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A review on *Punarnavadi Kwath* : An Ayurvedic polyherbal formulation for Chronic Kidney Disease (CKD)

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ABSTRACT

Chronic kidney disease (CKD) is defined by persistent urine abnormalities, structural abnormalities, or impaired excretory renal function suggestive of a loss of functional nephrons. Most patients with CKD are at risk of accelerated cardiovascular disease and death. *Punarnavadi Kwath* is a formulation, which contains nine medicinal plants viz. *Boerhavia diffusa*, *Barberis aristate* Dc. *Curcuma longa*, *Zingiber officinale* Roxb, *Terminalia chebula* Retz. *Tinospora cordifolia* (Willd.), *Plumbago zeylanica* Muell Arg, *Clerodendron serratum*, *Cedrus deodara* (Roxb) Loud. These herbs have the potential to treat symptoms of CKD like inflammation and pain other than that, the goal of treatment is to improve kidney function, reduce symptoms and prevent complications. This review paper emphasized on a comprehensive information for each herb of *Punarnavadi Kwath* because pharmacology, mechanism of actions based on various preclinical studies, safety precautions along with the current research potential of the herb. At the same time, the probable pharmacodynamic action of drugs is drawn to know the imperative for optimal and safe utilization of the herb, are discussed in this review paper.

Key words: Ayurvedic Medicinal Plants, Chronic Kidney Disease, *Punarnavadi Kwath*, Uraemia

INTRODUCTION

Chronic kidney disease (CKD) is defined by persistent urine abnormalities, structural abnormalities, or impaired excretory renal function suggestive of a loss of functional nephrons. Most patients with CKD are at risk of accelerated cardiovascular disease and death. For those who progress to end-stage renal disease, the limited accessibility to renal replacement therapy is a problem in many parts of the world. India like any other developing country is facing a silent epidemic of

chronic renal failure (CRF-a) facet of the health transition associated with industrialization partly fuelled by increase in sedentary lifestyle, low birth weight and malnutrition. India has very little infrastructural renal care facilities with few centres that too being placed at major cities only. Indian Government spends very less on health each year and patients are supposed to attend its primary health centres. Patients do not attend because in doing so they lose a day's wages. A normal person in India cannot afford this high costing treatment that too for an incurable disease- CKD. If still can afford it, these costs have to be borne for life time. This puts an unbearable load on the patient and his/ her family. This is the most important reason why only 2-3% of Kidney failure patients in India get treated. Rest prefers an early death so to decrease the financial burden on their kith and kins.^[1] The conventional approach of management includes dialysis and renal transplantation which is not affordable and acceptable by Indian populations. Therefore, exploration of safe and alternative therapy is highly needed which proves

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to be helpful on reducing requirement of dialysis and in postponing the renal transplantation. Over the next decade, the number of patients with end-stage renal disease requiring renal replacement therapy is sure to increase by many folds worldwide posing a difficult situation to overcome with respect to economy and health of the working and earning population of the nation. There is an urgent need to explore, highlight and modify modifiable risk factors as a basis for treatment strategies to prevent the development and progression of CKD.

Ayurveda is a traditional system of medicine that originates in India thousands of years ago. It is based on principle of balance and harmony between the body, mind and spirit. In *Ayurveda*, Chronic Kidney Disease is known as disease of the *Mutravaha Srotas*, which are the channels responsible for the elimination of the urine. *Ayurvedic* treatment for chronic kidney disease typically involve a combination of dietary changes, herbal remedies, and life style modifications. The goal of treatment is to improve kidney function, reduce symptoms and prevent complications. These significantly correct uremia which is the cardinal feature of the CKD and improve the renal function which is evident by reduction in serum creatinine and blood urea. In addition, the treatment also improves the general condition of the patient.

AIM

To review the properties and action of *Punarnavadi Kwath* on CKD

DRUG REVIEW

1. *Punarnava*

Botanical Name: *Boerhavia diffusa* (Linn.)

Family: *Nyctaginaceae*

Classical Names of *Punarnava*

Sanskrit: *Punarnava, Rakta Pushpa, Shilaatika, Kshudravarshabhu, Varshaketu, Kathillaka*

Hindi: *Gadapurna, Thikari, Sant, Biskhafra*

English: Spreading Hogweed

Chemical constituents:

Punarnavoside, hoeravinones A, B, C, D and E, liridodendrin, syringaresinol mono- β -D glucoside, flavones, sterols, isofuroxanthone, boeravine, hypoxanthine-9-Larabinofuranoside.

