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Malabar Spinach: A Functional Food for Better Health

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Abstract

Basella rubra and Basella alba is the underutilized leafy green, which is known as Indian spinach or Malabar spinach, that have a great nutritional and therapeutic value. Generally grown in tropical regions and subtropical regions, these perennial vines grow quickly and can withstand high temperatures. Malabar Spinach long been used as food and medicine. Carbohydrates, proteins, vitamins, minerals, dietary fiber, carotenoids and organic acids are all rich in Basella species. The bioactive compounds, such as bioflavonoids, saponins, β-sitosterol, lupeol, and kaempferol, have been found in Basella species through phytochemical studies. These substances help in many pharmacological functions, including wound healing, anti-ulcer, antimicrobial, anti-inflammatory, antidiabetic and cholesterol management. Basella is used in traditional medicine such as Ayurveda and Siddha to treat digestive issues, urinary tract issues, skin infections, digestive problems and anaemia.

Keywords: Basella rubra, Basella alba, Malabar spinach, nutritional value, medicinal importance.

Introduction

Medicinal plants have an important role from the early days in traditional healthcare systems and are still used today to cure and prevent illness. Due to growing interest in plant-derived therapies, the global medical plant-based business is rapidly expanding, with an annual growth rate between 7–15% (Khan et al., 2011). Finding, assessing, and using traditional medicinal plants for phytotherapy has been a main priority for the World Health Organization (WHO) since 1980. Nearly 75–80% of people worldwide are thought to receive their primary healthcare through traditional medical systems, mainly in rural and developing regions (WHO, 2002).

Basella rubra (Red/Purple stem) and Basella alba (Green stem) are green leafy vegetables which are native to tropical Asia, that grow fast and are semi-succulent. They are also known as Indian spinach or Malabar spinach. Nutrients include vitamins, minerals, dietary fiber, proteins, carotenoids, organic acids, and essential amino acids which are rich in Basella species. Additionally, they include bioactive phytochemicals which provide to their therapeutic qualities, including as betacyanin's, flavonoids, β-sitosterol, saponins, and lupeol (Pandey, M.,2023). In Ayurveda, Siddha and Chinese medicine, Basella species have traditionally (Yanadaiah., 2012) used to treat conditions like

constipation, skin conditions, iron deficiency anaemia, inflammation, diabetes, and urinary tract infections. Antioxidant, antibacterial, antidiabetic, anti-inflammatory, wound-healing, and hepatoprotective properties are among the certified pharmacological activity. It contains many advantages, Basella species is still underutilized and little known, which peak the necessity for scientific assessment and its enhancement.

Basella Alba.

Basella Rubra

Table:1 Nutritive Value of Cooked Malabar Spinach per100g

Nutrient	Unit	Value per 100g
Water	g	92.5
Energy	kcal	23
Protein	g	2.98
Total lipid(fat)	g	0.78
Carbohydrate	g	2.71
Fiber	g	2.1
Calcium	mg	124
Iron	mg	1.48
Magnesium	mg	48
Phosphorus	mg	36
Potassium	mg	256
Sodium	mg	55
Zinc	mg	0.3
Vitamin C	mg	5.9
Folate	µg	114
Vitamin A	IU	1158

Sources,(Ciju, 2021)

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Table:2 Therapeutic Uses of *Basella* species

Properties	Compound	Health Benefits
Antioxidant Activity	Rich in phenolic compounds,(p-Coumaroylmalic acid, 6′-O-Feruloyl-d-sucrose, Dicaffeoylquinic acid-O-glucoside, and Isorhamnetin-7-O-glucoside) flavonoids, and carotenoids	Helps in reducing oxidative stress and cellular damage
Anti-Inflammatory Effects	**Flavonoids** Isorhamnetin and its glycosides (e.g., Isorhamnetin-7-O-glucoside) Quercetin derivatives **Phenolic Acids** p-Coumaric acid derivatives (e.g., p-Coumaroylmalic acid) Caffeic acid derivatives Ferulic acid derivatives (e.g., 6′-O-Feruloyl-D-sucrose)	Helpful in maintaining arthritis and inflammatory disorders
Digestive Health	Mucilage (Polysaccharides) Phenolic Compounds (e.g., caffeic acid, p-coumaric acid derivatives) Flavonoids (e.g., isorhamnetin derivatives)	Helps in Smoothening the gastrointestinal tract which protects against gastric irritation Which is used traditionally to treat constipation and ulcers
Anti-Anaemic Property	Iron (Non-Heme Iron) Phenolic Compounds & Flavonoids (e.g., p-coumaric acid derivatives, isorhamnetin glycosides)	Useful for pregnant women and adolescent girls.
Immune System Support	Vitamin C (Ascorbic Acid) Vitamin A (β-Carotene) Flavonoids	Helps to fight infections which Stimulates the

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	(e.g., isorhamnetin derivatives) Phenolic Compounds (e.g., p-coumaric acid, caffeic acid derivatives)	production and activity of white blood cells.
Cardiovascular Health	Dietary Fiber Potassium Flavonoids (e.g., isorhamnetin derivatives) Phenolic Compounds (e.g., p-coumaric acid, caffeic acid, ferulic acid derivatives)	Potassium helps in regulating blood pressure which reduces the risk of hypertension and stroke.
Skin and Hair Health	Vitamin A (β-Carotene) Vitamin C (Ascorbic Acid) Flavonoids (e.g., isorhamnetin derivatives) Phenolic Compounds (e.g., p-coumaric acid, caffeic acid derivatives)	Enhancing collagen stimulation, by improving blood supply to skin and hair follicles Maintaining hydration and cell integrity.
Anti diabetic property	Dietary Fiber Phenolic Compounds (e.g., p-coumaric acid, caffeic acid, ferulic acid derivatives) Dicaffeoylquinic Acid Derivatives Low Glycemic Load	Helps in slowing down the carbohydrate digestion and absorption, which enhances the insulin sensitivity, by maintaining pancreatic β-cells.
Anti-viral property	**Flavonoids** (e.g., isorhamnetin and quercetin derivatives) **Dicaffeoylquinic Acid Derivatives** (e.g., dicaffeoylquinic acid-O-glucoside) **Polysaccharides (Mucilage)**	Helps in reducing oxidative stress and inflammation Enhances innate immunity.

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CNS(Central Nervous System) depressant property	**Flavonoids** (e.g., isorhamnetin and related glycosides) **Phenolic Compounds** (e.g., caffeic acid, p-coumaric acid derivatives)	Helps in reducing oxidative stress and neuroinflammation, neuromuscular relaxation By producing mild sedative and calming effects.

Conclusion

Malabar spinach (Basella spp.) is a leafy vegetable which is both therapeutically significant and nutrient-rich .and it has a close relationship with both traditional and modern healthcare systems. Clinical studies have revealed that Basella rubra and Basella alba have antibacterial, antiulcer, antiviral, anti-diabetic, antioxidant, anti-inflammatory, wound-healing, and central nervous system depressant properties. Its diverse phytochemical profile, which includes flavonoids, saponins, terpenoids, polysaccharides and antioxidant pigments which control oxidative stress and inflammatory pathways, is chiefly responsible for these therapeutic actions.

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