

A REVIEW ON MEDICINAL USE OF HIBISCUS PLANT

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ABSTRACT

The Malvaceae family includes the medicinal plant *Hibiscus sabdariffa* L. (Roselle), also known as Jamaica flowers, Sorrel, and Karkdah (in Egypt). It is grown in Africa, South East Asia, Central America, and Mexico. Roselle appears to be a good and promising source of water-soluble natural red colorants. It has been claimed to be used as a flavoring for sauces, jellies, marmalades, and soft beverages or to use as a colorant for dishes. Due to the rising disease burden, natural plant products are becoming popular today. The plant *Hibiscus rosa Sinensis* Linn., which belongs to the Malvaceae family, is found all over the world. In India's traditional medicine, its leaves, bark, roots, and flowers have been used to treat a variety of illnesses. Numerous studies have demonstrated the antioxidant, antimicrobial, antidiabetic, antiulcer, hepatoprotective, antifertility, antigenotoxic, and anti-inflammatory qualities that the various sections of *Hibiscus rosa Sinensis* plants contain, which aid in the treatment of a variety of ailments. It is used to treat conditions including cancer, diabetes, heart disease, the liver, kidney, and neurological illnesses. Due to its extensive ethnomedical use, it is one of the most significant ingredients in herbal compositions that are frequently utilized. This plant's leaves are applied externally as an emollient and taken internally to alleviate stomachic ailments.

INTRODUCTION

The shrub *Hibiscus subdariffa* Linn. is a member of the Malvaceae family. It is believed to be native to either tropical Africa or Asia (from Malaysia to India). The plant is commonly cultivated as a home garden crop in tropical regions including the Caribbean, Central America, India, Africa, Brazil, Australia, Hawaii, Florida, and the Philippines.^[1] These plants are abundant in secondary metabolites that can be exploited to create new medications. About 80% of the population in poor nations relies on traditional medicines for their medical needs. There are 500,000 plant species in the world, yet only 1% of them have undergone phytochemical research.^[2] Because of their capacity to create chemical compounds that are essential in preventing various diseases like cancer, diabetes, etc., plants have been classified as therapeutic plants. A vast range of chemical compounds also serve crucial biological purposes and act as defenses against herbivorous mammals, insects, and other types of predators.^[3] All year long, they produce spectacular flowers with brilliant colours. There are numerous cultivars with flowers (single or double) in the colours red, peach, white, pink, and orange.^[4] *Hibiscus sabdariffa* is said to have come from India and Malaysia, where it is frequently grown, and must have traveled to Africa at a young age.^[5] The leaves have five or seven deeply lobed lobes that are further divided into smaller lobes. The enormous, up to 15 cm in diameter flowers

have five petals that might be pink, red, orange, or yellow, and a dense center of stamens. *Hibiscus Rosa Sinensis* has long been a staple of traditional medicine and is still well-liked today.^[6] Teas and tinctures made from blossoms are thought to have therapeutic effects. Additionally, cosmetics and essential oils are made from plant.^[6] While the leaves and powdered seeds are used in meals in West Africa, the oil from the seeds and the plant's therapeutic qualities are employed in China. It is also utilized in the food and pharmaceutical industries.^[7] Because common pathogens have become resistant to commonly used treatment drugs, such as antibiotics and antiviral agents, in today's world, scientists are once again interested in finding novel anti-infective chemicals derived from various plants.^[2] Due to their high nutritional content, some plants, like ginger, green tea, and walnuts, are advised for their medicinal benefits. Active compounds that are commonly used in the manufacture of various medications are routinely extracted from medicinal plants using raw materials.^[2] Ayurveda, Siddha, Unani, Amchi, and Tibetan systems of medicine use between 1,200 and 2,000 different types of medicinal plants, while Siddha, Unani, and Tibetan medicine are organised and codified traditional medicines that are based on written treatise texts. Local health traditions are based on customs followed by villagers, folk healers, vaidyas, and other community members.^[3] It is a shrub that is frequently grown as an

ornamental plant in the tropics and comes in a variety of shapes and bloom colours. Additionally having medical qualities, hibiscus is a common main component in herbal drinks. In medicine, red-flowered plants are recommended.^[3] It is known as Hibiscus de Chine (China), Joba (Bengali), Java (Telugu), Chinesischer Roseneibisch (German), Clavel japonés (Spanish), Hibiscus (Swedish), and Gudhal in addition to Bent EL-Kunsil (Arabic), Rosa dellaCina (Italian), Aka-bana (Japanese), Shoe flower (English), Japa (Sanskrit), Ja (Urdu).^[4] The leaves' or calyces' infusions are thought to be diuretic, choleric, febrifugal, and hypotensive, reducing blood viscosity and promoting intestinal peristalsis. The fresh calyx of Hibiscus sabdariffa is used as a flavouring in pastries, eaten raw in salads, and is currently drunk hot and cold throughout the world.^[5]