Pharmacological Activities:

Diuretic, anti-inflammatory, antiviral, anticonvulsant, cardiogenic, antihypertensive, hepatoprotective, antibacterial, significant antifibrinolytic.

Therapeutic Use:

Shotha, Netra Roga, Agnimandhya, Vibandha, Udararoga, Hridroga, Pandu, Kasa, Shwasa, Urahshata, Raktapradara, Mutrakrichchhra, Kushtha, Jwara

2. *Darunisha*

Botanical name: *Barberis Aristate Dc.*

Family: *Berberidaceae*

Synonyms:

Hindi: *Daru Haldi*

English: Indian beri beri

Chemical constituents:

Berrberine, berbamine, oxycanthine, epiberberine, palmatine, dehydrocaroline, jatrorrhizine and columbamine

Pharmacological activities:

Anti-microbial, anti-inflammatory, analgesic, anti-pyretic, hepatoprotective, immunomodulatory and cardiogenic activity.

Therapeutic uses:

Sothahara, Vedana Sthapan, Vrana Shodhana, Deepan

3. *Nisha*

Botanical name: *Curcuma longa*

Family: *Zingiberaceae*

Classical names:

Sanskrit: *Haridra, Nisha, Krmighna*

Hindi: *Haldi*

English: turmeric

Chemical Constituents:

curcuminoids (curcumin, demethoxycurcumin and bisdemethoxycurcumin)

Pharmacological Activities:

cosmeceuticals, expectorant, antiseptic, antihelminthic, blood purifier, in leprosy, spleen disorders, rheumatism, bronchitis, cough and cold, insecticide, spasmolytic, hypotensive, cholera, syphilis

Therapeutic Use:

Kushthaghana, Kandughana, Lekhaniya

4. Shunthi

Botanical Name: *Zingiber Officinale Roxb*

Family: *Zingiberaceae*

Classical Names of *Shunthi*

Sanskrit: *Shunthi, Vishva, Nagar, Vishvabhesahj, Ushana, Katubhadra, Shringbher, Mahaushadha*

Hindi: *Sonth*

English: Ginger

Chemical constituents:

Heptane, Octane, Isovaleraldehyde, Nonanol, Camphene, Myrecene, Limonene, Gingerol, Zingerone, Shogaol, Dihydroingerol (Essential Oil), 6-Ginger-Sulphonic Acid, Ginglycolipids A, B and C, Monoacyl-Digalactosylglycerols (Rhizomes), Dehydrogingerdione, Gingerdione and Gingerol (Root), Aspartic Acid, Threonine, Serine, Glycine, Cysteine, Valine, Isoleucine, Leucine and Arginine (Aerial Parts and Tuber).

Pharmacological Activities:

Antiinflammatory, Hypolipidaemic, Antiatherosclerotic, Antiemetic, Antiulcer, Antiplatelet, Antipyretic, Cardiovascular, Antioxidant, Antibacterial, Antifungal, Antitumoral, Carbonyl Reductase Activity, Antiserotonergic, Antirhinoviral, Hypouricemic, Analgesic, Antidepressant, hepatoprotective, Hypoglycaemic, Inotropic.

Therapeutic Use:

Agnimandhaya, Pandu, Adhaman, Svasha, Udararoga, Amavata.

5. Haritaki

Botanical Name: *Terminalia chebula Retz.*

Family: *Combretaceae*

Classical Names of *Haritaki*

Sanskrit: *Haritaki, Abhaya, Pathaya, Kaystha, Putana, Amrita, Hemavati, Avyatha, Chetaki, Shreyashi, Shiva, Vyastha, Vijaya, Jivanti, Rohini*

Hindi: *Harada, Harre*

English: Myrobalan

Chemical constituents:

Tannins, Anthraquinones and Polyphenolic Compound.

Pharmacological Activities:

Immuno Modulatory Activity: Ethanol extracts study confirms the immunomodulatory activity of ripe *T. Chebula* fruits as evidenced by the increase in the concentration of antioxidant enzymes, T and B cells, the proliferation of which play important roles in immunity. This phenomenon also enhances the concentration of melatonin in the pineal gland as well as the levels of cytokines.

