INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES
[ISSN: 0975-4725; CODEN(USA):IJPS00]
Journal Homepage: https://www.ijpsjournal.com

OPEN ACCESS

Review Article

Review On *Rumex Vesicarius* Plant

Tanmayi Patil[1], Kaushal Patil [2]*, Yash Vikhankar [3], Pooja Dhangar [4], Vishal Bodke[5]

[1-4] *Department of Pharmacology, Konkan Gyanpeeth's Rahul Dharkar College of Pharmacy and Research Institute, Karjat.*

[5] *Department of Pharmaceutics, Konkan Gyanpeeth's Rahul Dharkar College of Pharmacy and Research Institute, Karjat.*

ARTICLE INFO

Received: 03 Sep 2024
Accepted: 07 Sep 2024
Published: 15 Sep 2024

Keywords:
Rumex vesicarius, Polygonaceae, anti-inflammatory, antiulcer, anti-hypertensive.

DOI:
10.5281/zenodo.13732558

ABSTRACT

Medicinal and food plants as well as their bioactive fractions have been used by diverse human cultures since ancient times. These plants provide multiple health benefits because of the presence of a plethora of phytochemicals including phenylpropanoids, isoprenoids, alkaloids, sulphated compounds, peptides and polysaccharides that are responsible for various biological activities such as anticancer, antioxidant, antifungal, antibacterial, anti-dysenteric, anti-inflammatory, antiulcer, anti-hypertensive and anticoagulant properties. The genus Rumex includes edible and medicinal herbs belonging to buckwheat (Polygonaceae) family, consisting of about 200 species rich in phenylpropanoids and anthraquinones. Some Rumex species have exhibited health-promoting effects and have been used as traditional foods and herbal remedies, though a limited information has been documented on their specific biological properties. Therefore, this survey aimed at reviewing the Rumex species with documented biological activity, focusing on preclinical evidences on their efficacy and safety. Fruits and vegetables are emerging fast as most economical and nutritious universal foods. Leafy vegetables are those plants whose leaves or aerial parts have been included in a community's culture for use as food over a long instance. These vegetables are highly recommended due to their relatively high nutritional value. Rumex vesicarius L., a commonly grown and sometime found in wild habitat. This leafy vegetable is a rich source of vitamins, minerals, proteins, fibers, carotenes and flavonoids with many health benefits. This present study describes useful information about R. vesicarius L., current research carried out so far and some medicinal properties identified and explored.

***Corresponding Author:** Kaushal Patil.
Address: *Department of Pharmacology, Konkan Gyanpeeth's Rahul Dharkar College of Pharmacy and Research Institute, Karjat.*
Email ✉: kaushal1439patil@gmail.com

Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

INTRODUCTION

The genus Rumex, belonging to the Polygonaceae includes more than 250 species, which are distributed worldwide [1]. The Rumex includes many edible plants, which attracted the attention of many investigators because of their medicinal importance [2]. For centuries, Rumex spp. have been used in folk medicine for treating a wide range of ailments including; colds, sore throat, indigestion, scurvy, as well as a cooling drink for fevers. Also, they have been used to treat cancer, rheumatism, liver disorders, foul ulcers and skin conditions. Moreover, roots have been made into poultices for treating nettle and bee stings and other inflammations [3]. The R. vesicarius L. is belongs to family Polygonaceae which is cosmopolitan in nature and known as the smartweed buckwheat or knotweed family. The family name is based on the Type genus "Polygonum" [4]. In 1789, the name was first used by Antoine Laurent de Jussieu in his book, Genera Plantarum. A total 1120 species under 50 genera are distributed all over the world, largely in temperate and tropical regions. There are about 121 species and 29 varieties (including exotics) under 12 genera are scattered in India [5]. The genus Rumex L. is representing ca 200 species distributed in temperate regions, European countries, America, Asia and Australia continents [6-8] and 22 species are occurs in India. Among them, R. vesicarius L. is annual semi-succulent herb, pale green, 15-30 cm high, monoecious, branched from the root, glabrous, dichotomously branched. The plant is cultivated as a vegetable and for its medicinal properties in Uttar Pradesh, Maharashtra and Karnataka. It is said to be indigenous in Western Punjab [9]. Known as 'Chuka, Chukar, and Khatpalak' in native languages (28), it is considered an excellent food plant with well-studied medicinal importance. Sometimes it has found as an escape from cultivated field. It gets flowered and fruiting in the month of January and March respectively [10]. Leaves are cooked with pulses [11,12] or sometimes eaten fresh also prepared as papad. Egypt, plant is utilized in beverage products. R. vesicarius is an edible weed, eaten fresh or cooked, and commonly known in Arabic as "Humaidah" and in English as "Bladder dock". As a medicinal herb, it is used in treatment of liver diseases, digestive problems, toothache, nausea, pain, anti-inflammatory, antitumor as well as antischistosomal, and antimicrobial activities [13,14]. It was also found to have aphrodisiac effect. The roasted seeds were eaten for the cure of dysentery. Finally, the plant can be used also to reduce biliary disorders and control cholesterol levels. The medicinal importance of this plant is a reflection to its chemical composition since this plant contains many bioactive substances such as flavonoids (vitexin, isovitexin, orientin and isorientin), anthraquinones particularly in roots (emodin and chrysophanol), quinones, carotenoids, vitamins (especially vitamin C), proteins, lipids, carbohydrates, reducing sugars, phenols, tannins, saponins, triterepenoids and organic acids. This plant is also a good source of minerals, such as; K, Na, Ca, Mg, Fe, Mn, Cu [15]. The medicinal properties of plant-derived compounds such as phenolics, flavonoids, and terpenoids have been extensively investigated. Rumex vesicarius L. is an annual semi-succulent pale green leafy plant growing to a height of 15-30 cm. Research indicates that this plant has significant levels of β-carotenes [16], vitamins (particularly vitamin C), lipids, proteins, and organic acids, making it a valuable supplement. It also contains minerals like potassium, sodium, calcium, magnesium, iron, manganese, and copper [17,18]. Recent research has focused on the characterisation of active chemical components and biological applications of extracted plants. The entire plant has therapeutic properties and can

treat a range of maladies, including Antidepressants, tumours, hepatic disorders, poor digestion, diarrhoea, calculi, heart difficulties, pains, spleen diseases, and hiccups [19-21]. The previously mentioned bioactive phytochemicals found in Rumex vesicarius L. (such as polyphenols, flavonoids, carotenoids, tocopherols and ascorbic acid) have a role as antioxidant and detoxifying agents [22]. The intake of dietary antioxidant phytochemicals like carotenoids, phenolic compounds and flavonoids will lead to the protection against noncommunicable diseases in human beings; cancer, cardiovascular diseases and cataract [23-24].

Figure No.1: Leaves of Rumex vesicarius.

Pharmacological evidences of polygonaceae family:

Various medicinal benefits are credited to this family, especially for bronchitis, cough, asthma, dysentery, diarrhea, earache, eczema, inflammatory, kidney disease, jaundice, paralysis, leprosy, toothache, colitis, intestinal parasites, ulcerative and money more, among polygonaceae species Rumex is famous and interesting which is discussed as under. Rumex, a genus of polygonaceae family, is very predominant worldwide. There are about 200 species of this genus known, many of which are useful and traditionally used for medicinal practices [25]. All parts of the plant were found useful and have a number of health benefits. Literature studies revealed that genus Rumex possess diverse pharmacological assays like, antioxidant, anti-inflammatory, antifertility, cytotoxic, purgative, antibacterial, antifungal, antidiarrheal, antiviral and antipyretic assays. It was found that plant parts (root, stem leafs) of Rumex hastatus, are shown various bioassays such as antioxidant, anti-nociceptive, anti-diarrheal, and cytotoxic potential [26].

