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Review Article

Rosehip (*Rosa Canina* L.): A Systematic Review of The Plant, Traditional Uses, And Pharmacological Aspects

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ABSTRACT

The fruit of the genus Rosa, commonly known as "rose hip," has been traditionally used in medicine to address various health issues, including kidney stones, gastrointestinal problems, hypertension, and respiratory conditions such as bronchitis and colds. This review highlights the ethnopharmacological uses and phytochemical properties of rose hip. Rose hips contain approximately 129 compounds, including flavonoids, tannins, and phenolic acids, contributing to their antioxidant, anti-inflammatory, anti-cancer, and neuroprotective effects. Rosehip powder and extracts have also demonstrated benefits for arthritis. The genus Rosa, which includes over 100 species, belongs to the Rosaceae family. Rosehip is valued for its micronutrient content and has a long history of use in folk medicine to treat various conditions, including its roles as a laxative and diuretic. This review discusses rose hip's traditional applications and clinical potential, emphasizing its historical significance and the scientific support for its benefits in pharmacological research.

INTRODUCTION

The fruit of the genus Rosa, commonly referred to as "rose hip," is widely utilized in various traditional medicines. Rose hips have a long history of use in treating kidney stones, gastrointestinal issues, hypertension, and respiratory problems, including bronchitis, coughs, and colds. This review focuses on the ethnopharmacological uses of rose hips, along with their phytochemical and pharmacological properties. [1] The ethno-medical uses of rose hips have been documented in many countries for a long time. Approximately 129 chemical compounds have been isolated and identified from rose hips. This fruit contains several major active components, including flavonoids, tannins, anthocyanins, phenolic compounds, fatty oils, organic acids, and inorganic compounds.

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Scientific studies have suggested a wide range of pharmacological activities for rose hips, such as antioxidant, anti-inflammatory, anti-obesity, anti-cancer, hepatoprotective, nephroprotective, cardioprotective, anti-aging, anti-H. Pylori, neuroprotective, and antinociceptive effects. Notably, rose hip powder and extracts have been reported to have therapeutic benefits for arthritis. [2] The genus Rosa is one of the most widespread members of the Rosaceae family, encompassing over 100 species. Rosehip, also known as rose haw, is an excellent source of various micronutrients (vitamins) and phytochemicals, including phenolic acids, tannins, and flavonoids. It has a long history of traditional use in folk medicine. Rosehip has been utilized for treating several health issues, particularly those related to the ears, nose, and throat. In traditional European folk medicine, rosehip has been used as a laxative, diuretic, and remedy for gout and rheumatism.

To explore potential future applications of rosehip for medicinal and clinical purposes, we reviewed its traditional uses, clinical properties, and pharmacological potential across various ethnomedical systems. In addition to its traditional applications, Rosa spp. Exhibits various pharmacological properties. Numerous in vitro and in vivo studies, along with clinical trials, have confirmed the traditional uses of rosehip. These studies are also discussed in this review. [1,2]

Plant Profile

Kingdom	Plantae
Phylum	Angiosperm
Class	Eudicot
Order	Rosales
Family	Rosaceae
Genus	Rosa
Species	R. canina L.



Figure 1 Rose Hip plantr

Figure 2 Rose Hip plantr

Characteristics of rose

1. Roses are woody perennial plants that are members of the Rosaceae family and the Rosa genus.
2. Around 10,000 cultivars of the approximately 300 species of roses can be found globally.
3. They grow in a variety of ways, including erect shrubs and stem-supported climbers.
4. Different species of roses have different blossom sizes, and they come in a variety of hues including red, white, yellow, blue, and more.
5. While the majority of rose species are Asian in origin, there are several that are also native to Europe, North America, and other places.
6. Roses are simple to grow and develop in gardens due to their strong adaptability for hybridization [3]

