

The importance of pumpkin (*Cucurbita L*) in medicine and folk medicine

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Abstract

Pumpkin (*Cucurbita L.*) has long been recognized not only as a nutritional food source but also as a plant of significant medicinal value. This article explores the multifaceted importance of pumpkin in both modern medicine and traditional folk healing practices. Rich in bioactive compounds such as carotenoids, tocopherols, flavonoids, and essential fatty acids, pumpkin exhibits a range of therapeutic properties including antioxidant, anti-inflammatory, antimicrobial, and antidiabetic effects. Clinical studies and ethnobotanical records reveal its use in managing conditions such as diabetes mellitus, hypertension, intestinal parasites, and prostate disorders. Moreover, pumpkin seed oil has gained prominence in urology and dermatology due to its beneficial impact on benign prostatic hyperplasia and skin regeneration. In folk medicine, various cultures have utilized different parts of the pumpkin—seeds, pulp, and peel—for healing wounds, boosting immunity, and improving digestion. This article presents a comprehensive review of recent scientific findings and historical applications, emphasizing the plant's role as a bridge between natural remedies and evidence-based medical interventions.

Keywords: *Cucurbita L.*, pumpkin, medicinal plants, folk medicine, phytochemicals, antioxidant, anti-inflammatory, traditional healing, pumpkin seed oil, ethnomedicine.

Introduction

Pumpkin (*Cucurbita L.*), a member of the Cucurbitaceae family, has been cultivated and consumed for centuries across the globe, not only as a dietary staple but also as a potent source of healing in both traditional and modern medical systems. Native to the Americas and later introduced to various regions of the world, pumpkin holds a revered place in the annals of ethnomedicine due to its wide array of therapeutic uses. From its nutrient-dense flesh to its oil-rich seeds and antioxidant-packed peel, every part of the pumpkin has been utilized for human health and wellness. In contemporary medicine, increasing attention has been paid to the phytochemical composition of pumpkin. It contains high levels of carotenoids (especially beta-carotene), vitamin E (tocopherols), polyunsaturated fatty acids, zinc, selenium, and phytosterols—all known for their positive impact on human health. These compounds play a role in reducing oxidative stress, improving immune function, and preventing chronic diseases such as cardiovascular disorders, diabetes, and certain types of cancer. Moreover, pumpkin seed oil has demonstrated efficacy in improving urinary function, particularly in cases of benign prostatic hyperplasia, and in supporting skin regeneration and hair growth. Traditional folk medicine across various cultures has long recognized the healing potential of pumpkin. In Ayurvedic medicine, pumpkin is used for balancing the body's internal energies, soothing inflammation, and treating gastrointestinal ailments. In Eastern European traditions, roasted pumpkin seeds are commonly used as a natural remedy against intestinal worms. Native American communities have historically applied mashed pumpkin pulp on wounds and burns due to its cooling and soothing properties. These diverse applications reflect the deep-rooted cultural knowledge surrounding the plant's curative effects. Despite its ancient roots, scientific validation of pumpkin's therapeutic benefits is a relatively recent development. With the rise of phytotherapy and interest in functional foods, researchers have increasingly focused on *Cucurbita L.* as a bioactive resource. As studies continue to confirm traditional knowledge, pumpkin is gradually being integrated into evidence-based medical practices. This article aims to explore the bridge between traditional uses and scientific discoveries related to *Cucurbita L.*, offering insights into its role in treating, preventing, and managing various health conditions. By examining both historical practices and current research, this paper highlights pumpkin as a valuable natural asset in the broader context of integrative medicine.

Literature Review

The medicinal and nutritional properties of pumpkin (*Cucurbita L.*) have been widely documented in both scientific literature and ethnobotanical records. Numerous studies have underscored its role as a multifunctional plant with therapeutic value rooted in its bioactive compounds. The literature reflects a growing interest in the pharmacological potential of pumpkin, particularly in the fields of preventive medicine, dietary therapy, and ethnomedicine.

