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PHYTOCHEMICAL SCREENING, MORPHOLOGY, BOTANICAL DESCRIPTION, NUTRITIONAL ANALYSIS, TRADITIONAL AND PHARMACOLOGICAL SIGNIFICANCE OF *RUMEX NEPALENSIS SPRENG.*

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ABSTRACT

In many cultures, Rumex nepalensis is a well-known traditional medicinal herb that is used to make medications and food. Nowadays, there is a lot of interest in the pharmacological and phytochemical analyses of R. nepalensis. Thus, the phytochemical analysis and pharmacological uses of R. nepalensis are the primary subjects of the current review. Different secondary metabolites were extracted from the plant's roots and aerial parts, including emodin, endocrocin, chrysophanol, neopodin, physcion, torachrysone, aloesin, catechin, quercetin, and resveratrol, as well as their derivatives.The pharmacological properties of R. nepalensis extracts and isolated substances include anti-inflammatory, antioxidant, antibacterial, wound-healing, anti-plasmodial, and anti-ulcer properties.R. nepalensis has various sections that are important for ethnomedicine. R. nepalensis is a possible source of isolated chemicals and extracts with pharmacological activity. The manufacture of contemporary medications may benefit greatly from the use of R. nepalensis in the future.

KEYWORDS: Medicinal plants, Rumex nepalensis, Pharmacological activities, Phytochemical

INTRODUCTION

Herbs or medicinal plants are those that have therapeutic properties; they have been utilized for human health and medicine from ancient times. Over time, several pharmaceutical firms began using these plants or herbs to generate herbal preparations, although their primary use was in Ayurvedic medicine.[1]

Approximately 250 species of herbs make up the genus Rumex. Known as "Nepal dock," Rumex Nepalensis Spreng. (R. Nepalensis) is a perennial, ascending herb that is a member of the Polygonaceae family. Although it is an agricultural weed, this "wild plant" is not "unwanted" in the context of traditional herbal treatments. Numerous investigations have validated the remarkable therapeutic advantages of this herb.

Fig. 1: *Rumex Nepalensis Spreng.*

When young leaves of this plant are cooked as vegetables, they give food a lemony, acidic taste. Locals also consume the young shoot as a cooked vegetable. This plant is also used as a dye or coloring agent. Plant leaves' green hue is frequently employed in confections. The high anthraquinone concentration of R. nepalensis makes it a valuable medicinal herb in the North Western Himalaya. Purgative, antioxidant, antifungal, antibacterial, antihistaminic, anticholinergic, antibradykinin, antiprostaglandin, antipyretic, antiinflammatory, antialgal, insecticidal, analgesic, and central nervous system depressive qualities have all been demonstrated by R. nepalensis. There are additional reports that the herb has skeletal muscle relaxant propertiey.[2]

The purpose of this review is to give the scientific community a source of information about this plant and its potential uses in the future by critically evaluating the literature on its phytochemical profiles, traditional medicinal uses, and validation of these claims, among other powerful qualities and applications of this highly medicinal herb.

Botanical description

Morphological features of R. Nepalensis: In general, plants belonging to the Rumex genus have long, upright taproots. With a height of 50 to 100 cm, R. nepalensis is a plant that Gonfa et al. 2021:18 Page 2 of 11 Beni-Suef University Journal of Basic and Applied Sciences glabrous, grooved, branching, and greenish.[19] Large roots that erect branches and develop deeply in the ground characterize this perennial herb. The edible leaves measure 5 to 10 cm in length, feature a petiole, a broad or arrow-shaped base, and a bottom portion that is both long-stalked and wide-stalked. Its petiole is 4–10 cm long on its basal leaves.[20] The bisexual,reddish blooms of the plant create long, almost leafless racemes.

Fig. 2: ***Rumex nepalensis Spreng.***

Taxonomy Of The R. Nepalensis: The Rumex genera contain 250 plant species, including R. nepalensis. The altitudinal conditions of the areas where it grows determine when it flowers and bears fruit, which occurs between April and September.[19,22] According to reports, it has n = 50 (10×) meiotic chromosomes.[22] It is a perennial herb that climbs, and different localities have different colloquial names for it.

Geographical distribution of R. Nepalensis: Although rumex genera are often found in northern parts of the world, particularly in Africa, America, Asia, and Europe, the plant species can be introduced practically anywhere. R. nepalensis can tolerate a variety of

