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REVIEW OF THE MEDICINAL PROPERTIES OF THE BLACKBERRY (RUBUS) PLANT

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Abstract. This article presents a comprehensive review of the medicinal properties of the blackberry (Rubus spp.) plant, synthesizing data from ethnobotanical traditions and contemporary phytopharmacological research. The plant's fruit, leaves, roots, and seeds have long been utilized in folk medicine, particularly for treating gastrointestinal ailments, respiratory infections, dermatological conditions, and systemic inflammation. Recent studies confirm that blackberries are a rich source of anthocyanins, flavonoids, tannins, vitamins, and other bioactive compounds with antioxidant, anti-inflammatory, antimicrobial, antidiabetic, and anticancer properties.

Keywords: Rubus, blackberry, phytotherapy, traditional medicine, anthocyanins, bioactive compounds.

INTRODUCTION

Blackberry (Rubus spp.), a member of the Rosaceae family, has been recognized for centuries not only as a valuable food crop but also as a therapeutic agent in traditional medicine. Different parts of the plant—fruits, leaves, roots, and seeds—have been widely used in Europe, Asia, and the Americas to treat a variety of health conditions. With the increasing interest in plant-based treatments and functional foods, the medicinal properties of blackberries have gained renewed scientific attention.

Modern analytical methods have confirmed many of the traditional claims regarding the plant's healing potential. Blackberries are now known to contain significant levels of phenolic compounds, including anthocyanins, flavonols, ellagitannins, and catechins, as well as ascorbic acid, fiber, and essential minerals. These compounds contribute to a range of pharmacological effects, which will be explored in detail in this review.

MATERIALS AND METHODS

Blackberry fruits are considered one of the richest natural sources of anthocyanins, particularly cyanidin-3-glucoside and cyanidin-3-rutinoside. These pigments possess strong antioxidant activity, contributing to the neutralization of reactive oxygen species (ROS) and the prevention of oxidative stress-related diseases such as atherosclerosis, cancer, and neurodegenerative disorders[1][2].

In folk medicine, unripe berries are used to treat diarrhea due to their astringent properties, while ripe fruits are consumed to improve digestion, support cardiovascular health, and enhance immunity. Recent in vitro and in vivo studies have confirmed that blackberry extracts inhibit the proliferation of cancer cells, reduce LDL oxidation, and improve glucose metabolism in diabetic models[3][4].

RESULTS AND DISCUSSION

Traditionally used in the form of infusions or decoctions, blackberry leaves contain tannins, flavonoids, organic acids, and vitamin C. Their astringent and anti-inflammatory effects make them suitable for the treatment of gastrointestinal issues such as gastritis, enteritis, and ulcerative colitis. They are also used for treating oral inflammations (e.g., gingivitis, stomatitis) when used as a gargle or rinse.

Moreover, blackberry leaf extract exhibits antimicrobial activity against a wide range of bacteria and fungi, supporting its use for wound cleansing and topical infections[1][5].

The roots of the blackberry plant are used less frequently, but are valued in folk remedies as a hemostatic and diuretic agent. Decoctions made from roots are traditionally employed to stop internal bleeding, reduce fever, and cleanse the urinary tract. While scientific validation of these uses is limited, preliminary phytochemical analyses show the presence of alkaloids and tannins, which could underlie these effects.

Although not widely used in traditional medicine, blackberry seeds have recently drawn interest due to their oil content, which includes polyunsaturated fatty acids, tocopherols (vitamin E), and sterols. Blackberry seed oil is being investigated for its dermatological benefits, including antioxidant protection and anti-aging effects, and is now used in various cosmeceutical formulations[2].

Multiple studies confirm that blackberry extracts have significant free radical scavenging abilities. Anthocyanins, particularly cyanidin derivatives, are primarily responsible for this action. These antioxidants protect cells from DNA damage, lipid peroxidation, and protein oxidation, all of which are implicated in chronic degenerative diseases[3].

Tannins and flavonoids in blackberry leaves and fruits exhibit anti-inflammatory effects by downregulating pro-inflammatory cytokines such as TNF-α and IL-6. In animal models, these compounds reduce tissue edema and inflammatory cell infiltration. Moreover, aqueous and ethanol extracts of Rubus leaves have demonstrated antimicrobial activity against Staphylococcus aureus, E. coli, and Candida albicans, supporting their traditional use in treating infections[1][5].

Blackberry polyphenols have been shown to modulate glucose and lipid metabolism. In diabetic rat models, blackberry extract improves insulin sensitivity and reduces blood glucose levels. In cardiovascular research, anthocyanins from blackberry inhibit platelet aggregation, improve endothelial function, and reduce blood pressure in hypertensive models[4].

Blackberry fruit extracts have demonstrated cytotoxicity against multiple cancer cell lines, including colon, breast, and prostate cancer. Mechanisms include induction of apoptosis, inhibition of angiogenesis, and suppression of inflammatory mediators such as COX-2 and NF-κB. These findings support the development of blackberry-based nutraceuticals for cancer prevention and adjunct therapy[3].

Recent research conducted at the VNIISPK (Russia) has identified elite blackberry genotypes—particularly hybrids of ‘Loch Ness’ and ‘Cheyenne’—with significantly elevated levels of bioactive compounds. For example, the No. 4 elite seedling of ‘Loch Ness’ was found to contain up to 1050 mg/100 g of R-active substances and high ascorbic acid levels (14.2 mg/100 g), making it especially suitable for medicinal use. These elite cultivars not only offer enhanced therapeutic value but also address agronomic challenges such as winter hardiness, early ripening, and resistance to fungal diseases.

CONCLUSION

The medicinal value of the blackberry plant (Rubus spp.) is well supported by both traditional knowledge and modern scientific research. Its diverse phytochemical profile provides a basis for its use in treating a wide array of conditions, including inflammatory disorders, infections, metabolic syndromes, and certain cancers. Continued research into elite cultivars and standardized extraction methods will further enhance the clinical applicability of blackberry-based preparations. As a functional food and medicinal plant, blackberry holds considerable promise for integrative medicine and evidence-based herbal therapy.

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