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Ethno-Pharmacology of *Rumex vesicarius* Linn. *(Hummaz)* and It's Importance in Unani System of Medicine

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ABSTRACT

Since the ancient period, herbal medicines have been used for the treatment of so many diseases as they are effective, with fewer side effects, and are cost-effective. *Rumex vesicarius* Linn. *(Hummaz)* is an important medicinal plant belonging to the family Polygonaceae. It is a herb, commonly found in many parts of India especially in Tripura, West Bengal and Bihar. It is commended for the medicinal application of its seeds, leaves, and roots in Unani system of medicine. It is the most widely used medicine in Unani for the treatment of diarrhea, jaundice, nausea, vomiting and is also very useful in intestinal abrasions. It is known by different vernaculars in different parts of India such as Chukka Kurain Telugu, Chukkain Bengali and Marathi, and in Sanskrit Amlasara, Jussisoppu in Kannad, and in English, it is called Bladder dock or country sorrel. Various Phytochemical constituents have been isolated from *Rumex vesicarius* Linn. In which coumarins, flavonoids, phenolic acid, tannins, saponins, and anthraquinones are primary phytoconstituents. Wide literature is available in Unani medicine regarding its pharmacological actions and therapeutic uses. Besides classical literature, numerous studies have been conducted for antibacterial, antioxidant, antidiarrheal, hepatoprotective, nephroprotective, and anti-inflammatory wound healing and other pharmacological actions of the drug. In this review paper, an attempt has been made to explore the complete profile of *Rumex vesicarius* Linn. (*Hummaz*) as mentioned in Unani classical literature as well as in studies conducted in the recent past.

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INTRODUCTION:

Rumex vesicarius Linn. (*Hummaz*) is anannual, glabrous herb. It is also known as "Bladderdock", "Rosydock", and "Blistersorrel" or "Countrysorrel.[1] It belongs to the family "Polygonaceae" which is cosmopolitan and also known as "Smartweed", "Buckwheat" or "Knotweed" family.[2] This Plant is widely cultivated as a green leafy vegetable in many parts. It is widely used as a food, also as a medicinal herb.[1] In the Unani system of medication, it was used as a tonic, analgesic, cooling agent, antidote for bites and stings of poisonous animals, appetizer and also used in skin diseases like leucoderma, scabies, and to check nausea.[3] In the Ayurvedic system of medication it was used as stomachic, antitumor, analgesic, laxative, flatulence, spleen diseases, hiccup, asthma, bronchitis, dyspepsia, vomiting, piles, heart troubles, and biliousness.[3] Fresh juice of *Rumex vesicarius* Linn. Has been used traditionally as a cooling agent, astringent, anti-venom agent, and appetizer for the treatment of allay pain of toothache, nausea, and insect bite, seeds were used for dysentery.[4] The various part of *Rumex vesicarius* Linn. As leaves, roots, and seeds are used as medicine. Several pharmacological properties of *Rumex vesicarius* Linn. Have been verified and proved on experimental trials on animals, as well as several studies have been done on isolation and characterization of phytochemicals. The plant is having lots of pharmacological activities such as antioxidant, anticancer, antidiabetic, antidiarrheal, and antipyretic, etc.[2]

Historical Background:

According to "Charaka"- the leaves are considered an antidote to snake venom, and the seeds an antidote to the scorpion venom. The leaves are also applied externally to the part bitten.[3]

Habitat and geographical distribution:

The plant is native to South West Asia and North Africa found throughout India, either in cultivation or as a gardenscape.[5] It is an annual herb found in Western Punjab and cultivated in Tripura, West Bengal, and Bihar for its leaves that are used as a vegetable.[6] It is an underutilized, underexplored, traditional, valuable, medicinal, and vegetable herb. It is widely distributed as an environmental weed and is sparsely cultivated in market and truck gardens as a minor leafy vegetable crop in South India. It can grow in moist moderately fertile well-drained soil in a sunny position. It is found in a wild state in West Punjab, Trans-Indus Hills, Afghanistan, Persia, and North Africa.[7]

Table No. 1: Taxonomical Classification[8]

Kingdom	Plantae–Plants
Subkingdom	Tracheobionta-Vascular plants
Superdivision	Spermatophyta-Seeds plants
Division	Magnoliophyta-Flowering plants
Class	Magnoliopsida–Dicotyledons
Subclass	Caryophyllidae
Order	Polygonales
Family	Polygonaceae-Buckwheat family
Genus	Rumex L.–dock
Species	*Rumex Vasicarius* Linn.