Genus Rumex:

About 250 species are included in the genus Rumex, both annual and perennial herbs worldwide distributed. Previous studies have reported anticancer, antidiarrheal, antioxidant, analgesic, anti-inflammatory, anthelminthic and antimicrobial activities of plants belonging to this genus (40), rich in bioactive phytochemicals [27]

Figure No.2: Cultivation of Rumex vesicarius.

Taxonomic position:

The importance of plants, especially medicinally active plants are in demand for the pharmacological studies in order to overcome the stress of medicinal needs. Among the largely existing traditionally valued plants known, the Rumex dentatus has its place on top. The genus Rumex is the second major family of Polygonaceae with approximately more than 200 species spread in Europe, Asia, Africa and North America, largely in the northern hemisphere [28]. Rumex dentatus is a species of flowering plant of family polygonaceae known by the common names like toothed dock, Indian dock or aegean dock. It is native to parts of Eurasia, North Africa, and Asia. It is commonly known as Abuj in Kashmir and widely distributed all over Jammu & Kashmir region. Rumex dentatus has therefore been chosen for the investigation due to its simplicity of access and strong traditional and pharmacological values [29].

Classification:

Kingdom: Plantae.
Subkingdom: Tracheobionta (vascular plant).
Super division: Spermatophyta (seed plant).
Division: Magnoliophyta– Flowering plants.
Class: Magnoliopsida– Dicotyledons.
Subclass: Caryophyllidae.
Order: Polygonales.
Family: Polygonaceae– Buckwheat family.
Genus: Rumex.
Species: vesicarius.[30]

Distribution around the globe:

The main distribution area of R. vesicarius is the Arabian Peninsula, Near East and northeastern Africa. The northern limits are through central Iraq, the southwestern part of Saudi Arabia and the Sinai. North of this line there are isolated stands situated at the border between Israel and Jordan. In northeastern Africa the species occurs in eastern Egypt and Sudan. From here R. vesicarius extends along the coasts of the Mediterranean Sea to northwestern Africa and the Canary Islands [31]. From the Arabian Peninsula it spreads to southern Iran, Afghanistan, Pakistan and the Punjab. R. vesicarius occurs at low altitudes between sea level and 1000 m, however, in Central Sahara it reaches 2800 m. In Iran it is generally found between 550 and 2000 m, in Pakistan between 100 and 1600 m, and in Iraq from 100– 750 m [32].

General morphology:

It is an erect, succulent annual herb which grows to up about 60 cm high, and has triangular to ovate leaves which are truncate or cordate at the base and about 5–10 cm long, with entire margins [33]. The stipules form an almost complete sheath around the stem which disintegrates. The flowers are green with a red tinge, and have six perianth segments with the inner three becoming enlarged and papery when fruiting. The hard, red and reticulately veined fruit persist, giving rise to spectacular displays [34].

Tissue Culture Studies:

Some in vitro studies show by El-Bakry et al. (29) and Nandini et al. (30) on different growth nutrient media. El-Bakry et al. (29) evaluated in vitro growth percentage of seedlings and their require days and suitable media for proper growth. They found that, for appropriate germination of seedlings 2 to 16 days were required on MS medium, and 10 days in case of seedlings grown on agar. This was followed by Nandini et al. who developed multiple shoots and in vitro flowering from nodal explants on MS medium which was supplemented with BAP (8.8 µM) and NAA (2.4µM). and Flowering with BAP, NAA and GA3 in different concentration of 8.8 µM, 2.4 µM and 1.4 µM respectively [35].