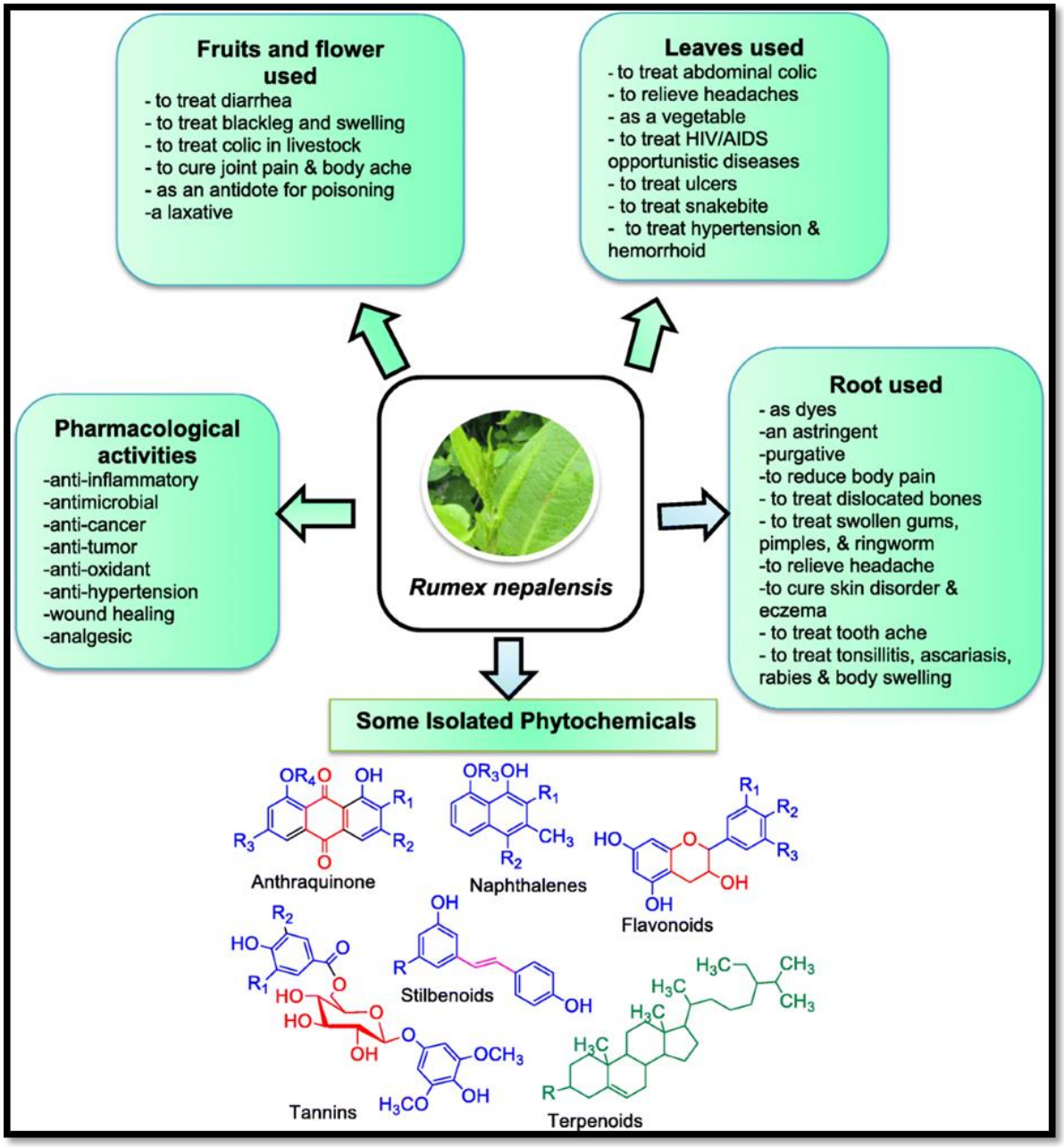
ecological settings. It is frequently a weed plant that develops in a variety of climatic conditions at higher elevations between 900 and 4000 meters.[20]

Table 1: An examination of the nutritional value of several sections of Rumex nepalensis Spreng.[23]

Plant part	Protein%	Fat And Oil%	Carbohydrates%
Root	11.12	15.57	48.62
Stem	15.30	18.69	40.20
Leaf	13.95	17.54	41.52
Flower	9.88	19.10	48.43
Fruit	14.84	11.78	50.83
Seed	18.53	13.80	40.41

Phytochemical Compounds Isolated From *R. Nepalensis*

A wide variety of secondary metabolites are present in R. nepalensis, according to phytochemical screening activities. But scientific groups have only reported a small number of these. There are phytochemical substances such as anthraquinones (Fig. 3), naphthalenes (Fig. 4), flavonoids (Fig. 5), terpenoids, and sterols (Fig. 6) that have been validated by studies on the solvent extracts of R. nepalensis roots.[24, 40]



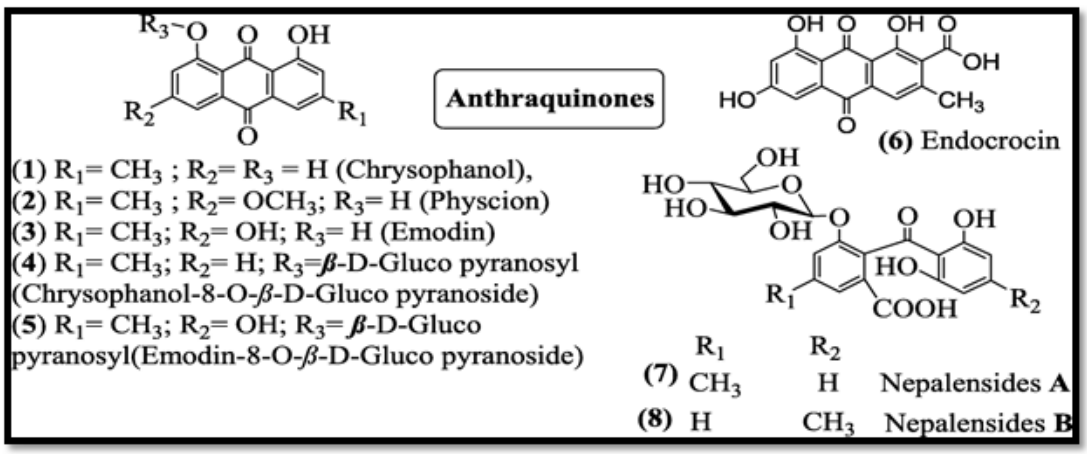


Fig. 3: Isolated anthraquinone compounds from the root extracts of *R. Nepalensis.*