Antioxidant Activity: Methanol Extract, water extract, 95 % ethanol extracts were used comparisons of antioxidant activities between unfermented extracts and fermented products are demonstrated for the first Time. The antioxidative pattern plots revealed valuable information and showed good correlation between scavenging effect on DPPH radical assay and hrp-luminol-H₂O₂ assay.

Therapeutic Use:

Vibanda, Aruchi, Udavarta, Gulama, Udararoga, Arsaha, Pandu, Sotha, Jirnavara, Visamajavara, Parmeha, Siroroga, Kasha, Tamaka Svasha, Hridroga

6. Guduchi

Botanical Name: *Tinospora cordifolia (Willd.)*

Family: *Menispermaceae*

Classical Names of *Guduchi*

Sanskrit: *Guduchi, Madhuparni, Amrita, Amritavallari, Chhinnaruha, Chhinodbhavaa, Vatsadani, Jeevanti, Tantrika, Soma, Somavalli, Kundali, Chakralakshanika, Dheera, Vishalya, Rasayani, Vayastha, Mandali, Devnirmitta, Chhinna, Chandrahaasaa*

Hindi: *Giloy*

English: Heart leaved moon seed

Chemical constituents:

Tinosporin, tinosporon, tinosporic acid, tinosporol, tinosporide, tinosporidine, columbin, chasmanthin, palmarin, berberin, giloin, giloinisin, cordifolide, Tinisporidine, β -sitosterol, Cordifol, Hepacosanol, octacosanol, Isocolumbin, Tetrahydropalmatine, Magnoflarine, Palamatine

Pharmacological Activities:

Hypoglycaemic, CNS depressant, antibacterial, antimicrobial, antipyretic, anti-inflammatory, anti-arthritic, antiallergic, hepatoprotective, analgesic, immunosupportive, antineoplastic, antidiabetic, antitumour, adaptogenic, antioxidant, antiendotoxic, hypotensive, diuretic.

Therapeutic Use:

Kushtha, Vatarakta, Trishna, Daha, Chhardi, Aruchi, Agnimandhya, Shola, Yakridvikara, Kamala, Amlapitta, Pravahika, Atisara, Raktavikara, Amavata, Pandu, Shwasa, Kasa, Shukradaurbalya, Prameha, Madhumeha, Mutrakrichchhra, Kushtha, Visarpa, Twakroga, Jwara, Vishamajwara, Jeernajwara

7. Chitraka

Botanical name: *Plumbago zeylanica* Muell Arg

Family name: *Plumbaginaceae*

Vernacular names: *Leadwort, Chita*

Synonyms: *Agnika, Dahana, Jyotiska*

Chemical constituents:

Plumbagin, Zeylanone, Chloroplumbagin, Droserone, iso Zeylanone, Plumbagic acid, Naphtheleone

Pharmacologic activities

Anti-bacterial, anti-fungal, anti-viral, anti-spasmodic, anti-carcinogenic, anti-pyretic and analgesic.

Therapeutic uses: *Grahani, Kushth*

8. Bharangi

Botanical name: *Clerodendron serratum*

Family: *Berberaceae*

Synonyms:

Sanskrit: *Bhramanayastika, Kharashakha, Padma, Kasajith, Barbura*

Hindi: *Bharangi, Babhanaiti*

English: Turk's turban moon, beetle killer, blue glory

Chemical constituents:

Mannitol, b-sitosterol.

Pharmacologic activities:

Anti-inflammatory, anti-allergic, wound healing activity, bronchodilator, anti-carcinogenic activity, anti-bacterial activity, allergic asthma.

Therapeutic uses:

Agnimandhya, Paachan, Gulma, Shoth, Kasa, Swasa, Pinas, Jwara

9. Devadaru

Botanical name: *Cedrus deodara* (Roxb) Loud

Family name: *Pinaceae*

Vernacular names: *Deodar, Devdara, Surdaru, Indradaru*

Synonyms: *Bhadradaru, Surahva, Kilimam*

Parts used: heart wood

Chemical constituents:

"p-methylacetophenone, atlantone, sesquiterpenes, deodarin

Pharmacologic activities:

The extract showed strong "antileishmanial" activities within a dose 25-200 μ g/ml culture and significant immunomodulant activities against the host cells".