Chemical Composition:

This plant mainly contains ascorbic acid, protein and low quantity of lipids, tocoferol and minerals. The plant also contains rich source of ß carotenes and anthraquinones particularly in roots such as emodin and chrysophanol and other parts rumicine, lapathine, Lutein [36] and even some glycosides: vitexin, isovitexin, orientin and iso-orientin vitamins (especially vitamin C), proteins, lipids and organic acids. The high acidity and lemony flavour could be suggested that it may be useful in the formation of acid foods [37]. Subsequently, Gupta et al. [38] analyzed blanching treatment effects on ascorbic acid content in R. vesicarius L. if it is blanched at 80% for 1 minute in distilled water, their leaves showed highest retention of 70-75% of ascorbic acid. If time is increased to 4 min showed only 10% reduction. In chemical solution at 80% for 1 minute showed maximum retention 92-97% of ascorbic acid. This plant is a good source of minerals such as; K, Na, Ca, Mg, Fe, Mn and Cu [39-43]. Also it has many important medicinal uses, the plant is stimulant, tonic, and acts as aphrodisiac agent [44].

Acute Oral Toxicity Dose Test:

Tests were conducted on 18 rabbits to evaluate how much R. vesicarius was toxic to them. They were split into three groups of six rabbits each, and they were deprived of feed for 24 h before getting doses of 1000, 3000, and 6000 mg/kg orally. For 14 days of taking the R. vesicarius the rabbits were inspected for jerkiness, tiredness, and death [45].

Traditional Uses:

In indigenous medicine, the seeds' decoction has been used to treat fever, venereal illness, rheumatism, and leprosy [46]. Bacterial infections, rheumatic aches, and malignancies are treated with leaf extract [47]. Pharmacological studies reported its antioxidant, analgesic, lipid-lowering, antimicrobial, anti-obesity, insecticidal, antipyretic, gastroprotective, anticancer, and antidiabetic effects [48]. It was devised to address cardiac diseases in folk medicine (49-52). Plants recognized for hepatoprotection, antioxidants, antidiabetic, antithrombotic, and anti-inflammatory, are believed to provide cardioprotection. Previously we have reported antipyretic, antiemetic, antidiarrheal, bronchodilator, wound healing, and counter-irritant potential of R. vesicarius [50-55].

Figure No.3: Rumex vesicarius Herb.

CONCLUSION:

Rumex vesicarius has been demonstrated to have antioxidant, hypotensive, vasodilatory, calcium channel blocking, and anticoagulant effects. R. vesicarius aqueous-methanolic leaf extract may have cardioprotective properties due to its diverse phytoconstituents. R. vesicarius therapy can boost antioxidant levels in cardiomyocytes, enhancing resilience against ADR-induced oxidative stress. However, an appropriate molecular mechanism for cardioprotection has yet to be identified. Additionally, cardiac glycosides, flavonoids, anthraquinones, and tannins were identified. R. vesicarius has been shown to be effective in treating cardiovascular disorders through in vivo, in vitro, and ex vivo studies. This will pave the road for developing new medications to treat cardiovascular disorders by impacting many pathways. Based on the present review, we conclude that this leafy vegetable is a rich source of vitamins, minerals, proteins, fibers, carotenes and flavonoids with many health benefits. It grows as a common vegetable and also run wild. This review describes useful information about current research which were identified and explored.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTION

All contribute equally.

REFERENCES:

1. Rao KNV, Sunitha Ch, David B, Hya S, Mahesh V. A study on the nutraceuticals from the genus Rumex. Hygeia J D Med. 2011;33(1):76-88.
2. Mostafa HAM, El-Bakry AA, Alam EA. Evaluation of antibacterial activity of different plant parts of Rumex vesicarius L. at early and late vegetative stages of growth. Int J Pharm. Sci. 2012;4(4):426- 435.
3. Hatfield G. Encyclopedia of folk medicine: Old world and new world traditions. Santa Barbara, California: ABC-CLIO Inc.; 2004.
4. Heywood, V.H. 1978. Flowering Plants of the World. Oxford University Press Oxford: 336 pp.
5. Qaiser, M. 2001. Polygonaceae. In: Flora of Pakistan (eds.): Ali, S.I. & Qaisar, M., Karachi University and Missouri Botanical Garden, St Louis, Missouri, U.S.A. 205: 110-124.
6. Sanchez, I. & Kron, K.A. 2008. Phylogenetics of Polygonaceae with an emphasis on the evolution of Eriogonoideae. Systemaic Botany 33(1): 87-96.

