



Medicinal Importance Of Rumex Acetosa

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Abstract

Rumex acetosa, also known as sorrel, is a perennial herbaceous plant belonging to the buckwheat family. Both as a cultivated plant and as a wild species, sorrel has been used for thousands of years. Numerous bioactive substances have been discovered in recent studies that have examined Rumex's various phytochemical and pharmacological capabilities. Plants have several health benefits because of the abundance of phytochemicals found in plants, including phenylpropanoids, isoprenoids, alkaloids, sulfated compounds, peptides, and polysaccharides, they possess biological qualities including anticancer, antifungal, anti-dysenteric, antioxidant, anti-inflammatory, antiulcer, antibacterial, anti-coagulant, and antihypertensive properties. Sorrel provides a decent source of micro-and macro-nutrients in its leaves. So when we use uncooked plant components, excessive quantities of oxalic acid impair the bioavailability of some nutrients, particularly calcium. Because of their antioxidant and anti-microbial properties, Rumex species are used to preserve food. Food plants are taken into account not only both from a nutritional aspect but as a preventative measure for the most prevalent lifestyle diseases, like diabetes, cardiovascular illnesses, and cancer. To demonstrate the full impact of so many sorrel chemicals, more research is required. More research needs to be done on phytochemistry's potential as a medicine. More study is required to support these medical claims; nonetheless, this review attempts to bridge the knowledge gap and so provides sufficient data for ongoing studies on its potential as a functional food.

Keywords ; Rumex, acetosa , Functional , Benefit



INTRODUCTION

The long-lived perennial *Rumex acetosa* is a member of the numerous and varied Polygonaceae family (Jema Tuazon-Nartea & Geoffrey Savage, 2013). According to Korpelainen and Pietiläinen (2020), *Rumex* is a genus of roughly 200 species of the annual, biennial, and perennial plants, infrequently shrubs, that are found in Europe, Asia, Africa, and North America, mostly in the northern hemisphere. There are 25 perennial plant species in the genus *Rumex*, which is well-known in places like Poland. The parts most frequently utilized in traditional medicine are aerial parts, fresh plant juice, leaf, root, and seed. Today, many disorders and diseases are usually treated using both the aerial and underground sections of several docks, such as *R. acetosa*, *R. acetosella*, *R. confertus*, *R. crispus*, *R. hydrolapathum*, and *R. obtusifolius* (Kulp *et al.*, 2006) (Wegiera and Smolarz, 2005) (Leonard *et al.*, 2006)

Since humans began using plants and herbs as treatments for illnesses, *Rumex* (dock) species have become widely accepted due to their medicinal advantages and healing properties. Sorrel is a pleasant plant, and the macro-and micronutrients in its leaves are abundant. However, when using uncooked plant components, excessive quantities of oxalic acid impair the bioavailability of some nutrients, particularly calcium (Bello *et al.*, 2019). *Rumex* gets its name from the Latin word for suck, which the Romans used to suck the plants to quench their thirst. The species name *Acetosa* comes from the Latin word *Acetum*, which means vinegar and denotes a harsh flavor, similar to the name and flavor of sheep's sorrel *R. acetosella* (Pietiläinen, 2020).

In Eastern Asia and numerous other nations, the *Rumex acetosa* has been used in phytotherapeutics, food technology, and medical treatments (Jeong *et al.*, 2020). Its leaves are used in salads and sauces as food (Alfawaz, 2006). Its therapeutic value in treating several ailments, including hypertension and illnesses of the neurological, respiratory, cutaneous, and gastrointestinal systems, has also been established (Qamar *et al.*, 2018). Numerous medical applications for the genus *Rumex* are well documented. The medicinal value of this genus is acknowledged by the homeopathic system. At least three species in this genus, including *Rumex acetosa*, *Rumex Crispus*, and *Rumex acetosella*, are employed as homeopathic remedies. The homeopathic community has done much research on the first two. In this medical system, the medicine under study has received comparatively little research (Biswas *et al.*, 2021)

Common Name:

The docks or sorrel are now classified under the genus *Rumex* (Medagam Thirupathi Reddy *et al.*, 2015). There is a long list of additional names by which *R. acetosa* is known. Common sorrels,

sheep sorrels, sour weed, garden sorrels, red sorrels, and field sorrels are other names for them. *Rumex* species have a wide range of common names, some of which even confusingly overlap. It is also known as garden sorrel (in English), chuukaa (in Ayurveda), and churkuy (in Local) (Biswas *et al.*, 2021; Hussain *et al.*, 2015)