Classification

Kingdom	Plantae-plants
Subkingdom	Tracheobionta-vascular plant
Super division	Spermatophyta-seed plant
Division	Magnoliophyta-Flowering plant
Class	Magnoliopsida-Dicotyledons
Subclass	Dilleniidae
Order	Malvales
Family	Malvaceae-Mallow family
Genus	Hibiscus L.-Rosemallow
Species	Hibiscus rosa sinensis L.-Shoeblack plant

Geographical Distribution

Hibiscus rosa-Sinensis is very susceptible to freezing in even moderately cold temperatures. It grows most well in full sunlight and organically rich, well-drained soil. It is generally available in the following nations: South Africa, the Philippines, Myanmar, China, Pakistan, Thailand, Sri Lanka (tropical regions), and India (southwestern regions).^[4]

The tropical plant known as Hibiscus rosa-Sinensis is indigenous to China and India. Other tropical regions, like Hawaii and the Caribbean, also contain it. The plant thrives in damp, shaded environments. It favours soil with a lot of organic materials. Hibiscus rosa-Sinensis can expand to a height of 6 feet and a width of 10 feet. The leaves are lustrous and dark green. With five petals that range in hue from white to pink to red, the flowers are big and magnificent. From July to fall, Hibiscus rosa-Sinensis flowers.^[6]

Morphological Character

The perennial shrub Hibiscus rosa-Sinensis has tap roots. 3 to 12 cm long and 2 to 5 cm wide describe its leaves. Simple ovate or lanceolate leaves with whole bases and coarsely serrated tips/margins make up the plant's leaves. Flowers are full, pentamerous, pedicellate, and actinomorphic. Corolla measures 3 inches in diameter and has five petals. Several types of corollas vary in size and colour. Fruit is a 3 cm long capsule that occurs very infrequently. The optimal growth conditions for Hibiscus rosa Sinensis are well-drained, slightly acidic soils. It

This plant is a member of the subkingdom Tracheobionta-vascular plant, a class of flowering plants that comprises most of the familiar plant species to us, including tulips, roses, and apple trees. Magnoliopsida, sometimes known as dicotyledons, and Liliopsida, more frequently known as monocotyledons, are the two groups that make up the subkingdom. Monocots only have one cotyledon, whereas dicotyledons have two.^[6] Hibiscus blossoms have historically been used to treat diabetes due to reports that they offer anti-diabetic qualities. Numerous flavonoids and other phytoconstituents with proven antioxidant, anti-inflammatory, and anticarcinogenic properties are present in the floral extract.^[6] Additionally high in ascorbic acid (vitamin C), hibiscus has health-improving properties.

uses fully decomposed organic matter in sandy soils to preserve the soil's aeration, drainage, and water-holding capacity. Plants need direct sunshine because insufficient light prevents flowers from blooming.^[4] Tropical plants like Hibiscus rosa-Sinensis are frequently cultivated for their decorative qualities. It originated in East Asia and has since spread to several other regions of the globe. The plant belongs to the Hibiscus family, which has approximately 200 different species.^[6] Small trees or shrubs are home to Hibiscus rosa-Sinensis. The flowers are enormous, showy, and come in a variety of hues, such as red, yellow, white, and pink. Five petals that are fused together at the base make up the blooms, which also feature a lengthy stamen sticking out of the centre. The tropical Asian shrub Hibiscus rosa-Sinensis is extensively grown around the world in warm areas. The hibiscus rosa-Sinensis flower thrives well in hot, rainy regions.^[6]

Root: This hibiscus plant's root system is of the taproot variety and has the same root colour as other plants' roots in general. The hibiscus plant's roots in this situation will have a nasty brown tint. The roots of this hibiscus plant may penetrate the earth up to 40–60 cm, which distinguishes it from certain other plants and makes it special. It typically can be more than that; it just depends on how the hibiscus plant itself grows.^[12]

Stem: This hibiscus plant is a shrub that can reach a height of up to 3 meters, though it typically grows higher than that. This hibiscus plant has a woody stem that is

spherical, rigid and has a diameter of about 9 cm. This hibiscus plant has stems in a variety of hues. If the stem is still young, it will seem purple in hue. In contrast to the stems of fresh flowers, which have a clean white stem hue.^[12]

