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A REVIEW ARTICLE ON CHUKRA (RUMEX VASICARIOUS LINN.)

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ABSTRACT

Since ancient period, ayurvedic herbal medicine used for the treatment of many diseases because of minimum side effects and cost effectiveness. This leafy vegetable is an abundant source of vitamins, minerals, proteins, fibers, anthraquinones, sterols, terpenes, tannins, saponin and flavonoids with lot of health benefits. Wide literature is available in ayurvedic medicine and unani medicine regarding its therapeutic uses. Beside classical literature, many studies have been conducted for antioxidant, hepatoprotective, antimicrobial, anti-inflammatory, wound healing, antidiarrheal, antidiabetic, anticancer, antifungal etc. In this review article, an attempt has been made to explore the complete profile of Rumex vasicarious linn. as mentioned in ancient classical literature as well as studies conducted in recent modern era.

KEYWORDS: Rumex Vacicarious, Chukra, Ayurveda, Antimicrobial, Anti-inflammatory.

INTRODUCTION

Wild plants are considered pharmacologically as a source of bioactive molecules. Early people treated their ailments using plants; hence, the history of medicinal plants is as long as the history of mankind.[1,2] About 80% of the world's population, primarily in Africa and other underdeveloped countries, still depends mainly on traditional medicine for disease treatment. African medicinal plants have a vast range of biological qualities that need to be identified, recorded, and researched. Over 1300 medicinal plants are used in European countries, out of which 90% are wild.[3] These confidential pharmaceutical drugs accessible from natural sources have fewer unfavorable side-effects than synthetic sources.[4]

Egypt's flora includes around 2080–2094 species of seed plants and vascular cryptogams.[5,6] The family Polygonaceae is a temperate-zone cosmopolite. Around the globe, there are 46 genera and 1100 species. This family is represented in Egypt by 28 species under eight genera.[5,7] The plants of genus Rumex comprise almost 150 annual, biennial, and perennial species broadly distributed in temperate climates worldwide.[7,8] Rumex vasicarious Linn. is a common household herb, which is used in ayurvedic and unani medicine for the treatment of constipation, hiccup, asthma, bronchitis, piles, dyspepsia, vomiting, spleen diseases etc. The plant having lot of phytochemicals like flavonoids, saponin, tannin, anthraquinone, glycoside, phenolic acid, coumarin, vitamin, minerals etc. Which are responsible for various pharmacological actions like anticancerous, antimicrobial, antidiabetic, anti-inflammatory, wound healing, hepatoprotective, cardioprotective etc.[9]

Habitat, geographical distribution and description

R. vasicarious is native plant to south west asia and north Africa and found all over india either in cultivation or as a gardenscape. It can grow in moist moderately fertile well drained soil in sunny area. This plant is mostly found in western Punjab and in states like Tripura, bihar, West Bengal and Maharashtra for its leaves as a vegetable.

It is an annual monoecious, glabrous, pale green, 15-30 cm height, dicotomously branched herb having 2.5-7.5 cm leaves. Racemes 2.5-3.8cm, terminal and leaf-opposed, leafles; pedicles slender, jointed about the middle or unjointed. Flowers 2-nate and connate in nature, very membranous and reticulate without a marginal nerve. Fruit is 1.3 cm diameter with white or pink in colour.[9,10]

Fig. No. 1 - Rumex Vasicarious Plant.

Fig. No 2 – Flowers of Rumex Vasicarious Linn.

Fig. No. 3 – Leaf of Rumex Vasicarious Linn.

Phytochemical studies

Numerous phytochemical studies of *R.Vasicarious* revealed the identification of 13 phenolic compounds: 8-C-glucosyl-apigenin, 8-C-glucosyl-luteolin, 6-C-hexosyl-quercetin, 3-O-rutinosyl-quercetin, 7-O-rhamno-hexosyl-diosmetin, 7-O-rhamno-acetylhexosyl-diosmetin, catechin, epicatechin, ferulohexoside, 6-C-glucosyl-naringenin, epicatechin gallate, 6-C-glucosyl-catechin, and epigallocatechin gallate. The leaves are good sources of minerals, a moderate source of protein and ascorbic acid along with high concentration of oxalic acid and low concentration of tocopherol and lipids. The plant also contains rich source of ß carotenes and anthraquinones particularly in root part such as emodin and chrysophanol This plant is a good source of minerals such as; K, Na, Ca, Mg, Fe, Mn and Cu. Fresh and green herbs contain 92% water content. Dried plant contains either extract 4.62%, albuminoid 16.27%, carbohydrate 57.86%, woody part 10.50% and alkaline 10.75%. Roots contain rumicin and lapathin, the active principles which resembles chregrophanic acid in proprties and action.[9,10,11]