Scientific classification and kingdom:

Kingdom: *Plantae*

Order: *Caryophyllales*

Family: *Polygonaceae*

Genus: *Rumex*

Species: *Rumex acetosa*

Binomial Name: *Rumex acetosa* Linn

Numerous plants inhabit the genus *Rumex*, some of which are annuals, biennials, or perennials and belong to subgenera, Acid-tasting *acetosella* and *acetosa* (Bello *et al.*, 2019). *R. acetosa* L., *R. acetosella* L., *R. confertus* Willd., *R. crispus* L., *R. hydrolapathum* Huds., and *R. obtusifolius* L. are the six species of *Rumex* L. (Wegiera *et al.*, 2011)

Different Rumex Species:

According to (Orbán-Gyapai *et al.*, 2017), there are 14 different *Rumex* species, including *R. acetosella*, *R. acetosa*, *R. alpinus*, *R. aquaticus*, *R. conglomeratus*, *R. crispus*, *R. hydrolapathum*, *R. obtusifolius* subsp. *obtusifolius*, *R. obtusifolius*. Different locations in the Kashmir Himalayas were used to collect the wild plants of *R. crispus*, *R. dentatus*, *R. hastatus*, *R. nepalensis*, and *R. Orientalis*.

Chemical Compound:

A multistep separation process was used to separate the highly active extracts from *R. acetosa* aerial portion and root. 19 substances, including naphthalenes (musizin and its glucoside, torachryson-glucoside, 2-methoxystyphandrone), anthraquinones (emodin, chrysophanol, physcion, citreorosein, chrysophanol-8-O-glucoside), flavonoids (quercetin, quercetin-3,3'-dimethylether), is When isolated compounds' antibacterial activity were assessed, it was found that naphthalenes, in particular, had impressive antibacterial effects on some bacterial species. (Orbán-Gyapai *et al.*, 2017) Alkaloids, saponin, tannin, polysaccharides, soluble starch, anthraquinones, and flavonoids were discovered to be present in the methanolic extract of *R. acetosa* (Ra. ME), although coumarin was not present. (Hussain *et al.*, 2015)

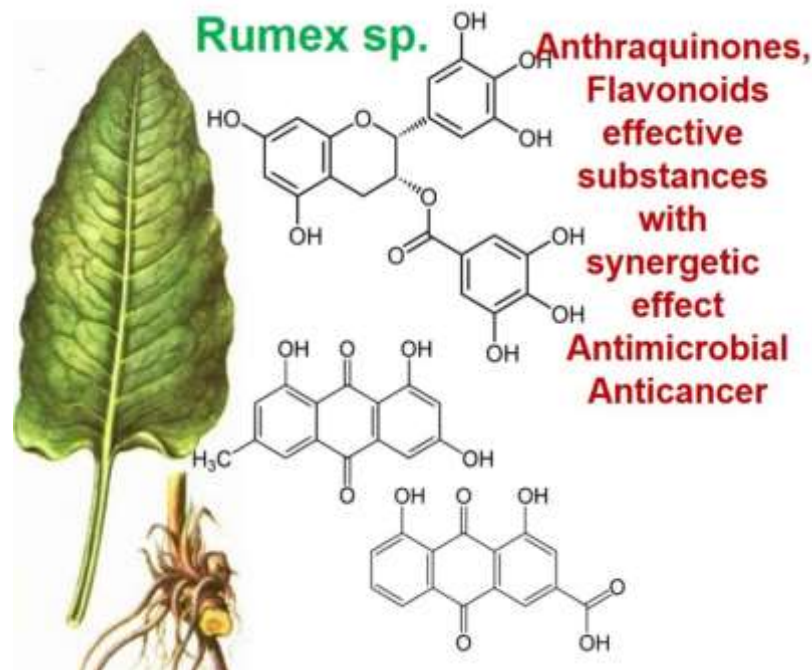


Figure 1. Chemicals compounds in R. acetosa

Wide Variety of Uses:

R. acetosa leaves are used in soups and sauces. *R. acetosa* stems are used as appetizers. Sorrel's tangy, acidic, sour-lemony flavor pairs well with several foods, including milk, cheese, and meat. Young, immature sorrel leaves and sprouts have a more delicate flavor and can be used in salads and sandwiches. The more developed leaves are typically cooked and added to soups, stews, and sauces. For thousands of years, people have used sorrel as food in a variety of recipes, herbal preparations for various uses, and as a source of numerous colored dyes (Bello *et al.* 2019; Couplan 2009; Dogan *et al.* 2015; Sun *et al.* 2015; Vasas *et al.* 2015). The leaves' flavor is comparable to kiwifruit or sour wild strawberries and they can be added to salads or puréed in soups and sauces (Bello *et al.*, 2018; Korpelainen & Pietiläinen, 2020).