7. Chase, M. & Reveal, A. 2009. An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG III. Botanical Journal of Linnaean Society 161(2): 105- 121.
8. Singh, N.P., Lakshminarasimhan, P., Karthikeyan, S. & Prasanna, P.V. (eds.) 2001. Flora of Maharashtra State: Dicotyledones-vol.-II (CombretaceaeCeratophyllaceae) Botanical Survey of India, Calcutta.
9. Srivastava, R.C. 2014. Family Polygonaceae in India. Indian Journal of Plant Sciences 3(2): 112-150.
10. Al-Quran, S. 2009. Ethnopharmacological survey of wild medicinal plants in Showbak, Jordan. Journal of Ethnopharmacology 123: 45-50.
11. Rao, K.N.V., Sunitha, C., David, B., Sandhya, S. & Saikumar, P. 2011. Pharmacognostic Studies on Rumex vesicarius. Asian Journal of Plant Science and Research 1(1): 102-115.
12. Batanouny, K.H. 1999. Wild medicinal plants in Egypt. Academy of Scientific Research and Technology, Egypt and International Union for Conservation (IUCN), Switzerland. 166-167.
13. Sonawane, S. & Arya, S.S. 2013. Antioxidant Activity of Jambhul, Wood Apple, Ambadi and Ambat Chukka: An Indigenous Lesser Known Fruits and Vegetables of India. Advance Journal of Food Science and Technology 5(3): 270- 275.
14. Abou Elfotoh, M.A., Khaled, A.S., Kevin, P.A., Abdelaaty, A.S., Magda, T.I., Nevein, M.A., Nahla, S.A.A., Faiza, M.H., Mostafa, M.E. & Mahmoud, A.S. 2013. Lipophilic Constituents of Rumex vesicarius L. and Rumex dentatus L. Antioxidants 2: 167- 180.
15. Abdel-Hameed, E.S.; El-Nahas, H.A.; Abo-Sedera, S.A. Antischistosomal and antimicrobial activities of some Egyptian plant species. Pharm. Biol. 2008, 46, 626–633.
16. Alfawaz, M.A. Chemical composition of hummayd (Rumex vesicarius) grown in Saudi Arabia. J. Food Compos. Anal. 2006, 19, 552–555.
17. Mostafa, H.M.; El Bakry, A.A.; Eman, A.A. Evaluation of antibacterial and antioxidant activities of different plant parts of Rumex vesicarius L. (Polygonaceae). Int. J. Pharm. Pharm. Sci. 2011, 2, 109–118.
18. Litvinenko, Y.A.; MuzychKina, R.A. Phytochemical investigation of biologically active substances in certain Kazakhstan Rumex species. Chem. Nat. Compd. 2003, 5, 368–370.
19. Panduraju, T.; Raja, S.R.; Sateesh, K.V. A study on antimicrobial activity of Rumex vesicarius Linn. Int. J. Pharm. Technol. 2009, 1, 21–25.
20. Rao, K.N.V.; Sunitha, C.; Banji, D.; Shwetha, S.; Krishna, D.M. Diuretic activity on different extracts and formulation on aerial parts of Rumex vesicarius Linn. J. Chem. Pharm. Res. 2011, 3, 400–408.
21. El-Bakry, A.A.; Mostafa, H.A.M.; Eman, A.A. Evaluation of some growth parameters and chemical compostion of in vitro growth seedlings of Rumex vesicarius L. (Polygonaceae). J. Am. Sci. 2011, 7, 170–179.
22. Rao, B.N. (2003). Bioactive phytochemicals in Indian foods and their potential in health promotion and disease prevention. Asia Pacific Jclin Nutr, (Vol.) 12 (1), pp. 9- 22.
23. Matkowski, A. (2008). Plant in vitro culture for the production of antioxidants – A review. Biotechnology Advances, (Vol.) 26, pp. 548-560.
24. Mostafa, H.A.M.; EL-Bakry, A.A. and Eman, A. Alam (2011). Evaluation of antibacterial and antioxidant activities of different plant parts of Rumex vesicarius L. (Polygonaceae). International Journal of Pharmacy and Pharmaceutical Sciences, (Vol.) 3 (2), pp. 109-118.

