



Review Article

Importance of Village Plant Rhubarb: Review

D K Sanghi ¹, Rakesh Tiwle *

¹Principal of Shri Laxmanrao Mankar Institute of Pharmacy, Amgoan, Gondia, Maharashtra, India- 441902.

*Research scholar Shri Laxmanrao Mankar Institute of Pharmacy, Amgoan, Gondia, Maharashtra, India- 441902.

ARTICLE INFO

A B S T R A C T

Received: 07 Nov 2016
Accepted: 01 Dec 2016

Rheum emodi commonly known as Rhubarb belongs to family Polygonaceae. Traditionally plant is widely used as tonic, diuretic, laxative, and to treat ulcers, diarrhea, fever, cough and indigestion. Rhubarb material was collected from journals, pharmacopeia and books. It constitute anthraquinone, tannins, flavonoids, and stilbene. Rhubarb is useful in the treatment diseases like cancer, microbial, inflammation, and fungal infections, liver, diabetes, and kidney disease. The plant is found high potent antioxidant activity. These studies raised the therapeutic efficacy of rhubarb. This review covers all the detail study of rhubarb plant.

Keywords: *Rheu* hytochemistry, antiulcer, antioxidant, antidyslipidemic, hepatoprotective,.

Corresponding author *

Rakesh Tiwle
Research scholar Shri Laxmanrao Mankar Institute of Pharmacy,
Amgoan, Gondia, Maharashtra
E-mail ID: rakesh_tiwle@rediffmail.com

1. INTRODUCTION

Rhubarb (*Rheum rhabarbarum*) is a species of plant in the family Polygonaceae. Although rhubarb is not a true fruit, in the kitchen it is usually prepared as if it were. Most commonly, the stalks are cooked with sugar and used in pies, crumbles and other desserts. ¹ A number of varieties have been domesticated for human consumption, most of which are recognised as *Rheum x hybridum* by the Royal Horticultural Society. Rhubarb contains anthraquinones including rhein, and emodin and their glycosides, which impart cathartic and laxative properties. It is hence useful as a cathartic in case of constipation. ²



Fig 1: Rhubarb Plant and Levees



Fig 2: Rhubarb Root

In the thousand years ago in china Rhubarb root has been used for medical purposes by the which is thought to have been compiled about 2,700 years ago. ³ It has been traditionally used to treat pathological ailments like fevers, ulcers, bacterial infections and fungal infections and also used to treat kidney stones, jaundice. ⁴ It was several times the price of other valuable herbs and spices such as cinnamon, opium, and saffron.

PLANT DESCRIPTION⁵

Table 1: Description of Rhubarb plant

Language/System	Name
English	Indian Rhubarb or Himalayan Rhubarb
Sanskrit	Gandhini, Revatchini Hindi Dolu
Kashmiri	Pumbekh
Tamil	Nattu-ireval-chini, Nattu-manjal-chinni-kizhangu
Telgu	Nattu-revalchini
Ayurvedic	Amlaparni, pitamuuli, Gandhini Revatikka
Siddha	Revalchinikattai, Nattirevaichini
Unani	Revandchini

2. BOTANICAL DESCRIPTION

Macroscopic characters

Leafy perennial herb is 1.5-3.0 m in height. Fresh rhizome is 6 to 12 inches long, and the freshly fractured surface is dull orange to yellowish brown. The roots and rhizomes contain ‘star-shaped’ spots (2.5mm – 4mm) in the pith. ⁶ It grows naturally in humus rich soil in exposed areas of alpine and sub-alpine zones of the Himalaya. ⁷ The flowers are small, greenish-white, and borne in large compound leafy inflorescences. Root of Indian Rhubarb is darker, inferior in aroma, coarser and untrimmed. ⁸

Microscopic Characters

Calcium oxalate rosettes (up to 200 µm in diameter) are found abundantly in the leaf blades. Compound starch grains are also present. The reticulate vessels and other wood elements present in Rhubarb shows absence of lignin. ⁹ The anthraquinone derivatives present in the medullary ray cells when treated with ammonia turn reddish pink and deep red when treated with caustic alkalis. ¹⁰

Soil And Fertilization

Rhubarb will grow and produce on most soils, but a deep, well-drained sandy loam or silt loam is preferred. Fertilizer applications should be based on results of soil tests; however, if soil test results are not available, a broadcast application of 2.5 to 3.5 lbs. per 1000 square feet (1000 to 1500 lbs. per acre) of 10-10-10 or other similar complete fertilizer is satisfactory for most locations. ¹¹ The fertilizer should be worked into the soil thoroughly to a depth of several inches at planting time.