DISCUSSION

Pharmacological activities

Wound healing activity

It showed better wound healing action in Rabbits treated with 20% gel prepared with methanol and aqueous extract of leaves as compare to the control group.[12]

Anti-diarrheal activity

Leaf extract exhibited anti-diarrheal activity in castor oil-induced diarrhea model in rats, through significant increase in the dry weight of their faeces & reduction in defecation drops.[13]

Antipyretic activity

The leaves of Rumex vesicarius Linn. showed the antipyretic action in experimental induced pyrexia in rabbits in dose-dependent manner.[14]

Anthelmintic activity

The Aerial extracts has shown significant dose-dependent anthelmintic activity through paralysis and the death of the earthworms.[15]

The antioxidant activity

The ethanol and ethylacetate extracts of Rumex vesicarius Linn. leaves exhibited better inhibition of free radicle activity as compared to standard quercetin.[16]

Antiemetic activity

Methanolic leaf extracts has displayed excellent antiemetic activity in male chicks compared with standard drugs Chlorpromazine, Domperidone, and Metoclopramide.[17]

Tracheal relaxant activity

Aqueous-methanol extract of Rumex vesicarius Linn. showed tracheal relaxant activity through anticholinergic and calcium channel blockade mechanism on isolated rabbit tracheal preparation.[18]

Nephroprotective activity

Methanol extract exhibited a protective effect against Cisplatin-induced kidney damage in Swiss albino male mice.[19]

Anti-inflammatory activity

Ethanolic leaf extract of R. vasicarious has shown anti-inflammatory activity in carrageenan-induced paw edema, and cotton pellet-induced granuloma, in male Wistar rats in dose dependent manner.[20]

Antidiabetic activity

Ethanolic extract of Rumex vesicarius Linn. leaves decrease the level of blood glucose in Streptozotocin-induced diabetes, in Wistar albino rats. This hypoglycaemic activity is due to flavonoid luteolin present in leaves of R. vasicarious and it is possibly through an interaction with the enzyme α-glucosidase.[21]

Antimicrobial activity

The extracts of leaves revealed the concentration-dependent nature of the extract with broad-spectrum activity against bacteria and fungi by agar cup plate method. Ether extract of root was most effective against Pseudomonas aeruginosa, Klebsilla pneumoniae, Staphylococcus aureus and Streptococcus pyogenes and methanol extract was shown to be effective against Streptococcus pneumonia while ethanol extract of flower was found to to be effective against Escherichia coli.[22]

Spasmogenic and Spasmolytic activity

Aqueous methanolic leaf extract exhibited spasmogenic effect on a low dose (0.03 to 0.3 mg/ml) and followed by the spasmolytic effect on the higher dose (1mg/ml) in adult albino rabbit jejunum.[23]

Anticancer activity

Different extracts of leaves of Rumex vesicarius Linn. and Symplocos recemosa Roxb. have shown a significant cytotoxic effect on HT-29 and PC-3 cell lines and as well as on BSL bioassay in a dose-dependent manner.[24]

Improve fertility activity

Seeds water extract of Rumex vesicarius Linn. has improved mice fertility in male and female with their embryo development, supported by a histological section of the ovary and testis of mice.[25]

Hepatoprotective activity

R. vasicarious Linn. whole plant methanol extract showed hepatoprotective activity in CCl_4 induced hepatotoxicity at different doses (100 mg and 200 mg/kgbw) in male albino Wistar rats.[26]

Antifungal activity

Aerial parts of Rumex vesicarius Linn. displayed antifungal activity against Fusarium, Helminthosporium, Alternaria, and Rhizoctonia species, besides, the sporogenesis of Alternaria and Fusarium species was suppressed.[27]

Cardio-protective activity

Its cardioprotective, anticoagulant, and vasorelaxant properties in both investigations (in vivo and ex vivo) are mediated through partial endothelium-dependent, NO and calcium channel blockade mediated vasorelaxation. HPLC study of *R. vesicarius* leaf extract (aqueous-methanolic) confirmed the presence of rutin, quercitrin, and emodin which inhibits cardiovascular pathogenesis by downregulating the ERK1/2 pathway, AMPKα dependent pathway, TNF-α, NF-κB pathway respectively.[28]

Immuno-modulatory activity

Oral administration of ethyl acetate and ethanolic extract at an experimental dose (400 mg/kg and 200 mg/kg) exhibitd a significant increase in the phagocytic index when compared with control group. This study showed immunomodulatory effect on both humoral as well as cell-mediated immunity which is due to activation of T-cell which mediated DTH response, activation of the reticuloendothelial system, enhance the capacity of monocytes macrophages system.[29]

Antihypertensive activity

The aqueous extract of R. vesicarius leaf decreased the systolic, diastolic, mean, and mean arterial blood pressure in hypertensive rats through vasodilatory properties.[30]

Toxicity Studies

Acute toxicity study showed that Rumex vesicarius L. was not a cause of death at a single dose of even 2000 mg/kgbw. A transient hypoactivity, loss of appetite, and piloerection were observed at a dose of 2000 mg/kg bw and recovered within 12 h., while no sign or symptom of toxicity was observed in a group of 100, 200, 1000 mg/kg bw treated. So 1/5 (200 mg/kg

bw) and 1/10 (100 mg/kgbw) of 1000 mg/kg bw were considered as the appropriate dose range for further pharmacological studies.

