



Golden Himalayan Raspberry (*Rubus Ellipticus* SM.) as a Medicinal Fruit: A Critical Review

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ABSTRACT –

Golden Himalayan raspberry or *Hisalu/Hinsar/Aakhe* (*Rubus ellipticus* Sm.) also known as Yellow Himalayan raspberry, belonging to family *Roseaceae*, is listed in top ten wild edible medicinal plant. It comprises about 1500 species distributed all over India as well as world. The fruit is round yellow cluster of droplets type and contains numerous compounds (protein, lipids, carbohydrates, fibre) and phytochemicals (anthocyanin, phenolics, antioxidants, ascorbic acid, flavonoids) as well as minerals (phosphorus, potassium, calcium, magnesium). Because of these, it possesses many health benefits and traditionally being utilized for curing fever, cough, sore throat and coronary heart diseases. Beside fruits, folks also utilize the paste/powder of leaves, shoots and roots for the effective treatments of wounds, bone fracture, stomach-ache, bacterial infection and tumours. Owing to the good blend of acids (malic, citric, and tartaric) and sugars, it has ability for its utilization in food product development i.e. jams, squash, wine, vinegar, juice, etc. However, it is still unable to get its identity due to its negligence by the processors and researchers. The aim of the present review is to focus all the researchers on the composition, health benefits of different parts and its nutraceutical properties

Keywords: *Rubus ellipticus*; Phytochemicals; Nutritive Value; Nutraceutical Potential; Pharmacognostical Potential.

Introduction –

Rubus ellipticus belonging to family Rosaceae is commonly known as Yellow Himalayan Raspberry is mostly found in forest edges, and numerous forests exist over wide areas of mountains and lowlands of India and Srilanka^[1]. It is a wild raspberry. The fruit is edible medicinally have astringent, febrifuge, kidney, miscellany, stomachic properties. The juice of the fruit is used in the treatment of fever, colic, coughs and sore throat. The inner bark is used in Tibetan medicine, it is said to have a sweet and sour flavour plus a heating potency. A renal tonic and antidiuretic, it is used in the treatment of weakening of the senses, vaginal/seminal discharge, polyuria and micturition during sleep. In recent years, multiple drug/chemical resistance in both

Human and plant pathogenic microorganisms have been developed due to indiscriminate use of

Commercial antimicrobial drugs/ chemical commonly used in the treatment of infectious diseases.

Use of medicinal plants as a source of relief and cure from various illness is as old as humankind. Even today, medicinal plants provide a cheap source of drugs for majority of world's population. Plants have provided and will continue to provide not only directly usable drugs, but also a great variety of chemical compounds that can be used as starting points for the synthesis of new drug with improved pharmacological properties. Modern scientific studies have found that an alcoholic extract of the fruits of the Yellow Himalayan Raspberry has antioxidant properties and antimicrobial ones^[2]. It was also shown to have anti-inflammatory properties when tested on rats in the lab^[3]. Triterpenoid, saponins have been found and research is continuing in this plant. Additionally, some of the constituents show promising characteristics in terms of functionality.^[4] Although fruits of *R. ellipticus* are shown to be highly nutritious, delicious, and rich in vitamins and sugars, their antioxidant and anti-proliferative potentials remain under explored. Therefore, the present review has summed up to date knowledge on chemical composition, with particular emphasis on nutraceuticals and on functionality of *R. ellipticus*.

Botanical description:

R. ellipticus is a thorny shrub of 1–3 m tall.^{[5][6]} Branches are purplish brown or brownish, pubescent, with sparse, curved prickles and dense, purplish brown bristles or glandular hairs. Leaves imparipinnate, 3- foliolate; petiole 2–6 cm, petiolule of terminal leaflet 2–3 cm, lateral leaflets subsessile, petiolule and rachis purplish red bristly, pubescent, with minute prickles; stipules linear, 7–11 mm, pubescent, with intermixed glandular hairs; blade of leaflets elliptic or obovate, terminal leaflet much larger than lateral leaflets, abaxially densely tomentose, with purplish red bristles along with prominent

veins, adaxially veins impressed, pubescent along midvein, base rounded, margin unevenly minute sharply serrate, apex acute, abruptly pointed, shallowly cordate, or subtruncate. Inflorescences terminal, dense glomerate racemes, Flowers: Calyx abaxially pubescent, intermixed yellowish tomentose, sparsely bristly; sepal's erect, ovate, abaxially densely yellowish gray tomentose, apex acute and abruptly pointed. Petals white or pink, spatulate, longer than sepals, margin premorse, densely pubescent, base clawed. Ovary is pubescent; styles glabrous, slightly longer than stamens. Aggregate fruit is golden yellow, subglobose, glabrous or drupelets pubescent at apex; pyrenes triangular- ovoid, densely rugulose. Fruits of *R. ellipticus* are aggregate, etaerio of drupes, borne on a nipples shaped thalamus, which is 6 mm long and 7 mm in diameter at the base; weight 444 mg; volume, 567 microlitres; colour, yellow; fruits, very easily detachable from the thalamus and fall down at maturity. Seeds are numerous, very small in size around 1 to 1.5 mm in diameter; weight, 246 mg per 100 seeds; volume. Flowering time March–April and fruiting time is April–May.