3. PHARMACOLOGICAL ACTIVITIES OF R.

EMODI

R. emodi possess anticancer, antidiabetic, antioxidant, antifungal, antiulcer, nephroprotective, immunoenhancing, antimicrobial, hepatoprotective and antifungal properties and theses action are due to a number of different compounds isolated from it. ¹²

1. Antidiabetic Activity

The activities of hexokinase, aldolase and phosphogluco isomerase, and gluconeogenic enzymes such as glucose-6-phosphatase and fructose -1,6-diphosphatase in liver and kidney of normal and alloxan-induced diabetic rats. ¹³

2. Antifungal Activity

Rhizome extract of rhubarb against *Candida albicans*, *Cryptococcus neoformans*, *Trichophyton mentagrophytes* and *Aspergillus fumigatus* (MIC 25-250 microg/ml). ¹⁴ It was found from the study that anthraquinones isolated from *R. emodi* Rhein, physcion, aloe-emodin and chrysophanol such as rhizomes are responsible for antifungal activity.

3. Antiplatelet And Anticoagulant Activities¹⁵

Anthraquinone derivatives isolated from rhubarb on platelet activity of four anthraquinone derivatives isolated from rhubarb examined, chrysophanol-8-O-glucoside (CP- 8-O-glc) was found to have the most potent inhibitory effect on collagen- and thrombininduced platelet aggregation. ¹⁶ CP-

8-O-glc-treated mice showed significantly prolonged bleeding times.

Insects

The rhubarb curculio lays its eggs in the stems of wild dock and other weed hosts. Elimination of weeds in and near the rhubarb planting in June-July, after the eggs are laid, will aid in controlling this insect.¹⁷ The stalk borer also punctures rhubarb stalks. Elimination of grassy and large-stemmed weeds around rhubarb plants also helps control the stalk borer.

Table 2: Phenolic Compound of Rhubarb Roots Extract.¹⁸

PHENOLIC COMPOUNDS	PHENOLIC CONTENT (G/100G D.W)	
	ETHANOLIC	WATER
Gallic	761.46	400.66
Pyrogallol	1282.78	791.97
3-Hydroxy tyrosol	471.58	31.05
4-amino benzoic	42.42	5.13
Protocatechuic	397.79	62.83
Chlorogenic	401.72	11.45
Catechol	785.44	40.94
Epicatechin	420.45	44.09
Catechein	-	60.59
Caffeine	174.39	12.77
P-hydroxy benzoic	308.46	54.12
Vanillic	234.47	7.00
Ferulic	1622.59	26.91
Iso-ferulic	89.51	175.38
Ellagic	536.51	55.08
3,4,5-methoxy cinnamic	308.88	102.59

USES OF RHUBARB¹⁹

	Ailments	Approach
Urogenital system	Retention of urine Dysmenorrhoea with oligomenorrhoea	Rhubarb is taken along with seeds of <i>Cucumis melo</i> and <i>Tribulus terrestris</i> Powdered rhubarb admixed is taken 2 days before menstruation and continue three days during menstruation, Taken with juice of <i>Plantago major</i> and <i>Nardostachys jatamansi</i>
Gastrointestinal system	Jaundice Diarrhea Indigestion, Hiccough	Rhubarb taken with decoction of root of <i>Foeniculum vulgare</i> , <i>Cichorium intybus</i> , <i>Capparis spinosa</i> and <i>Apium Graveolens</i> Taken with dried roses or pomegranate or gum of acacia Alone or taken with <i>Aloe vera</i> and <i>Chebulic myrobalan</i> . Taken with aniseeds or lukewarm water
Respiratory system	Cough and asthma Haemoptysis	Rhubarb is crushed and make pill with resins of quince. Crush root is chewed and kept in mouth for some time
Nervous system	Headache, Migraine, Paralysis	Rhubarb is taken with <i>Chebulic yrobalan</i> and <i>Polyporus officinalis</i> and <i>Aloe vera</i>
Skin	Freckle and other skin marks.	Root is crushed and grinded and makes paste with vinegar

	Melasma	and applied externally on affected part Powder of root is applied with fresh milk
--	---------	--

4. HEALTH BENEFITS OF RHUBARB PLANT²⁰

1. Alzheimer Disease:

Rhubarb juice contains Vitamin K which is important for brain development. Vitamin K is essential to stop neuronal damage in the brain. Drinking rhubarb juice is beneficial in preventing and delaying the onset of Alzheimer’s disease.