Chloroform extract of stem part of part *R. vesicarius* did not induce any significant level of toxicity in zebrafish embryos. Similarly no developmental toxicity was observed in zebrafish embryos treated with crude extract prepared in hexane, methanol, chloroform and water from the stem part of *R. vesicarius*. Zebrafish embryos treated with crude extracts prepared from root, leaves, and flowers did not show any significant level of toxicity as well.[31,32]

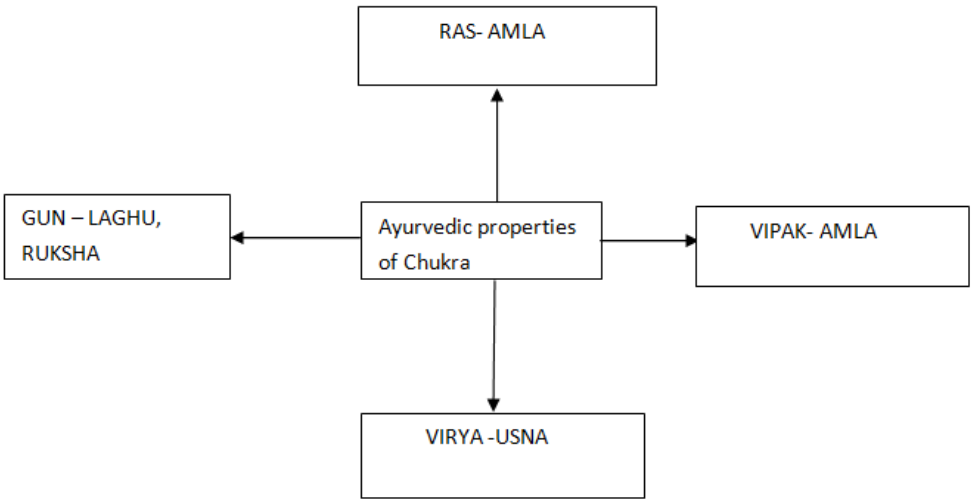
Different uses in Ayurveda[33]

Different Preparations	Diseased conditions	Route
Glue of leaf	Dental caries	Locally kept in gum
Glue of leaf	Scorpion chomp	Area influenced
Simmered & powdered seeds	Scorpion chomp	Taken orally
30 ml decoction with curd and pomegranate juice	Loose bowel	Orally
Juice of leaves	Ear infection	Locally
50 ml of decoction	Hepatomegaly & heaps	Orally
10 ml squeeze of leaves	Regurgitation	Orally
Kwath of Cangeri, Cukrika and Dugdhika with ghrita	Atisaar	Orally
Liquid gruels of Cukrika, Nagkesara and Utpala	Raktarsa	Orally

Rumex vesicularis and Ayurveda[33]

In ancient ayurveda medicine, *Chukra* term is used for Rumex vasicarious Linn.

The synonyms for *Chukra* in ayurveda are chukram, chukrika, patraamla, satvedhani, chuka, rochani, chuko, kharibhaji.



CONCLUSION

Since the existence of human, the disease have been associated with them. The diseases not only affect the human health but also results in death in very severe cases. R. vasicarious Linn. a promising potent and effective drug that was being used in ayurvedic medicine for the treatment of atisaar, raktarsha, spleen diseases, hiccup, asthma, bronchitis, dyspepsia, vomiting, piles etc. This review article confirms that, R. vasicarious contain various bioactive compounds such as coumarins, flavonoids, phenolic acid, tannin, saponin, anthraquinones, glycosides, vitamins, minerals and other miscellaneous compounds which are responsible for numerous pharmacological activities like antimicrobial, anticancerous, anidiabetic, anti-inflammatory, antifungal, antidiarrheal, wound healing, cardioprotective, hepatoprotective, immunomodulatory, antihelminthic etc. Though R. vasicarious Linn. has various medicinal properties, further studies on this herb are needed to explore its pharmacological actions with mechanism on scientific parameters. Present study can open up new meadows for research and can provide better conceptual leads for future R. vasicarious researches.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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