Traditional uses-

Rubus ellipticus is used as traditional medicine in Tibet for a number of purposes^[7]. The whole plant has astringent properties and has been used to reduce fevers, especially typhoid. The inner bark of the Yellow Himalayan Raspberry is used as a kidney tonic and an anti-diuretic. The juice extracted from the root has also been used for fevers, gastric problems (including infant colic when the young shoots are used too), diarrhoea and dysentery. It is one of the important ethno medicinal plants of Manipur^[8]. The Naga tribe of Manipur uses the root bark of the *R. ellipticus* for curing fever since ancient times. The decoction of root bark is recommended twice a day for curing fever by the Nagas. The root bark is also used in diarrhea, dysentery, as abortifacient, and in fractured bones^[9] (Kirtikar and Basu, 2001). The root juice drunk against urinary tract infection and its fruits are edible and its fruits were listed in the top ten wild edible medicinal fruits in Tanahun District of Western Nepal^[10](Upreti, *et al.*, 2011) *R. ellipticus* is used for curing different ailments by the Lepcha tribe of Dzongu valley in North Sikkim^[11], India. The young shoot is chewed raw to relieve sudden stomach pain. Root decoction given to the children to get rid of stomach warm. The inner root bark of the plant is valued as a medicinal herb in traditional Tibetan medicine, including its use as a renal tonic and anti-diuretic^[12].

Major Chemical Compositions-¹³

Table 1

Phytochemical Classes	Bioactive Compound	Plant Part
Flavonoids/Chalcones	Quercetin	Fruit
	Rutin	Fruit
	Quercetin 3-O-glucuronide	Fruit
	Phloridzin	Fruit
	Kaempferol	Leaves
	Catechin	Fruit
	Epicatechin	Fruit
	Epigallocatechin	Fruit
	Chrysin	Fruit
	Cyanidin	Fruit
Pelargonidin	Fruit	
Phenolic acids / Organic Acids	Gallic acid	Fruit and Leaves
	Malic acid	Fruit
	Ellagic acid	Fruit and Leaves
	Chlorogenic acid	Fruit and Leaves
	Citric acid	Fruit
	Ascorbic acid	Fruit
	Acuminatic acid	Root
	Quinic acid	Fruit

	Caffeic acid m-Coumaric acid p-Coumaric acid	Fruit and Leaves Fruit Fruit
Ellagitannins	Lambertianin C Sanguiin H6	Fruit
Triterpenes and Sterols	Tormentic acid Miquelianin Euscaphic acid <i>b</i> -Sitosterol <i>b</i> -Sitosterol- <i>b</i> -D-glucoside <i>b</i> -Carotene Rosamutin Sericic acid Buergeric acid Oleanane Ursolic acid Campesterol Niga-ichgoside-F1 [28- <i>b</i> -Glucopyranosyl ester of 19 <i>a</i> -hydroxyasiatic acid] Octacosanol Octacosanic acid 3- <i>b</i> -Hydroxy-urs-12,18-diene-28-oic-acid-3-O-(<i>b</i> -D-glucopyranosyl (1-4)- <i>a</i> -L-arabinopyranoside 24-Deoxysericoside	Leaves and Root Root Leaves and Root Fruits and Leaves Root Leaves Root Leaves and Root Leaves and Fruits Root Fruit and Aerial Part Whole Plant
Amino acids	Tyrosine Hydroxy proline Serine Histidine Leucine	Fruit

Nutritional Value - ¹³**Table 2.** Proximate composition of fruit of *Rubus ellipticus* on dry basis**Physico-chemical attributes**

(On dry basis,%)

Parameters	Values
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Moisture	66.36-80.6 (wet basis)
Crude protein	3.68 ± 0.04 (wet basis) and 4-4.37 (dry basis)
Ash	1.30 ± 0.05 (wet basis) and 2.97-4.1 (dry basis)
Carbohydrates	27.12± 0.12 (wet basis) and 72.7-86.4 (dry basis)
Crude fibres	2.35 ± 0.05 (wet basis) and 3.53-7.9 (dry basis)
Crude fat	0.96 ± 0.20 (wet basis) and 7.10 (dry basis)
Energy value (Kcal/100 g)	370.7-374 (dry basis)

Minerals (mg/100 g, on wet basis)

Phosphorus	0.20
Potassium	1.82
Calcium	0.95
Magnesium	5.60

Minerals (mg/100 g, on dry basis)