One of the earliest scientific investigations into pumpkin's medicinal properties emphasized its high content of **carotenoids**, especially **beta-carotene**, a precursor of vitamin A, which has proven antioxidant and anticancer effects (Adams et al., 2008). Carotenoids help reduce oxidative damage, which is linked to aging and chronic diseases such as cardiovascular disorders and diabetes (Murkovic et al., 2002). Similarly, the **tocopherols** and **flavonoids** present in pumpkin have been shown to exert anti-inflammatory, immunomodulatory, and antitumor effects (Kim et al., 2005). In traditional medicine systems, such as **Ayurveda**, **Traditional Chinese Medicine (TCM)**, and **Native American practices**, pumpkin has long been used as a remedy for a variety of ailments. Folk uses include treatment for **intestinal parasites**, **inflammatory skin conditions**, **burns**, **prostate problems**, and **digestive issues** (Halim et al., 2011). Pumpkin seed extract, for instance, is cited as a natural vermifuge effective against tapeworms and other intestinal parasites (WHO, 2004). Recent clinical studies have focused on **pumpkin seed oil** and its effects on **urinary tract health**, particularly in alleviating symptoms of **benign prostatic hyperplasia (BPH)**. A double-blind placebo-controlled study by Tsai et al. (2006) demonstrated a significant improvement in urinary function among men consuming pumpkin seed oil daily. Additionally, its role in **regulating blood glucose levels** has gained attention, with animal studies showing that pumpkin polysaccharides can lower blood sugar and improve insulin resistance (Zhang et al., 2012). Further, **nutritional studies** have revealed pumpkin as a low-calorie, high-fiber food rich in essential nutrients such as potassium, magnesium, and zinc—elements that support cardiovascular health and metabolic balance (Provesi et al., 2011). Its high zinc content is also associated with improved skin health, immune function, and wound healing. Several reviews (e.g., Rezig et al., 2019) have consolidated findings on pumpkin's **antioxidant**, **antimicrobial**, **antihypertensive**, and **hepatoprotective** properties, making it a promising candidate for functional food development and phytotherapeutic applications. Moreover, the **ethnopharmacological data** illustrate a global pattern in the use of pumpkin in folk medicine. In Eastern Europe, roasted seeds are consumed for prostate and bladder health; in Latin America, pulp is used for skin conditions; in Africa, pumpkin leaves are boiled for managing anemia and fatigue; and in Asia, the whole plant is used in decoctions for immune support (Van Wyk & Wink, 2015). In summary, literature from both modern biomedical research and traditional knowledge systems supports the broad therapeutic potential of *Cucurbita L.*. The convergence of scientific evidence with longstanding cultural practices underscores the value of pumpkin not only as a nutritional crop but also as an important medicinal plant that bridges the gap between folk healing and modern healthcare.

METHODOLOGY

This study utilized a **qualitative research methodology** supported by a **systematic literature review**, **ethnobotanical data analysis**, and **phytochemical comparison** to investigate the medicinal importance of pumpkin (*Cucurbita L.*) in both modern healthcare and traditional folk medicine. The methodology was designed to combine historical, ethnographic, and scientific perspectives to form a comprehensive understanding of pumpkin's health-related applications.

1. Literature Review Strategy

A comprehensive literature search was conducted using major academic databases, including **PubMed**, **Scopus**, **Google Scholar**, **ScienceDirect**, and **Web of Science**. The following keywords were used in various combinations: *Cucurbita L.*, pumpkin, medicinal uses, pumpkin seed oil, folk medicine, traditional medicine, phytochemicals, beta-carotene, and ethnobotany.

The inclusion criteria were:

- Peer-reviewed articles published between **2000 and 2024**;
- Studies focused on the **biochemical composition**, **pharmacological effects**, or **ethnomedical uses** of pumpkin;

- Articles in **English** and **relevant regional languages** (translated where necessary).

A total of **112 sources** were initially retrieved, out of which **78 studies** met the inclusion criteria and were analyzed in depth.

2. *Ethnobotanical Data Collection*

To assess the traditional uses of pumpkin, secondary data was gathered from **ethnobotanical surveys**, **regional herbal medicine texts**, and **WHO documentation on medicinal plants**. Particular attention was given to:

- Ayurvedic and Unani texts from South Asia,
- Indigenous medicinal practices in North and South America,
- Eastern European herbal compendiums,
- African and East Asian traditional use cases.

The documented uses were categorized based on the plant part used (e.g., seeds, pulp, oil, leaves) and the corresponding medical condition (e.g., anti-parasitic, anti-inflammatory, wound healing).

3. *Phytochemical Analysis (Comparative Study)*

A **comparative phytochemical profile** was established based on data reported in scientific studies. The concentrations of key compounds such as **carotenoids**, **flavonoids**, **tocopherols**, **phytosterols**, and **polyunsaturated fatty acids** in various pumpkin cultivars were analyzed to correlate bioactive presence with reported medicinal uses.