Leaves: You may identify the hibiscus plant's next morphology by looking at the leaves it has. This hibiscus plant has single leaves, irregular margins, a tapering base, and a blunt base on its leaves. Additionally, the leaves have a length that can reach 10 to 15 cm and a breadth that can be between 5 and 10 cm. The hibiscus plant features dark and light green leaves, which are consistent with the sort of plant it is in general.^[12]

Flower: Even the blooms differ dramatically from several other plant species, which has made them one of its distinctive traits. The flowers of this plant often have a single form and shape that resembles a trumpet, with a tapering tip. The axils of the hibiscus plant's leaves are

where the blossoms are found. Additionally, bell-shaped petals with golden colour are a feature of hibiscus plants. This flower, which is frequently referred to as a pink flower, has a crown and between 15 and 20 petals that are pink in hue. This plant produces flowers with many stamens that resemble tubes in shape.^[12]

Fruit and seed: The fruit of this hibiscus plant is sterile to fruitless, just like the fruit of a hibiscus plant. However, you should be aware that the hibiscus plant's fruits will display their distinctiveness with an alluring shape and, of course, will not resemble those of other plant species. This hibiscus plant typically produces fruit with an oval shape and a diameter of 4 mm. The fruit of the hibiscus plant contains seeds for this plant. When this hibiscus plant is young, it is white, and after night falls, it normally turns brown. If you want to breed this hibiscus plant, the seeds are typically used as the raw material for generative vines.^[12]



Fig. 1: Flower.



Fig. 2: Leaves.



Fig. 3: Stem.



Fig. 4: Root

Type of Soil

The pH range for well-drained soil that Hibiscus rosa-Sinensis likes is 5.5 to 6.5. Although it is not picky about the type of soil, rich or sandy loam is best for it. Although Hibiscus rosa-Sinensis can withstand moderate drought, it thrives with regular hydration.^[6]

Water

Throughout the growth season. Although the plant can endure brief periods of drought, it will not flower as frequently. During the growing season, fertiliser should be applied every 2-4 weeks to the heavy feeder Hibiscus rosa-Sinensis. Use a balanced fertiliser only half-strength.^[6]

Phytochemical

Organic acid: Aqueous extracts of Hibiscus sabdariffa Linn. flowers contain tartaric acid, as well as citric, oxalic, malic, ascorbic, and succinic acids.^[2]

Anthocyanins: The majority of chemical analyses of flower components have focused on characterising their pigments. they extracted an anthocyanin and gave it the name cyanidin-3-glucoside. Later, it became delphinidin-pentoside glucoside. According to reports, the two main components of plants growing in Trinidad are delphinidin and cyanidin. Du and Francis (1973) conducted additional research on these pigments and identified cyanidin-3-sambubioside as the second-most prevalent anthocyanin in the extract in addition to

isolating delphinidin-3-sambubioside (primary component), delphinidin-3-monoglucoside, and cyanidin-3-monoglucoside. In their earlier research on the pigments of Taiwanese roselle, Shibata and Furukawa (1969) found delphinidin-3-sambubioside as

well as trace levels of delphinidin-3-monoglucoside, cyanidin-3-monoglucoside, and delphinidin. Anthocyanins in *Hibiscus sabdariffa* had recently been measured using HPLC.^[5]

Table 1: The General Composition of fresh leaf.^[5]

Component	Amount (% fresh leaf wt.)
Water	85.6
Protein	3.3
Fat	0.3
Total carbohydrate	9.2
Fiber	1.6
Ash	1.6
Calcium	0.213
Phosphorus	0.093
Iron	0.0048
Beta- carotene Equivalent	0.0041
Ascorbic Acid	0.054
Thiamine	0.00017
Riboflavin	0.00045
Niacin	0.0012

Table 2: The General Composition of fresh fruit.

Component	Amount (% fresh fruit wt.)
Water	84.5
Protein	1.9
Fat	0.1
Total carbohydrate	12.3
Fiber	2.3
Ash	1.2
Calcium	0.0017
Phosphorus	0.057
Iron	0.0029
Beta- carotene Equivalent	0.0003
Ascorbic Acid	0.014

Pharmacological Use

Anti-Fertility activity

Hibiscus rosa Sinensis flower extracts (benzene, alcohol, and chloroform) were tested on male albino rats to see how they affected them. For twenty days, extracts were given at two separate doses (125 mg and 250 mg/kg of body weight). After therapy, there was a noticeable decrease in the amount of sperm in the epididymis and spermatogenic components of the testicles. Because of a reduction in androgen synthesis, the quantity of cholesterol in the testicles increased.^[4]