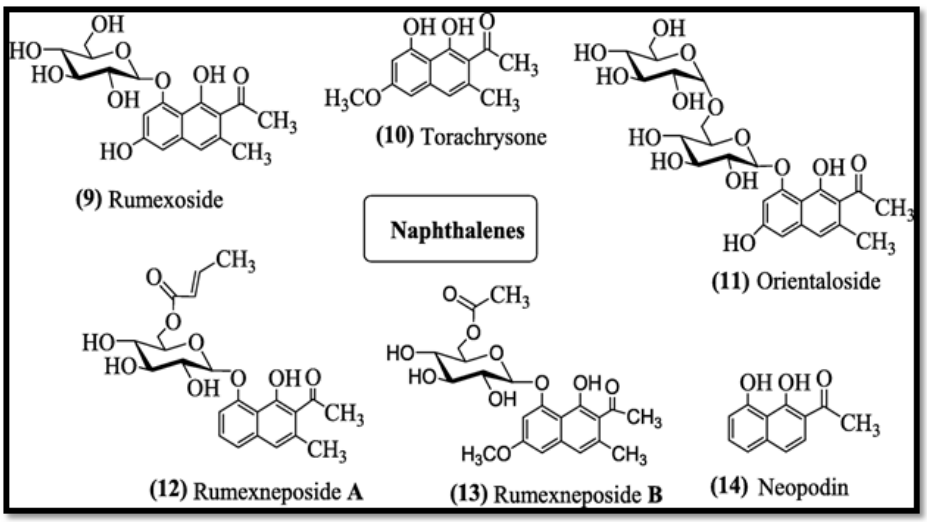


Fig. 4: Isolated Naphthalene Compounds From The Root Extracts Of *R. Nepalensis.*

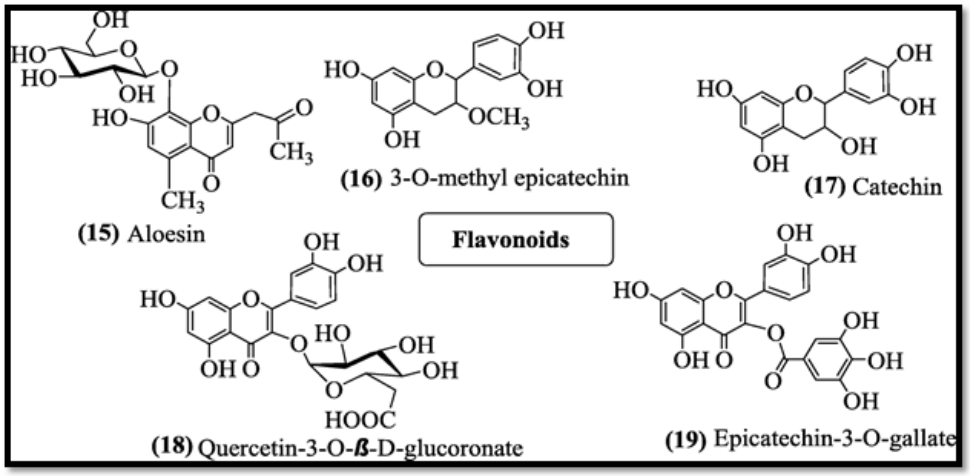


Fig. 5: Isolated Flavonoids From The Root Extracts Of *R. Nepalensis.*

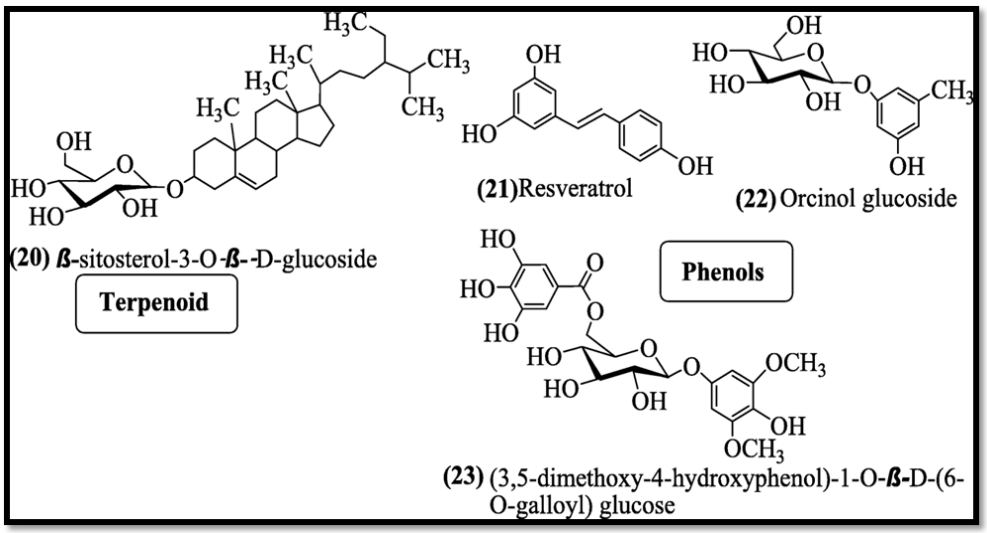


Fig. 6: Isolated Terpenoid And Phenol Compounds From The Root Extracts Of R. Nepalensis.