Vernacular names[3,5,6]

Arabic: Hamaz,Hummaz, Humarbostani, Humbijit; **English:** Bladder Dock, Sorrel; **Urdu:** Chukakasag, Chuka-Ka-Sag; **Persian:** Tursak, Turshah, Turshumuk, Turshah; **Hindi:** Ambari, Chuka, Chukekasak; **Sanskrit:** Amla, Amlabhedaka, Amlanayaka, Amlankusha, Amlasara, Amlavetasa, Bhedana, Bhedi, Bhima, Bodhi, Chukra, Gulmaha, Gulmaketu, Mahakshara, Mansadravi, Phalamla, Rajamala, Raktisara, Rasamla, Sahasrajita, Sahasravedhi, Shankadravi, Shatavedhi, Varabhida, Varangi, Vedhaka, Vetasamla, Viramla, Churka; **Bengali:** Chak, Chuk, Chuka, Chukapalang, Chukpal; **Assamese:** Sukhasag; **Telugu:** Chukkakura; **Tamil:** Shakkankirai; **Bombay:** Chuka; **Burma:** Kalakhenboun; **Central Provinces:** Ambutchuka; **Chagai:** Trushko, Trushpako; **Deccan:** Ambari, Chukka; **Kharan:** Khasako, Trushpako; **North Western Provinces:** Chuka, Chukapalak, Chukapalang; **Nushki:** Turushpako; **Punjab:** Kattamitha, Khatbiri, Khattitan, Saluni, Triwakka; **Pushtu:** Chok, Choka, Taluni; **Sind:** Chuka; **Sinhalese:** Suri; **Kannad:** Jussisoppu; **Marathi:** Chuka.

Ethnobotanical description of *Rumex vesicarius* Linn. *(Hummaz)*:

Rumex vesicarious Linn. Is an annual monoecious, glabrous, pale green, herb, with erect to ascending stem branching from the base and fleshy leaves. It flowers in March and April giving greenish to purplish bisexual flowers and purplish-red-veined fruits.[9] The herb is very sour due to the presence of Oxalic acid in the form of Potassium oxalate, Tartaric acid, etc. It grows at the height of 15-30cm. It is dichotomous branched. Leaves are 2.5-7.5 cm, obtuse or

acute, elliptic ovate or oblong, 3-5-nerved, base cuneate rarely cordate or hastate, petiole as long as the blade. Rameces 2.5-3.8 cm, terminal, and leaf-opposed, leafless; pedicels slender, jointed above the middle or unjointed. Flowers sometimes 2-nate and connate, valves large, orbicular, 2-lobe detach end, very membranous and reticulate without a marginal nerve. Fruit 1.3 cm. diameters, white or pink, valve hyaline.[3]

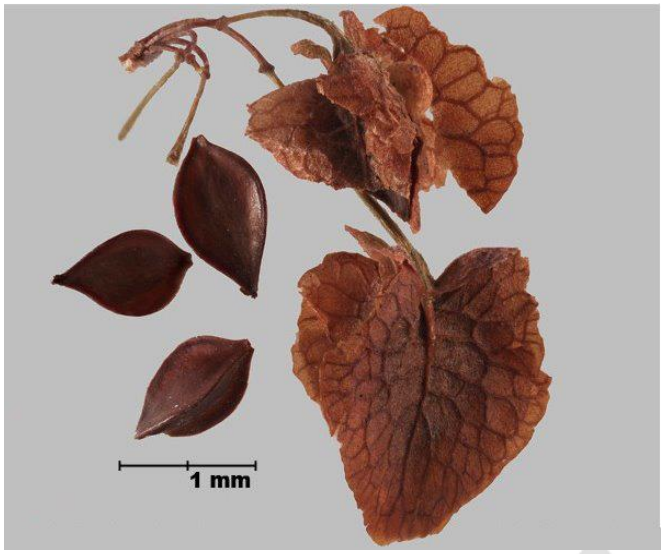

Figure No. 1: Seeds of *Rumex vesicarius* Linn.