“Cedrus genus- Cytotoxic, spasmolytic immunomodulatory, antiallergic, anti-inflammatory and analgesic activities”.

Therapeutic uses:

Dipan, Pachan, Medohara, Vedanasthapan, Sothahara, Lekhan, Swedajanan

Rasapanchaka of Punarnavadi Kwath

SN	Drug	Rasa	Guna	Veerya	Vipaka	Doshghnata	Karma	Useful Part
1.	Punarnava	Madhura, Tikta, Kashyaya	Laghu, Ruksha	Ushana	Madhura	Tridoshasha mka	Shothahara, Lekhana, Deepana, Anulomana, Rechana, Hridhaya, Raktavardhaka, Rasayana	Root
2.	Darunisha	Katu, Tikta	Laghu, Ruksha	Ushna	Katu	Kapha-Vatahara	Pacifies Vata and Kapha promotes Pitta	Root
3.	Nisha	Tikta, Madhur	Laghu, Ruksha	Ushna	Katu	Kapha Pitta Shamak	Kushthaghana, Kandughana, Lekhaniya	Rhizome
4.	Sunthi	Kaṭu	Laghu, Snigdha	Ushana	Madhura	Vata Kaphahara	Deepana, Pachana, Anulomana, Vatakaphahara, Hridaya	Fruit
5.	Haritaki	Amla, Madhura, Kaṣaya, Tikta, Kaṭu	Ruksha, Laghu	Ushna	Madhura	Tridoshaghana	Sarvadoshaprashamna ma, Chakshusaya, Rasayana, Deepana, Anulomana, Hridaya, Medaya	Fruit
6.	Guduchi	Kashaya, Tikta	Guru, Snigdha	Ushana	Madhura	Tridoshasha mka	Vedanasthapan, Kushthghna, Chhardinigrhna, Hridhya, Deepana, Pachana, Pittasaaraka, Anulomana, Samgrahi, Krimighna, Hridhya, Raktashodhaka, Raktavardhaka, Vrishya, Dahaprashamana, Balya, Mutrajanana, Jwaraghna, Trishnaanigrhna, Rasayana	Root, Stem, Leaf
7.	Chitraka	Katu, Kashaya	Laghu, Ruksha	Ushna	Katu	Kapha-Vatahara	Agnideepaka, Grahi, Pachaka	Root

						(Vata Vishesha)		
8.	<i>Bharangi</i>	<i>Katu, Tikta</i>	<i>Laghu, Ruks ha</i>	<i>Ushna</i>	<i>Katu</i>	<i>Kapha- Vatahara</i>	Pacifies Vata and Kapha promotes Pitta	<i>Root</i>
9.	<i>Devadaru</i>	<i>Tikta, Katu, Kashaya</i>	<i>Laghu, Snigdha</i>	<i>Ushna</i>	<i>Katu</i>	<i>Kapha- Vatahara</i>	<i>Dipana, Pachan, Medohara, Vedanasthapan, Sothahara, Lekhan, Swedajanan</i>	<i>Heart Wood</i>

CONCLUSION

Ayurveda is gaining an overwhelming response all over the world, especially in treating chronic or lifestyle disorders. Improper life style, irregular food habits, stress and workaholic attitude is now gripping the younger generation by altering the physio biological phenomenon of their body thus hampering their standards of life style causing an imbalance at cellular molecular level and inculcating one of the chronic diseases viz. CKD

Ayurveda paves a holistic approach regarding treatment of chronic and a life style disorder with a plentiful formulation quoted in numerous *Ayurvedic* classics and plays an eminent role in establishing the quality of life. *Punarnavadi Kwath* is one of the renowned formulations among them adapted by the *Ayurvedic* practitioners in their regular clinical practice for the treatment of CKD symptoms. Various researches states that the enlisted herbs of *Punarnavadi Kwath*, a significant formulation which respond positively to the cardinal symptoms of CKD like edema, inflammation, decrease the levels of serum urea and serum creatinine etc. as these herbs cumulatively works as an anti-inflammatory and rejuvenating the cells for management of the CKD symptoms by countering at cellular-mechano-bio molecular level.

Ancient *Ayurvedic* practitioners designed an *Ayurvedic* formulation with synergism of these medicinal herbs, to treat all the factors related to CKD and till date this formulation holds its quality's efficacy and proves its effectiveness at par to the contemporary parameters.

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