Uses in traditional medicine

The ancient medical systems of Nigeria, India, China, and Indonesia have been based on R. nepalensis for thousands of years. In Indian traditional medicine, R. nepalensis is widely utilized for a variety of therapeutic applications. The plant's leaves have demulcent, astringent, and diuretic properties.

It also relieves the discomfort that Urtica dioica L. causes Because it is high in vitamin C, this plant is used to cure rheumatism and scurvy. Leaf infusion has purgative properties, and the leaves' juice is administered externally to treat headaches and for its astringent properties. Its leaf extract is used to halt bleeding and has antibacterial qualities.

In addition to treating syphilis and colic ulcers, it also prevents allergies brought on by Acacia nilotica (L.) Willd ex Delile leaves. Applying leaf extract helps heal skin lesions. Body discomfort is lessened by using an aqueous extract as a wash. Scabies is cured by combining butter and leaf powder. Infusions of leaves are used to treat stomachaches and dysmenorrhea. Cuts, boils, blisters, and wounds are treated externally with crushed leaf extract as an anti-allergic. In Jimma, this herb is also used to cure skin ailments. For sheep, horses, and cows, R. nepalensis is a favorite source of feed. Additionally, leaf is used to cure ear infections.

After crushing the leaves, a solution is created and applied as a pesticide to eradicate pests. Additionally, crushed leaves are mixed into a paste using milk, churned curd, or cow urine, which is then applied to the body near the snake bite. After stinging nettle injuries, the injured areas are rubbed with fresh young leaves of R. nepalensis.

R. nepalensis root juice is taken orally on an empty stomach to treat jaundice.In Chinese traditional medicine, the roots of the plant are traditionally used to cure tinea, discomfort, inflammation, bleeding, and constipation.

Animals with diarrhea and dysentery are given the ground root. Additionally, R. nepalensis root is utilized as an astringent. Purgative and a replacement for rhubarb (Rheum species). For displaced bones and to ease discomfort in the body, a decoction is applied.

The root's paste is administered externally to cure headaches and to ringworm, pimples, and swollen gums. The methanolic root extract has a substantial hypotensive effect, is used to treat joint pain and paralysis, and exhibits muscle relaxant and tranquilizer properties.

Bale traditional medicine practitioners utilized R. nepalensis to treat edema, blackleg, and diarrhea.

This herb is used in Ethiopia as a laxative, poisoning remedy, and to treat animal colic. The plant's roots have been utilized in traditional medicine to ease mental stress and anxiety. The liquid from the crushed root is applied to the scalp to stop hair loss. Joint discomfort can be relieved by using a half spoonful of the crushed flower parts and root extract. It heals body aches as well. On burned bodily parts, powdered root powder is administered to promote quick healing and prevent infection. In traditional Chinese medicine, plant roots are also utilized to cure hemostasis. To cure tonsillitis, crushed fresh root and leaves are administered orally with water.[2]

Pharmacological Significance Of *Rumex Nepalensis*

Rumex species have shown potent pharmacological activities. Root and aerial parts of *Rumex* species are used as medicines throughout the world for a variety of human diseases such as purgative, tinea, antioxidant, cytotoxic, antipyretic, antidiarrhea, antiviral, antibacterial, antifungal, and anti-inflammatory activities.[41,55]

Anti-inflammatory activity

Different studies have indicated that solvent extracts and isolated pure compounds of *R. nepalensis* are rich in anti-inflammatory activities. There were reports on the investigation of chloroform and ethyl acetate extracts of the root of the plant which have shown significant anti-inflammatory activity.

For the treatment of acute inflammation of the mouse model, extracts of ethyl acetate and chloroform revealed a reduction in ear edema. Another report for ethanolic extract of the root part of *R. nepalensis* demonstrated an anti-inflammatory effect that has a strong comparison with the standard diclofenac. Some isolated compounds like neopodin, chrysophanol, and their derivatives from ethyl acetate fractions of the root part of the plant species have shown an improved anti-inflammatory activity than the control ibuprofen . Similarly, ethyl acetate extract of the root part of *R. nepalensis* was reported to show moderate to strong inhibitory effects against inflammatory effects on COX-1 comparing with indomethacin and COX-2 compared with celecoxib as positive controls.

The presence of anthraquinones and naphthalenes in the root extract of the plant species is responsible for the inhibition effects observed . From the root part of the plant, secondary metabolites such as chrysophanol, physcion, endocrocin, chrysophanol-8-O-β-D-glucopyranoside, nepodin, and nepodin-8-O-β-D-glucopyranoside were specifically reported for their anti-inflammatory activities.[56]

Antioxidant activities

Several studies showed the antioxidant activity of *R. nepalensis*. Water, ethyl acetate, ethanol, methanol, acetone extracts of this plant has been shown to have antioxidant properties. *In vitro* assays such as 2,2'-azino-bis(3-ethylbenzothiazoline-6-sulphonic acid ($ABTS^{\cdot +}$), 2,2-diphenyl-1-picrylhydrazyl ($DPPH^{\cdot}$), superoxide, hydroxyl and nitric oxide radical scavenging were employed to evaluate free radical scavenging and antioxidant potential of methanol, water and acetone extracts.