Effects on smooth muscles

Early research demonstrated that *Hs* flower alcohol extract had antispasmodic effects by reducing uterine and intestinal spasms *in vitro*. This was seen in the aortic smooth muscle of rabbits as well. Intriguingly, the extract of *Hs* inhibited the tone of the rabbit aortic strip, the rhythmically contracting rat uterus, the guinea-pig tracheal chain, and the rat diaphragms, but it promoted

the tone of the isolated quiescent rat uterus and the frog rectus abdominis.^[7]

Effect on blood pressure

Aqueous *Hibiscus sabdariffa* calyx extracts administered intravenously to anesthetized rats and cats resulted in a dose-dependent reduction in blood pressure. More recently, animals with experimental hypertension and spontaneously hypertensive rats that received the aqueous extracts at dosages of 250–1000 mg/kg for up to 14 weeks revealed that *Hibiscus sabdariffa* has an antihypertensive effect.^[5]

Anti-diabetic activity

In diabetic rats that had been treated with alloxan, the antioxidant, hyperlipidemic, and anti-diabetic potentials of *Hibiscus rosa-sinensis* extracts were investigated. Animals received flower extract (hydrochloric) at dose levels ranging from 50 to 200 mg/kg. *Hibiscus rosa sinensis* extract's anti-diabetic activity was comparable to those of prescription medications (glibenclamide and

sulphonylurea). The size, quantity, and diameter of islets considerably increased after twenty-eight days of therapy, and atrophy and necrosis were also improved.^[4]

Antibacterial, antifungal and antiparasitic activity

This time, the dried CHs' aqueous-methanol extract inhibited the growth of *Candida albicans* but did not affect a number of bacterial strains, including *S. Escherichia coli*, *Staphylococcus aureus*, *Bacillus stearothermophilus*, *Micrococcus luteus*, *Serratia marseilles*, *Clostridium sporogenes*, and *K. K. pneumonia*, *Bacillus cereus*, and *Pseudomonas*.^[7]

Renal effects

Kidney effects In rats with ammonium chloride-induced hyperammonemia, oral administration of *Hibiscus sabdariffa* extracts dramatically normalises blood levels of ammonia, urea, uric acid, creatinine, and non-protein nitrogen. *Hibiscus sabdariffa* extract consumption significantly reduced urine concentrations of creatinine, uric acid, citrate, tartrate, calcium, sodium, potassium, and phosphate in healthy human subjects, but not oxalate. Additionally, a low dose of *Hibiscus sabdariffa* (16 g/day) led to a more notable reduction in urine salt output than a high dose (24 g/day). Rats receiving dried *Hibiscus sabdariffa* calyx as dietary supplements experienced a notable uricosuric effect.^[5]

Anti-microbial activity

Using the good diffusion method, the antibacterial activity of a methanolic extract of *Hibiscus rosa-Sinensis* leaves was examined against *Streptococcus pyogenes*, *Enterobacter aerogenes*, *Pseudomonas aeruginosa*, and *Escherichia coli*. *Escherichia coli* and *Enterobacter aerogenes* had the highest inhibitory zones after 24 hours of incubation at 37 C, measuring 13 and 12 mm, respectively.^[4]

Antioxidant activity

The ability of several solvent extracts of *Hibiscus rosa-Sinensis* to block the oxidation of linoleic acid and their DPPH free radical scavenging potential, total phenolic and flavonoid levels, and antioxidant activity were all examined. Total phenolics (59.31 4.31 and 61.45 3.23) mg/100g as gallic acid equivalent and total flavonoid levels (32.25 1.21 and 53.28 1.93) mg/100g as catechine equivalent were found in ethanol and methanol extracts, respectively.^[4]

Nephroprotective activity

On the nephroprotective efficacy of Hs extracts on diabetic nephropathy in streptozotocin-induced type 1 diabetic rats, two investigations were described. Renal end-stage disease may develop from nephropathy. A study was done to find out how the polyphenol extract of Hs (100 and 200 mg/kg/day) affected the diabetic nephropathy that streptozotocin induced in rats. The extract showed positive effects, including decreased kidney mass, enhanced hydropic change in the renal proximal convoluted tubules, lower blood triglyceride,

total cholesterol, and LDL levels, increased catalase and glutathione activity, and decreased lipid peroxidation in the kidney.^[7]

Anxiolytic

Byutilizing methanolic extract of *Hibiscus rosa Sinensis* flower with anthocyanidins to induce anxiolytic action in mice. The authors of this study concluded that the methanolic extract and anthocyanidins may have a potential anxiolytic effect through a mechanism involving dopamine, noradrenalin, serotonin, and gamma amino butyric acid.^[13]