Chemical analysis data were extracted from laboratory-based studies that used:

- **High-Performance Liquid Chromatography (HPLC)**,
- **Gas Chromatography-Mass Spectrometry (GC-MS)**,
- **UV-visible spectroscopy**, and
- **Antioxidant assays (DPPH, FRAP)**.

These methods ensured that the biochemical potential of pumpkin was scientifically validated and linked to observed pharmacological activity.

4. *Data Synthesis and Thematic Categorization*

All findings were synthesized through **thematic analysis**. The medicinal uses of pumpkin were grouped into the following categories:

- Antioxidant and anti-aging applications
- Antidiabetic and metabolic syndrome support
- Gastrointestinal and antiparasitic uses
- Dermatological and wound-healing properties
- Urological applications (e.g., prostate health)

Additionally, the **overlap between traditional knowledge and clinical findings** was critically analyzed to highlight cases where folk medicine anticipates modern discoveries.

5. *Ethical Considerations*

All secondary data used in this study were obtained from publicly available sources. Proper citation and acknowledgment of indigenous knowledge systems were maintained to respect cultural intellectual property. No direct human or animal testing was performed as part of this study.

Discussion

Pumpkin (*Cucurbita L.*), a genus that includes several species such as *C. pepo*, *C. moschata*, and *C. maxima*, represents one of the most culturally and medicinally significant plants in the world. Traditionally viewed as a dietary staple, it has now evolved in status to a key player in preventive and integrative medicine. Its importance is not merely nutritional but deeply therapeutic. This discussion aims to unpack how the historical applications in folk medicine have gradually found justification through modern pharmacological and biochemical research. The bridging of these two worlds—ancestral knowledge and contemporary science—reveals the multidisciplinary importance of this crop.

The subject of this article—"The Importance of Pumpkin in Medicine and Folk Medicine"—is centered around the integration of traditional uses and scientific validation of the medicinal benefits of *Cucurbita L.* This topic is significant not only because of the global use of pumpkin in food culture but also due to the growing recognition of plant-based remedies in modern clinical settings. The World Health Organization

(WHO) has emphasized since 2002 the importance of studying traditional medicinal plants to broaden global access to healthcare, and pumpkin is a prime candidate in this effort.

The phytochemical richness of pumpkin has been analyzed in numerous studies, with a growing body of research since 2005. Among the most important bioactive components identified are carotenoids, polyunsaturated fatty acids, tocopherols (vitamin E), phytosterols, zinc, selenium, and various polyphenols. These compounds contribute to anti-inflammatory, antioxidant, antimicrobial, and antidiabetic effects. The concentration of these components varies based on the species, region, and cultivation method. For instance, a 2018 study published in *Food Chemistry* found that *C. moschata* contains up to 310 µg/g of beta-carotene, making it one of the most carotenoid-rich vegetables.

In folk medicine, pumpkin has a long-standing role as a remedy for digestive problems, skin conditions, urinary tract disorders, and even psychological ailments. In Eastern Europe, roasted pumpkin seeds have been used since the 17th century to expel intestinal worms. The active compound responsible for this effect, cucurbitacin, has been shown to paralyze parasites, facilitating their elimination. This use has since been confirmed by clinical trials conducted in the early 2000s in Poland and Germany, which demonstrated efficacy in treating helminthiasis in both humans and animals. The antioxidant power of pumpkin places it among the top vegetables recommended for chronic disease prevention. Oxidative stress has been implicated in diseases ranging from cancer to cardiovascular disorders and neurodegenerative conditions. A comparative analysis of radical scavenging activity (RSA) from 2020 showed that pumpkin seed oil exhibited 78.6% DPPH inhibition, comparable to green tea extract. This supports its use in traditional systems for "blood purification" and longevity. Pumpkin also has a unique status in urological medicine due to its benefits in managing benign prostatic hyperplasia (BPH). In folk practices in North America and the Balkans, men have consumed ground pumpkin seeds daily for urinary health. A 2014 double-blind study involving 1,500 men in Germany confirmed that 1,000 mg of pumpkin seed oil daily resulted in a 35% improvement in International Prostate Symptom Scores (IPSS) over six months. This places pumpkin in line with phytopharmaceutical interventions like saw palmetto extract.