These extracts contain significant amount of flavonoids, phenolics, vitamin C and tannin which showed inhibitory ability against the free radicals, thus aging related diseases will be prevented by these vegetables. The components of ethanolic, chloroform and ethyl acetate extracts are inhibitors of DPPH radical and also are reported to scavenge the NO radical, inhibite the lipid-peroxidation and also chelate the metal ions.[2]

Wound healing activity

The leaves extract of *R. nepalensis* was mixed with Vaseline or butter and applied to the infected body. Antibacterial and antipyretic activities of the plant products further justify *R. nepalensis* application as a traditional medicinal plant to cure wounds Secondary metabolites from the plant species were also reported showing wound healing properties.

The powder or juice of leaves has revealed the wound healing activity of the plant species . Furthermore, reports have shown methanol extracts of the root part of *R. nepalensis* were revealed promising anti-ulcer activity on pyloric ligation, cold restraint stress, and acetic acid-induced ulcer models which strengthen the claim on the plant as traditional medicinal remedy.[56]

Anti ulcer activity

Study confirmed the claim in Ethiopian traditional medicine that the plant has therapeutic value in stomach ulcers. So it needs further in-depth investigation by using other models,

isolation, and characterization of the active principles responsible for the anti-ulcer activity and to elucidate the exact mechanism action of this plant. Evaluation of its anti-ulcer efficacy in case of co-morbid illness in those previously reported.[57]

Anti microbial activity

The paper agar well diffusion method of Rios et al15 was used to determine the antimicrobial activity of all the extracts. Solution of different extracts of varying concentrations ranging from 1000 g/ml to 62.5 g/ml was prepared in DMSO. Nutrient agar was prepared, sterilized and 20 ml of the medium was poured into each sterilized Petri plate. The plates were inoculated with test organism. The wells or cups of 8 mm size were made with sterile cork borer into agar plates containing microbial (bacteria and yeast) inoculums.ciprofloxacin is used as standard

Result concluded that all the six extracts from roots of R. nepalensis showed significant antimicrobial activity against all the microorganism tested. However, the activity of benzene and ethyl acetate extract are very promising and can be used as alternative to classical antibiotics. Further, work is in progress to isolate active principle present in benzene and ethyl acetate extracts responsible for potent antimicrobial activity.[58]

Diuretic effect

Investigation demonstrated the diuretic effect of the hydromethanolic extract of *R. nepalensis* leaves and its ethyl acetate and aqueous fractions, as evidenced by increased salt and water excretion.The observed diuretic effect is possibly attributable to the presence of different secondary metabolites acting either independently or synergistically. The identified safety profile and diuretic effect of the crude extract and its solvent fractions corroborate the use of *R. nepalensis* leaves as an agent for their diuretic properties.[59]

Skeletal muscle relaxant activity

The present study evaluate the skeletal muscle relaxant activity of methanolic extract of the leaves of Rumex nepalensis (MERN) using Rota-Rod method. MERN was administered orally at dose of 400mg/kg to Wistar Albino rats. The methanolic extract significantly reduces the fall off time (motor coordination), and highly significant (***P<0.01 30min of duration. Thus, the result suggested that the MERN possess skeletal muscle relaxant activity may be due to presence of different chemical compounds present in the extract.[60]

Hypoglycemic and alalgesic activity

Ethanolic root extract of R. nepalensis show potential hypoglycemic and analgesic activity. Presences of phytochemcial constituents such as anthraquinone, steroids, saponins, reducing sugar, flavonoid and tannin in the plant extract may have contributed to these activities.[61]

Purgative activities

Reports suggested that the methanol extract of roots of *R. nepalensis* possess a purgative activity by increasing gastro-intestinal motility and intestinal peristalsis. Anthraquinones are reported to possess purgative activity. Giday et al estimated fidelity level values to evaluate the curing potentials of *R. nepalensis* against human ailment (gastrointestinal complaints) which recorded the highest fidelity level values that is 100%.[2]

Anti-plasmodial activity

R. nepalensis has been practiced by traditional healers for its anti-plasmodial activity. However, there are very few reports showing anti-plasmodial properties of the plant species. For example, the ethanol fraction of the root of *R. nepalensis* showed improved plasmodium percent suppression (70.08%) compared with the water extraction (54.31%), chloroform extraction (19.61%), and methanol extraction (10.27 %) suppression.[62]

Conclusion and Future Perspectives

The aim of this review was to enlighten the valuable application of this unique and valuable plant species. It carries high nutritional and medicinal values for humans and animals. The literature was analyzed to congregate the phytochemical and pharmacological information on *R. nepalensis*, which reaffirmed that this plant is a good source of phytocomplexes and medicinally important pure compounds for treatment of various diseases.

R. nepalensis demonstrated various medicinal, pharmacological and phytoremediation activities which gives immense importance to this herb. However, further clinical trials should be performed to verify efficacy and any side effects or toxicity of purified plant extracts. It is essential to conduct in-depth and comprehensive pharmacological studies at molecular level to investigate unexploited potential of this plant.