Analgesic effect

Aqueous and alcoholic extracts made from dried *Hibiscus rosa Sinensis* leaves were used in a recent investigation. This extract has a dose-dependent analgesic effect. In the leaves, a 20% extractability percentage was discovered.^[13]

Wound healing activity

A study employing the wound-healing properties of *Hibiscus rosa Sinensis* on Sprague Dawley rats. *Hibiscus rosa Sinensis* ethanolic extract was employed. According to the study, when compared to control animals, animals treated with an ethanolic extract of *Hibiscus rosa Sinensis* had wounds that were 86% smaller.^[13]

Anabolic effect

Extract from *Hibiscus rosa sinensis* leaf has anabolic properties. Due to their role in protein synthesis, aphrodisiac herbs have anabolic activity, which enhances male virility.^[13]

Anticancer effect

Studies conducted in vitro have demonstrated that *Hibiscus sabdariffa* extracts can cause cancer cells to undergo apoptosis. In a concentration-dependent way, hibiscus polyphenol-rich extracts (HPE) cause the death of human gastric cancer (AGS) cells; this action of HPE on AGS cells was mediated through p53 signalling and Additionally, *Hibiscus anthocyanins* extract (a class of natural pigments found in the dried calyx of *Hibiscus sabdariffa* L. induced cancer cell apoptosis, and Delphinidin 3- sambubioside (Dp3-Sam), isolated from the dried calices of *Hibiscus sabdariffa* L., similarly induced apoptosis in human leukaemia cells (HL-60).^[5]

Effects on decreasing lipids

In response to treatment with *Hibiscus sabdariffa*, blood lipids and lipoproteins circulating in the blood in the form of LDL are lowered. *Hibiscus sabdariffa* ethanol extract has been demonstrated to lower cholesterol, VLDL-cholesterol, and LDL-cholesterol in alloxan-diabetic rats. In hypercholesterolemic rabbits and hypercholesterolemic rats, dietary supplementation with *Hibiscus sabdariffa* reduced serum levels of triglycerides, total cholesterol, and LDL-cholesterol. In addition, LDL by CuSO₄, CCl₄ oxidation generated thiobarbituric acid reactive compounds (TBARs) and conjugated dienes,

which were reduced. Similar research employing Hibiscus anthocyanins (HAs) extracts revealed that the extracts reduced TBARS generation in the Cu²⁺-mediated oxidised LDL and scavenged over 95% of free DPPH radicals. They also decreased the relative electrophoretic mobility of oxLDL (Chang et al, 2006). Hibiscus sabdariffa calyx (5% or 10%) was given to hypercholesterolemic rats for 9 weeks, and the lipid fractions in their plasma, hearts, brains, kidneys, and liver were reduced.^[5]

Traditional Use

Hibiscus flowers and leaves are used in India for a variety of conditions, including abortion, infertility, contraception, diuretic, menorrhagia, bronchitis, emmenagogue, demulcent, and cough. Hibiscus flowers have a long history of use in sachets and perfumes in Africa and nearby tropical nations. Hibiscus has been utilized as a constipation remedy in parts of northern Nigeria. The fleshy red calyx is used to make cold and warm teas and beverages, jam, and jellies. Like spinach, the leaves have been prepared. Traditional treatments employ the leaves as emollients and aperients to treat constipation, skin conditions, and burning sensations. The plant is said to be diuretic in nature and is used in Egypt to cure and nervous ailments.^[3]

Table 3: Common name of Hibiscus plant in india.

Name	Common Name
Andhra Pradesh	Dusanna
Assamese	Jiwa, Joba
Bengali	Oru
Gujarati	Jasvua, Jasunt
Hindi	Guthur, Jassoon, Jasum, Jasund, Jasut, Java, Odhul
Malayalam	Dasavala
Kannasa	Dasavala
Manipuri	Jabakusum
Marathi	Dasindachaphula, Jasvand, Jasund
Mizoram	China pangpar, Midumpangpar

CONCLUSION

According to the study, the Hibiscus rosa-Sinensis bloom may have anti-diabetic properties. In rats, the flower extracts drastically lowered their blood sugar levels. The hypoglycemic impact of flowers may be due to their abundance in flavonoids and other bioactive chemicals. To clarify the mechanism of action and confirm its promise for treating diabetes in humans, more research is required. As a result, this plant has excellent therapeutic potential for bacterial infection, coronary heart disease, fungal infection, liver infection, cancer, hypertension, fever, cough, and stomachic, among other conditions. The current study demonstrates the considerable therapeutic and nutritional benefits of Hibiscus sabdariffa Linn. for both humans and animals.

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