Potassium	680.16±1.27
Nitrogen	700±0.08
Phosphorus	1.26±0.001
Sodium	89.43±0.01
Calcium	450.1±0.22
Magnesium	118.72±0.48
Iron	4.249±0.15
Zinc	12.77±0.05
Copper	0.020±0.01
Lead	0.02±0.18
Manganese	1.948±0.03
Chromium	0.47±0.19

BIOLOGICAL ACTIVITY

Activity	Mechanism	References
Antioxidant Activity	<p>There are various mechanisms through which <i>R. ellipticus</i> exhibits its antioxidant potential</p> <p>depending upon the bioactive chemical constituents present on the plant. These include</p> <p>scavenging free radicals and ROS, thereby reducing oxidative stress and cellular damage,</p> <p>neutralizing the free radicals by donating electrons, quenching singlet oxygen, and</p> <p>chelation of the metal ions</p>	Santos-Sánchez, ¹⁴
Antimalarial Activity	<p>Sachdeva et al. reported the potent anti-malarial activity of <i>R. ellipticus</i> leaf extract</p> <p>in both in vitro and in vivo models. From an in vitro study, they found the antimalarial</p> <p>efficacy of <i>R. ellipticus</i> with an IC₅₀ value of 14.26 µg/mL against the <i>Plasmodium falciparum</i></p> <p>INDO strain (PfINDO). They observed 64% of inhibition against <i>Plasmodium berghei</i> at</p> <p>a dose of 500 mg/kg</p>	Sachdeva et al., ¹⁵
Antidiabetic Activity	<p>α-Amylase and α-glucosidase are the carbohydrate-hydrolyzing enzymes that catalyze</p> <p>the breakdown of starch and disaccharides into glucose and are thus important in regulating</p> <p>blood glucose level</p>	Papoutsis, K.; Zhang, J ¹⁶
Antiviral Activity	<p>According to Panda et al., both aqueous as well as ethanol extracts of <i>R. ellipticus</i></p> <p>showed potent antiviral as well as cytotoxic activities against enterovirus 71 strains revealed</p> <p>by various parameters like the selectivity index, selectivity surface, as well as therapeutic</p> <p>index</p>	Panda, S.K ¹⁷
Wound Healing Activity	<p>George et al. studied the percentage of contraction of the wound via an excision and</p> <p>infection model with 1% and 2% w/w ointments of <i>R. ellipticus</i> methanolic leaf extract.</p> <p>In the excision model, a 2% acetone-extract-treated Wistar male rat demonstrated 94.23%</p> <p>of contraction on the 12th day of excision, which was comparable with the percentage</p> <p>contraction of betadine, a standard drug. Meanwhile, in the case of an <i>S. aureus</i>-infected</p> <p>wound, complete epithelization was observed in the 2% acetone-extract-treated group on</p>	George, B.P ¹⁸

	the 12th day with a percentage wound contraction of 79.25%	
Antiproliferative and Anticancer Activity	<p>Uncontrolled proliferation or production of the cells results in cancer. Recently, most researchers have been focused on either synthesizing new compounds or searching potent natural compounds that can be used for the treatment of cancer. A study conducted by George et al. showed an increased survival in tumor-enriched Swiss albino rats with the administration of 250 mg/kg of methanolic leaf extract from <i>R. ellipticus</i>. A similar finding was observed in another study showing a reduced solid tumor volume of Dalton's Lymphoma Ascites-induced Swiss albino mice when treated with 100 mg/kg of <i>R. ellipticus</i> methanolic leaf extract</p>	George, B.P ¹⁹
Nephroprotective Activity	<p>Sharma et al. studied the nephroprotective activity of various extracts of <i>R. ellipticus</i> (petroleum ether, ethanolic, aqueous). These extracts were able to normalize increased blood urea nitrogen, serum uric acid, creatinine, and serum urea levels induced by cisplatin and gentamicin</p>	Sharma, U.S ²⁰

Conclusion

The fruits of yellow *R. ellipticus* are an important source of natural antioxidants and their consumption may play vital role in reducing the oxidative stress and preventing the degenerative diseases including cancer, diabetes etc. The present study put forward a scope to develop an effective drug from *R. ellipticus* against inflammatory disorders as this plant has been used in

folk medicine to treat various other ailments. This study confirms presence of various phytochemicals in *R. ellipticus* essentially needed to treat various disorders and proves an eye opener to the researchers to find out the mechanism for responsible compound

behind these pharmacological properties of this highly valued fruit crop which stands underutilised. Moreover, with fruits like *R. ellipticus* the gross pressure levied on few fruit crops like mango, papaya and guava will ease profoundly for different nutraceutical properties. As this being hard crop grown in waste land in mountainous region, without any care or agronomic practices, its cultivation and utilization will prove beneficial.

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