For these reasons, wide pharmacological and chemical studies, together with human metabolism, might be the focus of future studies. Besides, the isolation of pure compounds with pharmacological activities and deciphering the underlying mechanisms holds

significance in contemporary and future research. Recently, the plant extract was also being used by the researchers to produce nanoparticles, but again more studies are required to use its potential *via* nanotechnologies.[79] This plant could also be improved, through the use of conventional breeding techniques, and genetic engineering approaches for metal tolerance, or the metabolism of organic chemicals. Therefore, there is huge room for research in these directions.

REFERENCES

1. Choudhary, M., Dahiya, D. P., Thakur, D. K., & Kumar, B. An Updated Review On Dicliptera Bupleuroides: Its Phytochemicals, Medicinal Use, Traditional Use, Pharmacological Activity And Toxicity.
2. Shaikh, Samrin[1]; Shriram, Varsha[2]; Srivastav, Amrita[1]; Barve, Pranoti[1]; Kumar, Vinay.[1,3,] A critical review on Nepal Dock (Rumex nepalensis): A tropical herb with immense medicinal importance. Asian Pacific Journal of Tropical Medicine, July 2018; 11(7): 405-414. | DOI: 10.4103/1995-7645.237184
3. Kunwar RM, Burlakoti C, Chowdhary CL, Bussmann RW. Medicinal plants in farwest Nepal: Indigenous uses and pharmacological validity Med Aromat Plant Sci Biotechnol., 2010; 4(1): 28–42.
4. Neeru, S. K., & Sharma, N. Study of antiepileptic activity of Roylea elegans wall (aerial parts). *World Journal of Pharmacy and Pharmaceutical Sciences*, 2016; *5*(7): 439-453.
5. Kumar SU, Joseph L, George MA, Bharti VI. Antimicrobial activity of methanolic extracts of *Rumex nepalensis* leaves Int J Pharm Pharm Sci., 2011; 3(4): 240–242.
6. Solanki R, Dalsania S. Evaluation of CNS action of *Rumex nepalensis* Spreng. (Polyginaceae) using mice as experimental animal Int J Res Pharm Biomed Sci., 2012; 3: 1750–1752.
7. Kashyap, S., Bala, R., Madaan, R. *et al*. Uncurtaining the effect of COVID-19 in diabetes mellitus: a complex clinical management approach. *Environ Sci Pollut Res*., 2021; 28: 35429–35436. https://doi.org/10.1007/s11356-021-14480-7.
8. Ghosh L, Gayen JR, Murugesan T, Sinha S, Pal M, Saha BP. Evaluation of purgative activity of roots of *Rumex nepalensis* Fitoterapia., 2003; 74(4): 372–374.
9. Begum S, AbdEIslam NM, Adnan M, Tariq A, Yasmin A, Hameed R. Ethnomedicines of highly utilized plants in the temperate Himalayan region Afr J Tradit Complem., 2014; 11(3): 132–142.

10. Iqbal I, Hamayun M. Studies on the traditional uses of plants of Malam Jabba valley, District Swat, Pakistan Ethnobot Leaflets, 2004; 1: 15.
11. Rokaya MB, Münzbergová Z, Timsina B. Ethnobotanical study of medicinal plants from the Humla district of western Nepal J Ethnapharmacol., 2010; 130(3): 485–504.
12. Ahmad KS, Kayani WK, Hameed M, Ahmad F, Nawaz T. Floristic diversity and ethnobotany of Senhsa, District Kotli, Azad Jammu & Kashmir (Pakistan) Pak J Bot., 2012; 44: 195–201.
13. Giday M, Asfaw Z, Woldu Z. Ethnomedicinal study of plants used by Sheko ethnic group of Ethiopia J Ethnapharmacol., 2010; 132(1): 75–85.
14. Giday M, Teklehaymanot T, Animut A, Mekonnen Y. Medicinal plants of the Shinasha, Agew-awi and Amhara peoples in northwest Ethiopia J Ethnapharmacol., 2007; 110(3): 516–525.
15. Tauchen J, Doskocil I, Caffi C, Lulekal E, Marsik P, Havlik J, Van Damme P, Kokoska L. *In vitro* antioxidant and anti-proliferative activity of Ethiopian medicinal plant extracts Ind Crops Prod., 2015; 74: 671–679.
16. Gaur RD. Traditional dye yielding plants of Uttarakhand, India Nat Prod Radiance., 2008; 7(2): 154–165.
17. Uniyal SK, Singh KN, Jamwal P, Lal B. Traditional use of medicinal plants among the tribal communities of Chhota Bhangal, Western Himalaya J Ethnobiol Ethnomed., 2006; 2(1): 1.
18. Flowers of India. [Online] Available from: http://www.flowersofindia.net/catalog/slides/Nepal%20Dock.html. [Accessed on 10th January 2018].
19. Kumar V, Ganeshkhind C, Shriram V A critical review on Nepal Dock (Rumex nepalensis): a tropical herb with immense medicinal importance. Asian Pac J Trop Med., 2018; 2: 405–414. https://doi.org/10.4103/1995-7645.237184
20. Wangchuk K. Himalayan dock (Rumex nepalensis): the flip side of obnoxious weed. J Anim Sci Technol., 2015; 57: 1–5. https://doi.org/10.1186/s40781- 015-0067-z
21. Shrestha L, Timilsina N. Anti-oxidant and anti-microbial activity and GCMS analysis of extract of Rumex nepalensis Spreng. J Pharma Innov., 2017; 6: 155–158.
22. Kaur D, Singhal K Ethnobotanical uses, chromosome counts and male meiotic studies in selected medicinal herbs from Kinnaur district of Himachal Pradesh, India. World J Pharm Pharm Sci., 2016; 5: 912–935. https://doi. org/10.20959/wjpps20165-6664