Table 1: Utilization of *Rumex Acetosa* (Korpelainen & Pietiläinen, 2020).

Plant Part	Traditional use	Main Region
Root	dried, then crushed into noodles	East Asia

	Antioxidant, astringent, hemostatic, diarrhea, fever, ulcer, scabies, skin itch, etc. folk medicine.	Britain, Ireland, Turkey
	Dye (green, grey, brown, red, black)	
Leaf	Salads and Fresh snacks	Italy, France, Serbia, Turkey
	Cooked vegetables (soups, sauces, side dishes) Flour additive	Albania, France, Italy, Poland, Serbia, Palestine
	Fillings for pies and wraps	Albania, Palestine, Turkey
	Folk medicine; fever, diarrhea, lack of appetite, worms, tumors	Hungary, Romania
	warts, bruises, wounds, diarrhea, jaundice, abscesses, laxative, itchy skin, ringworm, jaundice, etc. COMBINE this and above cell	Britain, Ireland, Czech Republic, South Africa, and North America COMBINE this and above cell
	Dye (grey-blue, yellow)	
Flower	Folk medicine: tumor	Czech Republic
Plant Juice	Removing stains (rust or ink from linen)	
	Clearing acne	
	Lowering High Blood Pressure	Pakistan
Whole Plant	mild purgative, cure for cutaneous diseases, anti-cancer, antipyretic, diuretic, etc. COMBINE this and above cell	North America
	Folk medicine; jaundice, vomiting, liver problems	Pakistan, Korea, Japan
	Noodles (mixed with wheat)	China

As a Homoeopathic Drug:

Traditional uses for the homeopathic medication *Rumex acetosella* include the treatment of inflammation, diabetes, and gastrointestinal issues, particularly diarrhea. Sorrel is a component of herbal medicines like Sinupret (Bionorica SE; Neumarkt, Germany), a mix of botanicals with bronchitis and sinusitis indications. The herbal combination known as "Essiac," which is commonly consumed as a tea, is particularly well-liked especially online because it is being promoted as a complementary treatment for cancer. Essiac tea, i.e (figure 2) which has been used for over 70 years, is seen by many as a beneficial strategy against cancer because synthetic and unconventional treatments for various malignancies have several negative side effects. This tea's name, Flor-Essence, was given by a Canadian nurse by the name of Renée M. Caisse, who changed the "Caisse" in her name to the "Essiac." (Bello *et al.*, 2019)

Other powerful biological traits that some *Rumex* species have to include antioxidant, anti-cancer, antiviral, immunostimulating, antiscorbutic, and antipyretic. They have historically been used as herbal remedies for a variety of conditions, such as urinary inflammation, gallstones, chronic cutaneous diseases, skin burns, hepatitis, jaundice, fever, osteomyelitis, and as anti-cancer, diuretic, and laxative agents (Wegiera *et al.*, 2011). They can also be used as tonics, diuretics, or hypertensive agents. The plants in this genus have anticancer, antidiarrheal, antioxidant, analgesic, anti-inflammatory, anthelmintic, and antibacterial properties. Numerous medical conditions can be treated with sorrel, including scorpion stings and disturbed stomachs. The characteristics of sorrel and mallow, another member of the 33 families of plants, are remarkably similar. Avicenna, a 35-year-old biologist, uses sorrel as part of his treatment for irregular uterine bleeding (Masumeh Mobli *et al.*, 2015). Surprisingly, sorrel may be useful in the treatment of cervical cancer.

