaluated for the diuretic activity. The aqueous extract showed significant increase in excretion of sodium, potassium and chloride ions in the urine in a dose dependent manner. Active principles such as flavonoids, saponins and terpenoids are known to be responsible for diuretic activity[97-99].

Active Dose: - 500 and 1000mg/Kg body weight (b.w.)

MENISPERMACEAE

COCCULUS HIRSUTUS L. Diels

Cocculus hirsutus L..Diels (Menispermaceae) is a pubescent twining herbs. Climbing shrub over bushes and small trees .Leaves ovate-orbicular male flower in panicles; Female flowers in fascicles. Sepals 3+3, free. Petals 6, free, greenish, apically 2- fid. Stamens 6, outer 3- free, 2- celled, inner 3 connate with 1- celled anthers. Drupe laterally compressed, purplish-black [29].

Ethnobotany and Pharmacological action

Traditionally it is used medicinally by the Indian tribes for a wide range of ailments, including constipation and kidney problems [100, 101]. Leaves for eczema, root is laxative [29].

The aqueous extract of the aerial parts and the roots are used for the treatment of rheumatism, fever and also as diuretic and laxative [102,103] The anti-inflammatory and analgesic activities of the roots were also reported[104].

Diuretic activity[105]

Aqueous extract of *C. hirsutus* aerial parts showed significant increase of urinary concentrations of Na_and K_in rats and the volume of urine at both dose levels. The extract, orally given to rats, induced a significant laxative. When orally administered to mice in graded doses from 100 to 3000 mg/kg, the aqueous extract of *C. hirsutus* produced sedation, increased urination and defecation at all tested doses. However, there was no mortality in any of the above-mentioned doses at the end of the 14 days of observation. The acute toxicity, orally evaluated in mice, was found to be higher than 3000 mg/kg.

Active dose: -100 and 200 mg/kg body weight (b.w.)

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PORTULACACEAE

PORTULACA OLERACEA

*Portuleca oleracea (*portulacaceae) *is* an edible plant grown wildly in all the parts of India and cultivated in the southern India. Prostrate or erect succulent herbs with purplish or green stem. Leaves sub opposite often whorled, obovate or spathulate. Flowers yellow, capsule ovoid; seed tubercled[63].

Ethnobotany and Pharmacological action

Its Seeds are used as Vermifuge. The herb is eaten by patients of effected liver [29]. Several workers have reported many pharmacological properties including analgesic, anti-inflammatory [106], and antifertillity [107].

Diuretic activity [108]

The diuretic potential of 70% ethanol extract of the leaves was assessed in albino rats. The 70% ethanolic extract has shown significant increase in the volume of urine, urinary concentration of Na, K and Cl ions. The natriuretic effect of the lower dose may not be sufficient to induce diuresis. While the natriuretic effect at higher dose is sufficient cause diuresis. Since the plant possesses cardiac glycosides and cardiac glycosides are also know to possess diuretic effect[109], the diuretic effect of the test extract may be attributed to the cardiac glycosidal content. However, the contribution of polyphenolic compounds to diuretic effect cannot be ruled out.

Active Dose- 400 mg/ kg body weight (b.w.)

RUBIACEAE

*RANDIA ECHINOCARPA*MOJ. ET SESSE

Randia echinocarpa Moj. Et Sesse (Rubiaceae) is a large shrub and sometimes trees in riparian tropical deciduous forest in south eastern Sonora. Reaches 8-12m, with a well developed but rather slender trunk; larger limbs often supported by other kind of trees. Bark smooth, gray or on older limbs or trunks somewhat irregular and flaking. Leaves 4-11 cm, obovate, minutely and often hairy, often glaborous. Flowers 2-3 cm in width[110].

Ethnobotany and Pharmacological action

It is a popular folk remedy for the treatment of a wide variety of urinary disorders in many areas of Mexico such as Guerrero, Morelos, Michoacan and Sonora States. For this purpose, the indigenous communities drink a decoction of the dry fruit three times a day[111].

Antioxidant and Antimutagenic Activities were reported from alcohol and aqueous extract of *Randia echinocarpa* Fruit[112].

Diuretic activity [113]

The efficacy of the aqueous extract of the fruit of *Randia echinocarpa* as a diuretic and antilithiatic drug in experimental animals is verified. The present investigation clearly showed that *Randia echinocarpa* aqueous extract caused a significant increase in diuretic activity, and markedly induced the formation of stones, acting as an urolithiatic agent. Such information indicates that the continuing use of this plant in traditional/folk medicine must be discouraged. So the drug is not acting as a antilithiatic.

Active dose: - 10, 20, 40 and 60 mg/kg body weight (b.w.)

CONCLUSION

The current review intended to provide an overview of current knowledge surrounding the use of herbal medicines as diuretics. The review include botanical characters of the plant which helps in identification of the plant, Ethnobotany which give traditional use of the plant , and the reported activities of the plant and finally the components responsible for diuretic activity is mentioned such as flavonoids, polyphenolic compounds, cardiac glycosides, Saponin glycosides etc. With these data's, above discussed plants are concluded to have good diuretic activity which can be used to treat the oedema, hypertension, backache, prostatitis, sciatica, kidney stones, bladder ache, lymphatic swelling, scalding urine, gonorrhea, skin eruptions, Premenstrual Syndrome, water retention, obesity and many other diseases. However, there the number of studies is limited and we recommend that further studies be conducted to confirm reported effects. Such evidence is needed to provide scientific credence to the folklore use of traditional medicines and even be helpful in the development of future medicines and treatments and treatment guidelines.

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