Phytochemicals of rose hip

Phytochemical reports on rose hips have identified various categories of phytochemicals. The most well-known include anthocyanins, phenolic acids (such as hydroxybenzoic and hydroxycinnamic acids), tannins (both hydrolyzable tannins and ellagitannins), flavanols, flavonoids (specifically dihydrochalcones), stilbenoids, carotenoids, chlorins, organic acids, sugars, fatty acids, galactolipids (monogalactosyldiacylglycerol), tocopherols, and vitamins. The total phenolic content in 25 types of rose hip fruit varies from 20.1 to 32.2 mg

of gallic acid equivalents per gram. Rosa canina is particularly noted for its high flavanol content, which is the predominant phenolic class found in most species. Fatty acid analyses show that rose hips contain nine major fatty acids, with α-linolenic acid being the most abundant, followed by palmitic and linoleic acids. Additionally, rose hips are rich in essential elements such as nitrogen (N), phosphorus (P), potassium (K), calcium (Ca), magnesium (Mg), and zinc (Zn). [1,2]Rose hips are well known for being a rich source of vitamin C. The powder made from the pulp and skin contains high levels of ascorbic acid and carotenoids, while the seeds are rich in vitamin E. These components contribute to the antioxidant properties of rose hips. They are often recommended as a supplement for medicinal and preventive purposes, particularly for addressing deficiencies in vitamins C and E. Currently, rose hip products, primarily derived from Rosa canina, are available in both oral and topical formulations. [1,2]

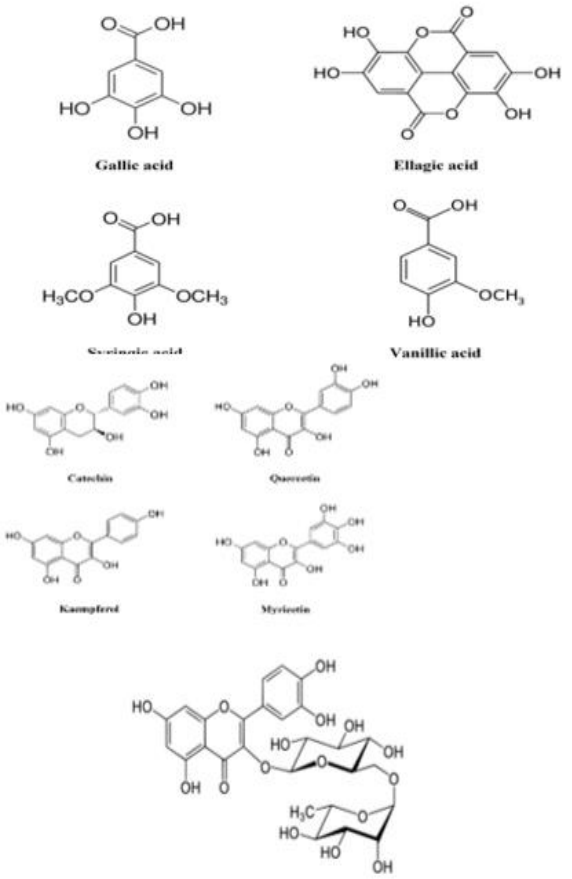

Figure 2 Chemical Compounds of Rose Hip

Uses

Roses are widely used to create perfumes, air fresheners, and various scented products. The calming and mood-enhancing effects of rose aroma have been scientifically proven. In addition to their therapeutic uses, roses are also popular in culinary applications. Rose petals are transformed into syrups, essences, jams, and flavorings. The rose hip, which is the most acidic part of the plant, can be enjoyed fresh, dried, or preserved and has a fruity flavor reminiscent of cranberries. Crushed rose hips are commonly used to make herbal tea. Rose oil is also used to flavor candies, syrups, and desserts. Furthermore, rose hips are rich in vitamin C, which supports our immune system and contains antioxidants and antibacterial properties.