Table 2: medicinal. Importance. Of *r.acetosa* (bello *et al.*, 2018)

Parts Used	Ethnomedicinal uses	Pharmacological activity	Phytochemicals Present	
Whole Plant	Gastrointestinal disorder, dermatological infections	Antimutagenicity or antigenotoxic activity, antiperiodontitis	Polyphenols, dimeric and trimeric proanthocyanidins	
Flower and Leaves	Used to manage, lumps and tumors.	Antiproliferation activity	Polyphenol	

Common. garden .sorrel: leaves and stem	Treatment for constipation - cramping and diarrhea.	Treat stomach discomforts and distress	Tannins and phenolic acids	
Fruit, leaves, and root decoction.	Treatment of skin disorder, sore throat, and warts.	Antimicrobial activity		
Roots in conjunction with, Xylopia Ethiopic	Mild-purgative, cutaneous diseases, jaundice, sore throat, warts.	Antioxidants activity through the ferric ions and scavenged DPPH, superoxides anions radical	Polyphenol	
Root powder/seeds	Tenesmus, dysentery, gonorrhea, fever, ulcer, scabies, skin itch kidney diseases	Against gastritis and gastric ulcers	Anthraquinones	
Leaf Juice	-Fever, diarrhea, lack of appetite, worm, "blood cleanser".			

Sorrel roots can start and halt the menstrual cycle, according to Dioscorides, who wrote: "pounded into little pieces and applied, they also block women's flows. They [pull out the menstrual flow] when boiled with wine and consumed as a beverage. (M Mc Nally 2020). Another sorrel related called bistort was utilized as a pregnancy and birthing assistance. Sorrel was also thought to have a chilly, melancholy sense of humor. (Terence Scully, 1995). The optimum remedy is a plant associated with melancholy. While William Salmon said that sorrel prevented "the Terms in Women," which may have been a euphemism for menstruation,

Elizabeth Blackwell agreed that lengthy bistort helped "advance the Menses and the Birth." All of this suggests that sorrels are a member of a larger plant family, and he might have connected them to concerns about reproduction, specifically about conception and menstruation. (M Mc Nally, 2020)

Toxicity

Oxalic acid, which is abundant in plants of the genus *Oxalis*, *Rumex*, and *Chenopodium*, is toxic and may cause hypocalcemia and the production of calcium oxalate crystals in the kidneys (Luczaj, 2010)

In the past three decades, more than 100 medicinal and aromatic plants have been introduced into cultivation (Agridea, 2010). Sensitive populations like children and pregnant women should avoid ingesting such plants (Committee on Herbal Medicinal Products (HMPC), 2007).Vegetables were especially attracted to plants growing in nitrogen-rich biotopes (*Rumex* sp., *Chenopodium bonus-Henricus*, *Urtica dioica*).They were consumed in salads, soups, and boiled vegetables. (Abbet *et al.*, 2013).

CONCLUSION

In herbal therapy, sorrel has been used to treat skin conditions, and extracts from the plant's aerial portions exhibit potent antiviral properties. The blooms of the plant also contain phenolic chemicals that have antiproliferative and tumor-arresting properties. Due to its characteristic bitter flavor, and its high level of oxalic acid, sorrel is frequently referenced in gardening and food literature. The tartness of sorrel pairs nicely with a range of foodstuffs, including meat, cheese, and milk. Oxalates are responsible for giving several meals their pleasant flavors. Young, immature sorrel leaves and sprouts have a more delicate flavor, making them appropriate for sandwiches and are used in salads.

The more developed leaves are typically boiled, added to soups and stew, and used to create sauces like pesto. Because they appear to be even more nutritionally superior to spinach leaves than sorrel leaves, it has been recommended that sorrel leaves could be used as an inexpensive source of plant-based protein. leaves of sorrel are an excellent source of macro & micronutrients. Despite being mineral-rich, some minerals, like calcium, have less bioavailability because it contains a lot of the anti-nutritional chemical oxalic acid. It is well known that eating meals high in soluble oxalates carries risk. This has led to several studies looking for ways to lessen the absorption of soluble oxalates.

Several elements, including soil characteristics, climates, cultivars or species, and maturation,



have an impact on the formation of oxalic acid in leaves. According to the type of plant being studied, interesting studies on oxalate buildup, as a function of maturity stage and regrowth give different results depending upon the plant being studied.

Future Perspective:

Research has been done on the *Rumex acetosa* and the percentage of oxalic acid in it. While none of them have looked at how leaf size affects how mature a leaf is. So that in future the research should be done on how leaf size affects the maturation of leaves.

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