25. Prasad, P. and Ramakrishnan, N. (2012.b). Antioxidant assay of Rumex vesicarius L.. International Journal of Current Research, (Vol.)3 (11), pp. 074-076.
26. Prasad, P. and Ramakrishnan, N. (2012.c). In vitro lipid peroxidation assay of Rumex vesicarius L.. International Journal of Pharmacy and Pharrmaceutical Sciences, (Vol.) 4 (suppl. 1), pp. 368-370.
27. Khare, C.P. Encyclopedia of Indian Medicinal Plants, Rational Western Therapy. In Ayurvedic and other Traditional Usage, Botany; Springer: Berlin/Heidelberg, Germany, 2004; pp. 314–315.
28. El-Bakry, A.A., Mostafa, H.A.M. & Alam E.A. 2011. Evaluation of some growth parameters and chemical composition of in vitro grown seedlings of Rumex vesicarius L. (Polygonaceae). Journal of American Science 7(6): 170-179.
29. Nandini, B.P., Sudarshana, M.S., Sherief, M.U. & Niranjan, M.H. 2013. In vitro propagation and flowering from nodal explants of Rumex vesicarius L. - an important medicinal plant. International Journal of Pharma and Bio Sciences 4(3): (B)13-18.
30. RECHINGER K. H. 1964a. Flora of lowland Iraq. Verlag J. Cramer, Weinheim.
31. RECHINGER K. H. 1968. Polygonaceae. Flora Iranica 56. Akademische Druck- u. Verlagsanstalt, Graz.
32. MAIRE R. 1961. Flore du Afrique du Nord 7. Éditions Paul Chevalier, Paris.
33. Belanger, J., Balakrishna, M., Latha, P. & Katumalla, S. 2010. Contribution of selected wild and cultivated leafy vegetables from South India to lutein and acarotene intake. Asian Pacific Journal of Clinical Nutrition 19(3): 417-424.
34. Nadkarni, A.K. 1976. The Indian materia medica. Popular Prakashan Pvt. Ltd. Mumbai. Vol 1: 1080-1081.
35. Bhaskarachary, K., Rao, D.S.S., Deosthale, Y.G. & Reddy, V. Carotene content of some common and less familiar foods of plant origin. Food Chemistry 54: 189-93.
36. Pullaiah, T. & Ali Moulali, D. 1997. Flora of Andhra Pradesh (India). Vol. 2. 910-911.
37. Saleh, N.A.M., El-Hadidi, M.N. & Raafat, A. 1993. Flavonoids and anthraquinones of some Egyptian Rumex species (Polygonaceae). Biochemical Systematics and Ecology 21(2): 301- 303.
38. Al–Rumaih, May, M., Al-Saad, F.A. & Warsy, A.S. 2002. Seasonal variation in mineral content of different organs development of Rumex vesicarius L. Saudi Journal of Biological Sciences 9(1): 69-78.
39. Alfawaz, Md.A. 2006. Chemical Composition of hummayad (Rumex vesicarius L.) grown in Saudi Arabia. Journal of Food Composition and Analysis 19: 552-55.
40. Filho, J.M.B., Alencar, A.A., Nunes, X.P., Tomaz, A.C., Filho, S.J.G., Petronio, F.A., Silva, M.S., Souza, M.F.V. & Cunha, E.V.L. 2008. Source of alpha-, beta-, gamma-, delta-, and epsiloncarotenes: A twenties century review. Brazilian Journal of Pharmacognosy 18(1): 135-154.
41. Gopal, R., Vijayakumaran, M., Venkatesan, R. & Kathiroli, S. 2008. Marine organisms in Indian medicine and their future prospects. Natural Products Radiance 7(2): 139-145.
42. Lakshmi, P.C.P., Chakradhara, R.P.S, Rao, J.L. & Gopal, N.O. 2009. EPR and IR spectral investigations on some leafy vegetables of Indian origin. Spectrochimica Acta part A. 74: 147-57.
43. Gupta, S., Jyothi Lakshmi, A & Jamuna, P. 2008. Effect of different blanching treatments on ascorbic acid retention in green leafy vegetables. Natural Product Radiance 7(2): 111-116.