The hips are high in vitamins A, B3, C, D, and E. Crushing rose petals releases natural rose water, essences, and oils. Rose petal tea aids in bile production and helps cleanse the gallbladder. The scientific name "Rosa" encompasses not only the physical attributes and diversity of this beloved flower but also reflects centuries of human admiration and cultivation. From ancient civilizations to modern gardens, roses have left a lasting impact on human culture. Their scientific name, Rosa, reminds us of the intricate beauty and complexity of this remarkable plant genus. Next time you encounter a rose, take a moment to appreciate its scientific identity, Rosa, and the rich history and natural wonder it represents. From wild roses to carefully cultivated varieties in our gardens, the rose continues to captivate our hearts and minds, highlighting the enduring power of nature's creations. Rose hips can be eaten raw, like berries, but care should be taken to avoid the hairs inside the fruit, which can cause skin irritation. Some rose species are grown specifically for the ornamental value of their hips. For example, *Rosa moyesii* produces large, red bottle-shaped fruits, while Rosa macrophylla 'Master Hugh' has the largest hips of any commonly available rose. Rose hips are often used in herbal tea, typically blended with hibiscus. Oil can also be extracted from the seeds. In Sweden, a popular dish called nyponsoppa is made from rose hip soup. Rhodomel, a type of mead, is created using rose hips. Additionally, rose hips are a key ingredient in pálinka, the traditional Hungarian fruit brandy, which is popular in Hungary, Romania, and other countries with Austro-Hungarian heritage. They are also the main ingredient in Cockta, the fruity national soft drink of Slovenia. Dried rose hips are sold for crafts and home fragrance purposes, while the Inupiat mixes rose hips with wild redcurrants and highbush cranberries to boil them into a syrup. [3,4,5]

Pharmacological aspects of rose hip

1. Gastrointestinal System

Several pharmacological studies have explored the gastro-protective effects of rose hip, particularly the fruit of r. Canina. Some findings indicate that r. Canina fruit has anti-ulcerogenic activity, proving to be more effective at a dose of 2070 mg/kg than the reference compound misoprostol at 0.4 mg/kg in rats. The carotenoids found in the rose hip can protect gastric mucosa in cases of peptic ulcer disease and gastroduodenal mucosal inflammation. An in vitro study demonstrated that carotenoids from rose hip exert an anti-h. Pylori effect, with a mic50 range of 8.2 to 11 µg/ml, is comparable to that of metronidazole. However, the hydroalcoholic crude extract of r. Canina did not exhibit a significant anti-ulcer effect. [1,6]

2. Antioxidant Properties

Several in vitro studies have demonstrated the antioxidant activities of rose hip. These activities are attributed not only to its high vitamin C content but also to its rich supply of polyphenols, proanthocyanidins, flavonoids, vitamin E, and carotenoids. The total phenolic content of r. Canina fruit is approximately 609.19 mg of gallic acid per 100 grams, while the total carotenoid content is about 18.07 mg of β-carotene per 100 grams. Additionally, the ascorbic acid content is 27.49 mg per 100 grams. Rosehip has an impressive ability to scavenge hydrogen peroxide (h2o2), achieving an effectiveness of about 87.26%, which is significantly higher than that of BHA (0.03%) and bht (0.14%). Furthermore, the trolox equivalent antioxidant capacity (teac) of this fruit is approximately 416 µmol Trolox per gram of fresh weight, which is close to that of BHA (462 µmol Trolox per gram of fresh weight) and much higher than bht (0.35 µmol Trolox per gram of fresh weight). [1,2,4]

3. Skin And Hair

One of the most common uses of rose hip in modern medicine is its incorporation into cosmetic products, such as creams and soaps. A clinical

study found that the topical application of seed and shell powder from r. Canina fruit significantly improved crow's-feet wrinkles and increased skin moisture and elasticity. In other clinical trials, r. Canina seed oil demonstrated the ability to prevent epithelitis following radiotherapy and reduce erythema in surgical scars. Additionally, some studies indicated that proanthocyanidins from rose hip methanolic extract could prevent melanogenesis in guinea pig skin and mouse melanoma cells, and showed beneficial effects on skin-whitening factors when consumed orally. Furthermore, quercetin derived from rose hip can inhibit melanogenesis by blocking both the expression and activity of the enzyme tyrosinase. [1,2,5.6]