Figure No. 2: Plant of *Rumex vesicarius* Linn. Figure No. 3: Leaves of *Rumex vesicarius* Linn.

Description of *Rumex vesicarius* Linn. *(Hummaz)* in Unani System of Medicine:

This is a small plant having size 6-12 inch. Leaves, seeds and roots are the part (*Hissa-i-Musta'mela)* used as medicine in Unani System of Medicine.[10,12,13] The leaves of the plant are elliptic ovate or oblong with a length of 1-2 inches, which are very sour in taste and are also used as a vegetable. Flowers are small rounded and white to reddish. Fruits are small white to reddish and arranged in a cluster. Seeds are small triangular shiny black and some are reddish in color, which is called *Tukhm-e-Turshah.* Root of the plant is red in colour and it is also sour in taste.[10,11,12,13,14] There are three modes of treatment in the Unani System of Medicine such as Ilajbiltadbeerwaghiza, Ilajbildawa, and Ilajbilyad, and *Hummaz* is used as Ilajbildawa.[15]

The *Mizāj* (temperament) of *Hummaz* is Barid 2 Yabis 2 (Cold 2 & Dry 2) as suggested by the majority of the Unani physicians and some said Barid 1Yabis 2 (Cold 1 & Dry 2). It is described *Muzir* (harmful) for chest and Bah (male sexual potency), and seeds are *Muzir* for kidney and spleen. The *Muṣleh* (corrective drugs) used for its harmful effects are Sarbatekhaskhas and sheereeni and for seeds Badyan and Qand. The *Badal* (substitute) of *Hummaz* is *Turanj* and *Habb-ul-Aas and for seeds Tukm-e-Bartang,* but it is strongly recommended to use the original drug as far as possible. The *Miqdār-I Khurak* (dose) is 3-6 g mormasha as per classical Unani literature.[11,12,14]

In Unani System of Medicine, *Hummaz* has been used as a single drug or as a compound formulation (*Murakkabāt*) for the management of various diseases. *Safoof-e-Teen*, *Qurskoharba*, *Majoon Masik-ul-Bol*, etc. Some are the common formulations of it. These formulations are named based on their chief ingredient or the disease condition in which it has to be used.[10]

***Afa'al* (Pharmacological actions) of *Rumex vesicarius* Linn. *(Hummaz)* in Unani:** [10,11,12,13,14]

Hābis-i-Dam (*hemostyptic*), *Musakkin-i-Harārat* (*antipyretic/febrifuge*), *Musaffī-i-Dam* (*blood purifier*), *Muqawwī-i-Jigar* (*hepatotonic*), *Muqawwī-i-Mi'da* (*stomachic*), *Musakkin-i-Alam* (*analgesic),* *Jālī*(*detergent*), *Qāti'-i-Safra',* *Musakkin-i-Atash*, *Dāfi'-i-Khumār* (*intoxication*), *Qābiḍ* (*astringent*), *Ḥabis-i-Ishāl (anti-diarrheal)*, *Muḥallil-i-Waram* (*anti-inflammatory*), *Mushtahī* (*appetizer), Mugharrī (mucilaginous)*.

Mawāq-i-Istemāl (Therapeutic Uses) of *Rumex vesicarius* Linn. *(Hummaz)* in Unani: [10,11,12,13,14]

Qay'(*emesis*), *Ishāl* (*diarrhoea*), *Saḥjwa Qurūḥal-Am'ā'* (*intestinal abrasions*), *Waramal-Mi'da* (*gastritis*),*Waramal-Ṭiḥāl,Waja'al-Asnān* (*toothahe*), *Sozish-i-Mi'da, Sozish-i-Majrā-i-Bawl, Khafaqān* (*palpitation*),*Yaraqān* (*jaundice*), *Judhām, Sayalanal-Raḥim* (*leucorrhoea*),*Waḥam* (*pica*), *Ghathayān* (*nausea*), '*Uṭāsh Mufriṭ* (*polydipsia*), *Salasal-Bawl* (*urinary incontinence*), *Ḥurqaal-Bawl* (*burning micturition*), *Ḥurqaal-Mi'da* (*hyperacidity*), *Qulā'* (*stomatitis*), *Jarab* (*scabies*), *Ḥikka* (*pruritus*), *Zaḥir* (*dysentery*), Scorpion Sting.