44. OECD Guidelines for the Testing of Chemicals (No 423) "Acute Oral Toxicity-Acute Toxic Class Method" (Adopted on 17 December 2011); Organization for Economic Co-Operation and Development: Paris, France, 2001.
45. Khare, C.P. Encyclopedia of Indian Medicinal Plants, Rational Western Therapy. In Ayurvedic and other Traditional Usage, Botany; Springer: Berlin/Heidelberg, Germany, 2004; pp. 314–315.
46. Ahirrao, Y.A.; Patil, D.A. Ethnomedicinal claims against stomach complaints in Buldhana District (Maharashtra, India). Life Sci. Leaflet 2012, 1, 16–25.
47. Elbakry, A.A.; Eman, A. Evaluation of antibacterial and antioxidant activities of different plant parts of Rumex vesicarius. (Polygonaceae). Int. J. Pharm. Pharm. Sci. 2001, 3, 109–118.
48. Dymoke, W. A History of the Principal Drugs of the Vegetable Origin, 2nd ed.; Pharmacographia Indica; Hamdard Publications Karachi: Karachi, Pakistan, 1972; p. 2114.
49. Khan, I.A.; Aziz, A.; Manzoor, Z.; Munawar, S.H.; Sarwar, H.S.; Afzal, A. Study on antipyretic activity of Rumex vesicarius leaves extract in albino rabbits. Vet. World 2014, 71, 44–48. [CrossRef]
50. Khan, I.A.; Aziz, A.; Manzoor, Z.; Munawar, S.H.; Sarwar, H.S. Antiemetic activity of methanolic leaf extract of Rumex vesicarius Linn. Int. J. Pharmal. Res. Allied Sci. 2013, 4, 33–37.
51. Khan, I.A.; Janbaz, K.H.; Saqib, F. Antidiarrheal activity of methanolic leaf extract of Rumex vesicarius. Bangladesh J. Pharmacol. 2016, 11, 175–180. [CrossRef]
52. Khan, I.A.; Aziz, A.; Manzoor, Z.; Munawar, S.H.; Sarwar, S. Tracheorelaxant effect of aqueous-methanol leaf extract of Rumex vesicarius L. in rabbits. Sci. Res. Assays 2015, 10, 150–155.
53. Khan, I.A.; Aziz, A.; Manzoor, Z.; Munawar, S.H.; Sarwar, S. Evaluation of wound healing potential of Rumex vesicarius L. leaf extract and fractions in rabbit. Afr. J. Tradit. Comp. altern. Med. 2015, 12, 60–64. [CrossRef]
54. Khan, I.A.; Aziz, A.; Manzoor, Z.; Munawar, S.H. Dermatological evaluation of counter irritant effect of methanol leaf extract of Rumex vesicarius Linn. in rabbits. JPMA 2016, 66, 49–54.

HOW TO CITE: Tanmayi Patil , Kaushal Patil , Yash Vikhankar , Pooja Dhangar , Vishal Bodke, Review On *Rumex Vesicarius* Plant, Int. J. of Pharm. Sci., 2024, Vol 2, Issue 9, 775-783. https://doi.org/10.5281/zenodo.13765727