4. Joints And Muscles

Preclinical and clinical studies have shown that rose hip possesses anti-arthritis and analgesic properties. These effects have been particularly noted in individuals with osteoarthritis, rheumatoid arthritis, and chronic musculoskeletal pain. A meta-analysis of randomized controlled trials (RCTs) indicated that treatment with r. Canina hip powder resulted in improvements in pain scores and reduced use of "rescue medication" compared to a placebo. However, the authors noted that the included studies (which comprised 287 patients: 145 receiving the powder and 142 receiving placebo, with a median trial duration of 3 months) were sponsored by the manufacturer. [1,2,7]

5. Anti-Cancer Properties

Due to its high content of antioxidant compounds such as phenols, β-carotene, glutathione, tocopherol, ascorbate, and anthocyanins, rose hip has gained attention as a potential anticancer plant. Notably, an extract from r. Canina has shown effectiveness in preventing the growth of tumor cell lines, including those associated with colon, breast, lung, cervical, and hepatocellular carcinomas while exhibiting no toxicity towards non-tumor primary liver cultures. [1,2,8]

6. Heart And Arterials

clinical and experimental studies have shown that the administration of rose hip can reduce the risk of cardiovascular diseases. Rosehip is rich in antioxidants, particularly ascorbic acid and phenolic compounds, which possess anti-obesity, anti-inflammatory, and antioxidative effects. In a hypercholesterolemic mouse model, a rose hip lowered plasma cholesterol levels and reduced atherosclerotic plaque formation. When rose hip extract was administered to mice fed a high-fat diet, it increased fecal cholesterol content and boosted liver expression of the older gene, along with selected genes involved in reverse cholesterol transport (RCT). Additionally, it lowered blood pressure, and oxidized LDL levels, total cholesterol, and the volume of atherosclerotic plaques. In a randomized double-blind, placebo-controlled trial, the administration of r. Canina powder (40 grams for 6 weeks) was found to reduce cardiovascular risk markers in obese, non-diabetic individuals. [1,2,9]

7. Central and Peripheral Nervous System

Rose hip extract has demonstrated neuroprotective properties, particularly in the context of brain ischemia. Research indicates that the fruit extract of r. Canina may have potential anti-Alzheimer activity. The primary mechanisms behind rose hip's neuroprotective effects appear to be its antioxidant and anti-inflammatory activities. However, current research is limited, as only two studies involving rat models have reported results, both utilizing intraperitoneal administration. Therefore, further investigations and clinical trials are essential to enhance our understanding of the neuroprotective effects of rose hip and its constituents. [1,2,9]

8. Anti-Inflammatory Activity

Rosehip extract and several of its bioactive compounds have been shown to reduce

inflammation. Various molecular mechanisms have been proposed for the anti-inflammatory effects of rose hip, including the inhibition of the nf-kappa B signaling pathway. This inhibition may help attenuate pro-inflammatory enzymes such as matrix metalloproteinases (mmps) and cyclooxygenase-2 (cox-2), while also decreasing the production of pro-inflammatory cytokines including TNF-alpha, il-1beta, il-6, and ccl5. Galactolipids may play a significant role in the anti-inflammatory activity of r. Canina fruit. However, it is important to note that only preclinical studies have been conducted. In these studies involving rats, the administered dose ranged from 100 to 500 mg/kg. [1,2,10]

Toxicity and side effects

Aside from two reported cases of allergic contact dermatitis to rosehip oil, no significant toxicity has been associated with this plant. Some minor side effects, such as loose stools, flatulence, and mild gastrointestinal discomfort, were observed in certain clinical trials involving rose hip powder. [1,2]

CONCLUSION

This review evaluates the folklore applications, phytochemicals, and pharmacological properties of rose hip. Rose hip contains various constituents, including anthocyanins, phenolic derivatives, and vitamins. This plant has been used in traditional medicine worldwide for various purposes, such as acting as a laxative, diuretic, and treatment for colds and pain. While several pharmacological activities, including anti-arthritis, anti-obesity, and antioxidant effects, have been reported for rose hip in preclinical studies, further research is needed to address existing gaps in our understanding of its pharmacological effects and bioactive components.

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