Table No. 2: Ethnomedicinal use of different parts of *Rumex vesicarius* Linn. *(Hummaz)*

Ailments	**Part used**
Diarrhoea	Leaf[21]
Wound healing	Leaf[20]
Inflamation	Leaf[27]
Worm infestation	Aerial parts[22]
Hepatic disorder	Roots, leaves and fruits[9,32]
Renal disorder	Aerial parts[26]
Fever	Leaf[34]
Emesis	Leaf[24]
Diabetics	Leaf[28]
Cancer	Leaf[17]

Phytochemical constituents of *Rumex vesicarius* Linn. *(Hummaz)*:

Roots and aerial parts of the plant are reported to contain several chemical constituents in which coumarins, flavonoids, phenolic acids, tannins, saponins, and anthraquinones are primary phytoconstituents.[16] The plant leaves are rich in ascorbic acid, tartaric acid, and citric acid, and they also contain glycoside, flavonoids, tannins, and phenolic compounds.[17] The Plant contains many bioactive substances such as flavonoids (vitexin, isovitexin, orientin, and isorientin) and anthraquinones particularly in roots (emodin and chrysophanol), these are good antibacterial agents. The plant also contains carotenoids, vitamins (especially vitamin C and E) proteins, lipids, and organic acids.

Phytochemicals such as polyphenols, flavonoids, carotenoids, tocopherols, and ascorbic acid have a role as an antioxidant and detoxifying agents. This plant is a good source of minerals such as "K, Na, Ca, Mg, Fe, Mn, Cu".[18] It also contains rumicin, lapathin, oxalic acid, mucilage, Helonioside A, gallic acid, isovanillic acid, p-hydrooxy cinnamic acid, succinic acid, n-butyl-β-fructopyranoside, quercetin, hexadecanoic acid 2, 3-dihydroxypropylester, β-sytosterol, daucosterol.[19] The presence of 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, epicatechingallate, 6-C-glucosyl-catechin, and epigallocatechin gallate has been reported in *Rumex vesicarius* Linn.[16]

Pharmacological activities of *Rumex vesicarius* Linn. *(Hummaz)*:

Wound healing activity- A significant wound healing activity was observed, the wound contraction was better in the animals (Rabbits) treated with 20% gel prepared with methanol and aqueous extract of leaves of *Rumex vesicarius* Linn. As compared to the control group. Aqueous fraction has shown (92.34%) maximum effect, while methanol has shown 79.71% effect compared to control.[20]

Anti-diarrheal activity- Leaf extract exhibited significant anti-diarrheal activity in castor oil-induced diarrhea model in rats, as it has shown a significant increase in the dry weight of their feces & reduction in defecation drops.[21]

Antipyretic activity- The leaves of *Rumex vesicarius* Linn. have the antipyretic action in dose-dependent manner. *Rumex vesicarius* Linn. significantly ($P<0.05$) lowered the elevated temperature against various protocols of experimental induced pyrexia in rabbits.[34]

Anthelmintic activity- The Aerial extracts have shown significant dose-dependent anthelmintic activity, as paralysis, as well as the death of the earthworms, was observed. The most potent activity was observed with the aqueous extract.[22]

The antioxidant activity-Antioxidant potential of *Rumex vesicarius* Linn. was determined by Nitric oxide free radical scavenging assay, by the Griess reagent method. The ethanol and ethylacetate extracts of *Rumex vesicarius* Linn. exhibited significant inhibition activity on compared to standard quercitin. Extracts of the plant have shown significant activity and total antioxidant capacity compared with standard antioxidants.[23]

Antiemetic activity- *Rumex vesicarius* Linn. methanolic leaf extracts has shown excellent antiemetic activity in male chicks compared with standard drugs Chlorpromazine, Domperidone, and Metoclopramide. Emesis was induced by the oral administration of Copper sulphate.[24]

Tracheal relaxant activity- Aqueous-methanol extract of *Rumex vesicarius* Linn. was found to possess tracheal relaxant activity. The tracheal relaxant activity was mediated via anticholinergic and calcium channel blockade mechanism, on isolated rabbit tracheal preparation.[25]

Nephroprotective activity- *Rumex vesicarius* Linn. methanol extract possesses a protective effect against Cisplatin-induced kidney damage in Swiss albino male mice.[26]

Anti-inflammatory activity- *Rumex vesicarius* Linn. leaf ethanolic extract has shown anti-inflammatory activity in a dose-dependent manner in carrageenan-induced paw edema, and cotton pellet-induced granuloma, in male Wistar rats.[27]

Antidiabetic activity- Ethanolic extract of *Rumex vesicarius* Linn. leaves significantly decrease the level of blood glucose in Streptozotocin-induced diabetes, in Wistar albino rats.