2. Anti-aging:

Rhubarb has high amount of antioxidants to fight free radicals in the body, which cause premature aging. It contains Vitamin C, which helps in preventing sagging skin and wrinkles.

3. Anti Inflammation:

Rhubarb helps in promoting blood circulation. Drinking its juice helps to relieve pain in case of any injury. It also reduces inflammation.²¹

4. Bone Strength:

As mentioned before, rhubarb stalks contain vitamin K, which is essential for bone development. Rhubarb juice is the best option for people suffering from osteoporosis and other bone disorder. It not only contains vitamin K but is also rich in calcium, which is much needed for bone growth and development.²²

5. Cholesterol:

Rhubarb contains low level of saturated fats and sodium, which helps in reducing high cholesterol level.

6. Constipation:

The stem and root of rhubarb have been found to have anthraquinone, a compound, which is laxative in nature and helps the digestion process run smoothly. People suffering from diarrhea or constipation can drink rhubarb juice to get relief.

7. Digestive Health:

Rhubarb contains astringent properties, which makes an effective tonic for your digestive system. This prevents intestinal health issues, improves peristaltic movements, help ease chronic constipation too.²³

8. Cuts Cancer Risk:

From ages, traditional Chinese medicine has been using rhubarbs to cure various ailments. Rhubarb has anti-tumor properties. It also contains Aloe-emodin, which along with Rhein, is used in medicine to kill tumor cells. Rhubarb juice is beneficial for those patients who want to recover from gastric cancer. It also helps fast recovery post-surgery.²⁴

9. Diabetes:

Rhubarb contains stilbenoid, which helps in reducing blood sugar level.

10. Gallbladder:

Rhubarb contains an ingredient called cholagogue, which helps to promote good digestive health

11. Immunity:

Rhubarb is a good source of Vitamin C. This vitamin plays a vital role in strengthening the body's immune system.²⁴

12. Liver Health:

Rhubarb root is helpful for liver growth and drinking its juice can help reduce hepatitis B.

13. Improves Vision:

The juice of rhubarb contains a good amount of Vitamin A, which helps in improving the vision. This list is by no means exhaustive. There are many more benefits that one can derive from drinking rhubarb juice. Make this nutritious vegetable a part of your daily routine and live a healthy, fit life.²⁵

14. Delays Ageing Symptoms:

Rhubarb is a storehouse of [vitamin A](#). This natural antioxidant helps in neutralizing the free radicals and helps in delaying the symptoms of ageing such as wrinkles and fine lines. Thus, rhubarb keeps your skin youthful and glowing by preventing the cell damage by free radicals.

15. Natural Hair Coloring Agent:²⁶

Rhubarb root contains a good dose of oxalic acid that is known to render a light brown or blonde hue to the hair. The presence of oxalic acid makes the hair color last longer and does not harm the scalp with harsh chemicals.

1. Add about three tablespoons of powdered rhubarb roots to two cups of water and simmer it for 15 minutes.
2. Allow it to rest overnight.
3. Strain the liquid in the morning and rinse your hair with this mixture for an awesome hair color.

16. Promotes Weight Loss:

Achieving your ideal weight can be made easy by adding rhubarb to your diet. 100 grams of rhubarb yields just 21 calories. It contains loads of dietary fiber, minerals, vitamins, as well as polyphenolic antioxidants. The synergistic action of all these nutrients improves body's metabolism rate and ensures elimination of unwanted fat.²⁷ The stem and root of rhubarb contains anthraquinones-rhein and emodin. These ingredients have natural laxative and cathartic properties, making it a preferred vegetable for those who are on a strict low fat, low calorie diet.

17. Good Natural Detox

Eliminating toxins from your body is very essential, especially when you are trying to lose weight. Rhubarb is rich in fiber and has wonderful laxative properties as mentioned before. This makes it a wonderful detoxifying agent.

18. Brain Health

A healthy body and a healthy brain is what will keep you at the top of your game. 100gms of fresh rhubarb stalks is enough to render 29.3 micrograms of vitamin K that satisfies about 24% of the RDA. Along with safeguarding the brain from neuronal damage, this vitamin is known to play a pivotal role in offering relief to people who are suffering from Alzheimer's. Regular use of rhubarb stalks is also known to boost memory and delaying the onset of dementia

19. Stabilizes Blood Clotting

Increased level of stickiness of blood triggers clotting, which in turn can cause strokes, deep vein thrombosis, as well as other critical cardiovascular disorders. Rhubarb is known to lower the levels of stickiness of blood protecting the body against such health issues.