23. Hameed, Ishfaq, and Ghulam Dastagir. "Nutritional analyses of rumex hastatus D. don, rumex dentatus linn and rumex nepalensis spreng." *African Journal of Biotechnology*, 2009; 8(17).
24. Liang H, Dai H, Fu H, Dong X, Humphrey A, Zhang L, Cheng Y Bioactive compounds from Rumex plants. Phytochem Lett., 2010; 3: 181–184. https://doi.org/10.1016/j.phytol.2010.05.005
25. Gaire P, Subedi L. Medicinal plant diversity and their pharmacological aspects of Nepal Himalayas. Pharmacogn J., 2011; 3: 1–12. https://doi.org/10.5530/pj.2011.25.2
26. Kumar S, Joseph L, George M, Kaur L, Bharti V. Skeletal muscle relaxant activity of methanolic extract of *Rumex nepalensis* in albino rats. J Chem Pharm., 2011; 3: 725–728.
27. Rawat S, Jalal S. Sustainable utilization of medicinal plants by local community of Uttarkashi district of Garhwal, Himalaya, India. Eur J Med Plants, 2011; 1: 18–25.
28. Ramasubramania R, Hussainaiah D, Amarnath K Skin diseases and folklore remedies: An ethnobotanical approach. J Pharm Res., 2012; 5: 987–989.
29. Abebe E (2011) Ethnobotanical study on medicinal plants used by local communities in Debark Woreda, North Gonder Zone, Amhara Regional State, Ethiopia. M.Sc. Thesis, Addis Ababa University.
30. Etana B (2010) Dryland biodiversity stream ethnobotanical study of traditional medicinal plants of Goma Wereda, Jima Zone of Oromia Region, Ethiopia. M.Sc. Thesis, Addis Ababa University.
31. Bussmann W, Swartzinsky P, Worede A, Evangelista P Plant use in Odo-Bulu and Demaro, Bale, Ethiopia. J Ethnobiol Ethnomed, 2011; 7: 1–21.
32. Dwivedi T, Kanta C, Singh R, Prakash I A list of some important medicinal plants with their medicinal uses from Himalayan State. J Med Plants Stud., 2019; 7: 106–11.
33. Maroyi A Alternative medicines for HIV/AIDS in resource-poor settings: insight from traditional medicines use in Sub-Saharan Africa. Trop J Pharm Res., 2014; 13: 1527–1536. https://doi.org/10.4314/tjpr.v13i9.21
34. Cosa H, Bruyne S, Sindambiwe M, Witvrouw E, Vanden B, Pieters V Anti-viral activity of Rwandan medicinal plants against human immunodeficiency virus type-1(HIV-1). Phytomedicine, 2002; 9: 62–68. https://doi.org/10.1078/0944-7113-00083
35. Amjad S, Arshad M, Qureshi R Ethnobotanical inventory and folk uses of indigenous plants from Pir Nasoora National Park, Azad Jammu and Kashmir. Asian Pac J Trop Biomed, 2015; 5(3): 234–241. https://doi.org/10.1016/S222116911530011-3

36. Awan I, Awan A, Aziz F, Khan N Ethnobotanical importance of some highly medicinal plants of district Muzaffarabad, Pakistan with special reference to the species of the genus Viburnum. J Pharm Biol Sci., 2013; 6: 53–66.
37. Murtem G, Chaudhry P An ethno-botanical study of medicinal plants used by the tribes in upper Subansiri district of Arunachal Pradesh, India. Am J Ethnomed, 2016; 3: 35–49.
38. Srivastav M, Kumar A, Hussain T Diversity of angiospermic plants in Dhanaulti Region, Uttarakhand: an emerging tourist destination in Western Himalaya. Biodivers Data J., 2015; 11: 1–10. https://doi.org/10.15560/11.4.1702
39. Meresa A An ethno-botanical review on medicinal plants used for the management of hypertension. J Clin Exp Pharmacol., 2017; 7: 1–16. https://doi.org/10.4172/2161-1459.1000228
40. Mei R, Liang H, Wang J, Zeng L, Lu Q, Cheng Y New seco-anthraquinone glucosides from *Rumex nepalensis*. Planta Med., 2009; 75: 1162–1164. https://doi.org/10.1055/s-0029-1185467
41. Tonny S, Sultana S, Siddika F Study on medicinal uses of Persicaria and Rumex species of polygonaceae family. J Pharmacogn Phytochem., 2017; 6: 587–589.
42. Bahadur S, Chhetri B, Khatri D Phytochemical screening, total phenolic and flavonoids content and antioxidant activity of selected Nepalese plants. World J Pharm Pharm Sci., 2017; 6: 951–968. https://doi.org/10.20959/wjpps201712-10571
43. Atsushi M, Taro O, Chengwei L, Hideaki O Cyclopentane-forming di/sesterterpene synthases: widely distributed enzymes in bacteria, fungi, and plants. Nat Prod Rep., 2018; 10: 1–17. https://doi.org/10.1039/c8np00026c
44. Azher K, Irm J Extraction, qualitative and quantitative determination of secondary metabolites of *Rumex nepalensis* roots. J Drug Deliv Ther., 2018; 8: 97–100. https://doi.org/10.22270/jddtv8i6-s.2092
45. Johanna D, Virginie P, Marion P, Eric L Research advances for the extraction, analysis and uses of anthraquinones. Ind Crops Prod., 2016; 94: 812–833. https://doi.org/10.1016/j.indcrop.2016.09.056
46. Timo D, Stark J, Onesmo B Ethnopharmacological survey of plants used in the traditional treatment of gastrointestinal pain, inflammation and diarrhea in Africa: future perspectives for integration into modern medicine. Anim., 2013; 3: 158–227. https://doi.org/10.3390/ani3010158