The result indicated that *Rumex vesicarius* can protect pancreatic β cells from Streptozotocin-induced damage, which is confirmed by the result of histopathological examination of pancreases.[28]

Antimicrobial activity- The extracts of leaves of *Rumex vesicarius* Linn. revealed the concentration-dependent nature of the extract with broad-spectrum activity against bacteria and fungi, by agar cup plate method using nutrient agar media.[29]

Antibacterial activity- Ether extract of root was most effective against *Pseudomonas aeruginosa, Klebsilla pneumoniae, Staphylococcus aureus* and *Streptococcus pyogenes*, and methanol extract was found to be effective against *Streptococcus pneumoniae*. While ethanol extract of flower was found to be effective against *Escherichia coli*.[18]

Spasmogenic and Spasmolytic activity- Aqueous methanolic leaf extract and fraction of *Rumex vesicarius* has shown a 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.[30]

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. The order of anti-cancer activity was found to be EARV>ESR>ERV>NSR.[17]

Improve fertility activity- Seeds water extract of *Rumex vesicarius* Linn. has shown safe and effective, in improving mice fertility in male and female with their embryo development, supported by a histological section of the ovary and testis of mice.[31]

Hepatoprotective activity- *Rumex vesicarius* Linn. whole plant methanol extract exhibits hepatoprotective activity in CCl_4 induced hepatotoxicity at different doses (100 mg and 200 mg/kgbw) in male albino Wistar rats.[32]

Anticancer remedy against Hepato-cellular carcinoma- The study has shown that the treatment of the HCC with *Rumex vesicarius* Linn. extract reversed the significant increase in liver enzyme activity, CEA, AFP, AFU, glypican 3, galgi 73 and VEGF level in serum as compared to HCC untreated counterparts.[33]

Treatment was evidenced by the marked improvement in the histopathological features of the liver of the treated group, in adult male albino rats (dose 400mg/kgbw). The study provided evidence for the significance of *Rumex vesicarius* Linn. as an anticancer remedy with a promising anticancer potential against HCC.[33]

Antifungal activity- Aerial parts of *Rumex vesicarius* Linn. and *Ziziphus spina-christi* leaf extracts exhibited antifungal activity against Fusarium, Helminthosporium, Alternaria, and Rhizoctonia species, besides, the sporogenesis of Alternaria and Fusarium species was suppressed. Both plants induced severe morphological changes in the hyphal shape and surface.[35]

CONCLUSION:

Rumex vesicarius Linn. *(Hummaz)* has been reported by several traditional physicians to treat various diseases of mankind. Since, the existence of human in the world, diseases have been associated with them. They not only affect human health but also lead to death in severe cases. *Rumex vesicarius* Linn. a promising very potent and effective drug that was being used as single and compound formulations in the Unani system of medicine for several medical

applications, because of its safety and effectiveness. It is reported that it is a very useful drug for Intestinal abrasions and Bible-related disorders. Traditionally, it has been used to treat nausea, diarrhea, dysentery, intestinal abrasions, and biliousness, etc. But in past few years, experimental studies have made it possible to discover more pharmacological properties of the plant such as anti-oxidant, anti-microbial, antibacterial, anticancer, anthelmintic, etc. From various parts of the plant, several bioactive compounds have been isolated which belong to various chemical groups. The isolated components belong to coumarins, flavonoids, phenolic acid, tannins, saponins, and anthraquinones, glycoside, vitamins, minerals, and other miscellaneous compounds. Now, it can be concluded that *Hummaz* is an important plant origin drug of the Unani system of medicine which can be used frequently by physicians according to its vast pharmacological actions. Though *Rumex vesicarius* Linn. *(Human)* has various medicinal applications, further studies on this drug are needed to explore its pharmacological action and proposed mechanism of action on scientific parameters.

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CONFLICTS OF INTEREST:

The authors declare no conflict of interest.

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