20. Wonder Fruit For Pregnant And Breastfeeding Women²⁹

Rhubarb stalk is a good source of iron, calcium, magnesium, vitamin C, B-vitamins, choline and folates. Choline plays a vital role in determining the health of the fetus' brain. Pregnant women need 450 mg of choline daily while lactating women should consume about 550 mg of this nutrient. One stalk of raw rhubarb contains 3.1gms of choline, making it a perfect choice for breastfeeding women.

Rhubarb: Potential Clinical Benefits²⁸

1. Cardiovascular: Pregnancy-induced hypertension (PIH), myocardial contractility
2. Renal and electrolyte balance: Diuretic, diabetic nephropathy and chronic renal failure, renal protectant
3. Gastrointestinal/hepatic: Diarrhea, constipation, liver disease, ulcers, pancreatitis
4. Reproductive: Uterine tonic
5. Immune modulation: Immunostimulant, anti-inflammatory
6. Antimicrobial: Antiviral, antibacterial, molluscicidal, antitrichomonal
7. Antineoplastic: Ingredient in Essiac remedy
8. Skin and mucus membranes: none
9. Other/miscellaneous: Toothache

5. CONCLUSION

Rhubarb roots ethanolic extract could be considered a rich source of antioxidant compounds. Rhubarb is an herb of enormous therapeutic effects and has been used in numerous ailments specially for constipation, indigestion, diarrhea, muscular pain, skin problems and menstrual disorder and. A number of compounds are isolated from it; anthraquinones and stilbenes are the most common which are responsible for its extensive use.

6. ACKNOWLEDGEMENT

The authors would like to acknowledge the assistance provided by kind cooperation of Secretary Shri Keshavrao Mankar Bhavabhuti Shikshan Sanstha "Shri Laxmanrao Mankar Institute of Pharmacy" Amagoan, Gondia Maharashtra, INDIA.

7. REFERENCES

1. Castleman M. The Healing Herbs: The Ultimate Guide to the curative powers of nature's medicine. Emmaus, PA: Rodale Press, 1991; 307.
2. Borgia M, Sepe N, Borgia R, Ori-Bellometti M. Pharmacological activity of an herbal extract: controlled