47. Gelana T, Yalemtsehay M (2011) Anti-microbial activity of solvent-extracts of *Cucumis ficifolius* and *Zehneria scabra* on some test microorganisms. M.Sc. Thesis, Addis Ababa University.
48. Mhalla D, Bouassida Z, Chawech R, Bouaziz A, Makni S, Jlaiel L, Trigui M Effects of *Rumex tingitanus* extracts and identification of a novel bioactive compounds. BioMed Res., 2018; 1–11. https://doi.org/10.1155/2018/7295848
49. Alberto J, Diana P, Ríos C, Villanueva L, Murrieta M Some traditional medicinal plants of North region from Puebla, Mexico: Uses and potential pharmacological activity of Rumex spp. Nat Prod Chem Res., 2016; 4: 1–8. https://doi.org/10.4172/2329-6836.1000223
50. Vasas A, Orbán-gyapai O, Hohmann J The Genus Rumex: Review of traditional uses, phytochemistry and pharmacology. J Ethnopharmacol., 2015; 175: 198–228. https://doi.org/10.1016/j.jep.2015.09.001
51. Sharma R, Jandrotia R, Singh B, Sharma U, Kumar D, Pradesh H Comprehensive metabolomics study of traditionally important Rumex apecies found in Western Himalayan Region. Nat Prod Commun., 2018; 13: 189–194.
52. Ahmad S, Ullah F, Sadiq A, Ayaz M, Imran M, Ali I, Shah M Chemical composition, antioxidant and anticholinesterase potentials of essential oil of *Rumex hastatus* D.Don collected from the North West of Pakistan. BMC Complem Altern Med., 2016; 16: 1–11. https://doi.org/10.1186/s12906-016-0998-z
53. Birhan Y, Kitaw S, Alemayehu Y, Mengesha N Ethnobotanical study of medicinal plants used to treat human diseases in Enarj Enawga district, East Gojjam Zone, Amhara Region, Ethiopia. J Med Plants Stud., 2017; 1: 1–20.
54. Fatima N, Zia M, Rizvi F, Ahmad S, Mirza B, Chaudhary F. Biological activities of *Rumex dentatus* L: Evaluation of methanol and hexane extracts. Afr J Biotechnol., 2009; 8: 6945–6951**.**
55. Yadav S, Kumar S, Jain P, Pundir K, Jadon S, Sharma A Anti-microbial activity of different extracts of roots of *Rumex nepalensis* Spreng. IJNPR, 2011; 2: 65–69.
56. Gonfa, Y.H., Beshah, F., Tadesse, M.G. *et al*. Phytochemical investigation and potential pharmacologically active compounds of *Rumex nepalensis*: an appraisal. *Beni-Suef Univ J Basic Appl Sci*., 2021; 10: 18. https://doi.org/10.1186/s43088-021-00110-1
57. Kashyap, S., Bala, R., & Behl, T. Understanding the concept of chronotherapeutics in the management of diabetes mellitus. *Current Diabetes Reviews*, 2021; *17*(5): 19-23.

58. Yadav, Sneha, et al. "Antimicrobial activity of different extracts of roots of Rumex nepalensis Spreng." *Indian J Nat Prod Resour*, 2011; 2.1: 65-69.
59. Tafesse, Fasika Argaw, Tafere Mulaw Belete, and Assefa Belay Asrie. "Diuretic effects of hydromethanolic extract of Rumex nepalensis Spreng. leaves and its solvent fractions in mice." *Phytomedicine Plus*, 2025; 5.2: 100775.
60. Kumar, Surjeet, et al. "Skeletal muscle relaxant activity of methanolic extract of Rumex nepalensis in albino rats." *J Chem Pharm*, 2011; 3: 725-728.
61. Khatri, Deepa, et al. "Hypoglycemic and analgesic activity of root extract of Rumex nepalensis." *World Journal of Pharmacy and Pharmaceutical Sciences*, 2018; 7.4: 730-743**.**
62. Al-naqeb G, Deen A The effect of *Rumex nervosus* Vahl leaves on high fat diet-induced hyperglycemia and hyperlipidemia in albino rats. Int J Chem., 2017; 1: 80–83.