- clinical study. *Current Therapeutic Research* 1981; 29:525-36
- Wani SA, Ashfaq M, SHAH KW, DHARMENDRA S. phytochemical screening of methanolic extracts of *Podophyllum hexandrum royle* and *Rheum emodi wall*. *J. Curr Chem Pharm Sc*, 2012; 2(2): 125-128
 - Babu KS, Srinivas PV, Praveen B, Kishore KH, Murthy US & Rao JM. Antimicrobial constituents from the rhizomes of *Rheum emodi*. *Phytochem*, 2003; 62: S203–207.
 - Rumpunen K, Henriksen K, Phytochemical and morphological characterization of seventy-one cultivars and selections of culinary rhubarb (*Rheum* spp.). *Journal of Horticultural Science and Biotechnology*, 1999; 74: 13-18.
 - Amandeep K, Sunil K, Ramica S. Assessment of Anti-Ulcer Activity of *Rheum emodi* Rhizomes Extract. *IGJPS*, 2012; 2(3): 333-341.
 - Kumar H, Spandana M. Qualitative and quantitative study of anthraquinone derivatives in the root extract of *Rheum australe* of Nepal (syn. *Rheum emodi*) by HPLC. *Journal of Pharmacognosy Phytochemistry* 2013; 2:40–42.
 - Akhtar MS, Amin MA, Maqsood, Alangeer A, Akseer-e-Jigar. Hepatoprotective Effect of *Rheum emodi* Roots (Revand chini) against Paracetamol-induced Hepatotoxicity in Rats. *Ethnobotanical Leaflets*. 2009; (2): 310-315
 - Chai YY, Wang F, Li YL, Liu K, Xu H. Antioxidant Activities of Stilbenoids from *Rheum emodi* Wall. , 2012; 1-7.
 - Agarwal SK, Singh SS, Verma S, Kumar S. Antifungal activity of anthraquinone derivatives from *Rheum emodi*. *J Ethnopharmacol*, 2000; 72(1-2): 43-6.
 - C. S. Li, P. C. Gui, X. H. He, and H. Yang, “Actions of NO and INOS on endotoxin induced rat acute lung injury and effect of rhubarb on them,” *Journal of Traditional Chinese Medicine*, 2000; 20(3): 216–222, 2000.
 - D. C. Chen, The clinical and experimental study of Rhubarb on gut-original sepsis in critical illness [Ph.D. thesis], Second Military Medical University, Shanghai, China, 2003.
 - Kumar H, Spandana M. Qualitative and quantitative study of anthraquinone derivatives in the root extract of *Rheum australe* of Nepal (syn. *Rheum emodi*) by HPLC. *Journal of Pharmacognosy Phytochemistry* 2013; 2:40–42.
 - Singh PP, Ambika, Chauhan SMS. Activity-guided isolation of antioxidants from the roots of *Rheum emodi*. *Natural Products Research* 2013; 27:946-949.
 - Krenn L, Presser A, Pradhan R, Bahr B, Paper DH, Mayer KK, Kopp B. Sulfemodin 8-O- -Glucoside, a new sulfated anthraquinone glycoside and antioxidant phenolic compounds from *Rheum emodi*. *Journal of Natural Products* 2003, 66:1107–1109.
 - Hrncirik K, Fritsche S, Comparability and reliability of different techniques for the determination of phenolic compounds in virgin olive oil. *European Journal of Lipid Science and Technology*, 2004; 106: 540-549.
 - Hakkinen SH, Karenlampi SO, Heinonen IM, Mykkanen HM, Torronen AR, HPLC method for screening of flavonoids and phenolic acids in berries. *Journal of the Science of Food and Agriculture*, 1998; 71:543-551.
 - Kemper KJ, Rhubarb root (*Rheum officinale* or *R. palmatum*). The Center for Holistic Pediatric Education and Research. 1999, 1-16.
 - Gw Pucher, Aj Wakeman, Hb Vickery. The Organic Acids Of Rhubarb (*Rheum Hybridum*). Iii. The Behavior Of The Organic Acids During Culture Of Excised Leaves *Journal Of Biological Chemistry*, 1938
 - Cheng XR, Cheng SX, Wang ZL. Talking about rhubarb in treatment. *Henan Zhongyi* 2000; 20: 68
 - Li GF. The use of rhubarb in clinic. *Shizhen Guoyao Yanjiu* 1994; 5: 44-46
 - Seto T, Yasuda I, Hamano T, et al. Determination method of sennoside A, sennoside B, Rhein and Rhein 8- glucoside in Kampo or crude drug preparations and the comparison of these components in processed rhubarb. *Natural Medicines* 1996; 50:138-44
 - Bradley PR. *British herbal compendium : a handbook of scientific information on widely used plant drugs / published by the British Herbal Medicine Association and produced by its Scientific Committee.* Bournemouth, Dorset: The Association, 1992.
 - Tian J, Chen XM, Li LS. Effects of *Cordyceps sinensis*, rhubarb and serum renotropin on tubular epithelial cell growth. [Chinese]. *Chung Hsi i Chieh Ho Tsa Chih Chinese Journal of Modern Developments in Traditional Medicine* 1991; 11:547-9, 518.
 - Liu SY, Sporer F, Wink M, et al. Anthraquinones in *Rheum palmatum* and *Rumex dentatus* (Polygonaceae), and phorbol esters in *Jatropha curcas* (Euphorbiaceae) with molluscicidal activity against the schistosome vector snails *Oncomelania*, *Biomphalaria* and *Bulinus*. *Tropical Medicine & International Health* 1997; 2:179-88
 - Lee MS, Sohn CB, Anti-diabetic properties of chrysophanol and its glucoside from rhubarb rhizome. *Biological & Pharmaceutical Bulletin*, 2008; 31(11), 2154-2157.
 - Xing XY, Zhao YL, Kong WJ, Wang JB, Jia L, Zhang P, Yan D, Zhong YW, Li RS, Xiao XH, Investigation of the “dose-time-response” relationships of rhubarb on carbon tetrachloride-induced liver injury in rats. *Journal of Ethnopharmacology*, 2011; 135(2): 575- 581.

28. Gao LL, Xu XD, Nang HJ, Yang JS, Chen SL, Chemical Constituents in *Rheum tanguticum*. Chinese Traditional and Herbal Drugs, 2011; 42(3): 443-446.
29. Shokravi A, Nasiri KA, Synthesis of 1,2,3,4,5,6,7,8-Octahydro-9-ethoxy-10-hydroxy-1-anthracenone (OEHA). Iranian Journal of Chemistry and Chemical Engineering 1997; 16: 10-15.

Conflict of Interest: None

Source of Funding: Nil