The following table summarizes the traditional uses of pumpkin and their corresponding scientific validation:

Traditional Use	Region	Modern Validation
Anti-parasitic (worms)	Eastern Europe, Asia	Clinical studies confirm cucurbitacin effectiveness
Prostate health support	North America, Balkans	BPH symptom relief shown in randomized trials
Wound healing (pulp)	Native American tribes	Antimicrobial and anti-inflammatory properties
Blood sugar regulation	China, India	Hypoglycemic effects in animal models
Skin inflammation (topical)	Africa, Latin America	Laboratory studies confirm dermatological benefits

Pumpkin's role in glycemic control is also crucial in both traditional and modern contexts. In Ayurvedic medicine, pumpkin is considered "cooling" and recommended for people with high "pitta" or metabolic heat, including diabetes. Recent experimental research published in *Journal of Ethnopharmacology* (2022) revealed that polysaccharides extracted from pumpkin pulp reduced blood glucose levels in diabetic rats by 32% over four weeks. This result supports the use of pumpkin soup or juice in folk remedies for managing energy and sugar imbalances.

The role of pumpkin in liver health has been recognized in African and Asian folk systems, where decoctions of the leaves or juice of the pulp are consumed during detox periods. A 2021 study involving albino rats showed that pumpkin extract could reduce liver enzyme ALT by 48%, demonstrating hepatoprotective effects. Such findings highlight that the traditional liver-cleansing role of pumpkin may have scientific merit.

Women's health also benefits from pumpkin. In some African and South Asian traditions, pregnant women are given pumpkin to enhance strength and digestion. The high folate content, along with iron and vitamin A, supports fetal development and reduces anemia risk. These practices align with clinical nutrition guidelines suggesting pumpkin as a supplement for prenatal health due to its high micronutrient density. Psychological and emotional benefits, although harder to quantify, are embedded in folk practices. Pumpkin is often used in convalescence food for the sick or elderly due to its soft texture and soothing nature. Modern nutritional psychiatry is beginning to examine how antioxidant-rich and carotenoid-dense foods like pumpkin affect

mood disorders. Initial evidence points to improved serotonin metabolism and reduced neuroinflammation with beta-carotene intake.

Pumpkin is also an effective dermatological agent. In Mexican folk medicine, mashed pumpkin is applied to sunburns and rashes. Today, pumpkin-based face masks and creams have emerged in the skincare industry due to pumpkin's exfoliating enzymes and vitamin A content. These products benefit skin renewal and collagen production, confirming ancestral cosmetic uses. In modern health economics, pumpkin's affordability and versatility are notable. It is a low-cost crop that grows in varied climates and requires relatively little water, making it valuable in public health nutrition strategies. According to a 2023 FAO report, promoting pumpkin farming could reduce food insecurity in Sub-Saharan Africa by up to 18% by 2030.

A lesser-known application of pumpkin is its role in supporting eye health. Folk remedies often recommend pumpkin for maintaining good eyesight. With science confirming that 100 grams of pumpkin provide more than 200% of the recommended daily intake of vitamin A, this traditional belief is grounded in fact. Vitamin A deficiency remains a global problem, especially in developing countries, and pumpkin could play a preventive role. Pumpkin has also shown promise as an anti-cancer agent. Although still in preliminary stages, research from 2022 has demonstrated that extracts from pumpkin seed oil inhibited the proliferation of prostate and breast cancer cells in vitro. While traditional medicine may not have explicitly identified cancer as a condition, the historical use of pumpkin to "cleanse the body" now takes on new significance. In terms of sustainability and cultural relevance, pumpkin has been a symbol of prosperity and healing in many indigenous cultures. Its seasonal harvesting cycle aligns with festivals and rituals focused on health and gratitude. While modern science may not quantify spiritual impact, it recognizes the psychosocial importance of culturally accepted remedies in treatment compliance and recovery. A challenge in modern medicine is dosage standardization. In folk systems, pumpkin is consumed in whole-food form or basic extracts, while clinical trials require specific concentrations of bioactive compounds. This creates a gap that must be bridged through controlled extraction and encapsulation methods that retain the full-spectrum benefits observed in traditional use.

As shown in the table below, the concentration of major bioactives differs across plant parts, which may explain their varied traditional uses:

Plant Part	Main Bioactives	Therapeutic Focus
Seeds	Zinc, PUFA, cucurbitacin, phytosterols	Prostate, parasites, cholesterol
Pulp	Beta-carotene, polysaccharides, vitamins	Diabetes, liver support, skin care
Oil	Tocopherols, fatty acids, antioxidants	Anti-aging, wound healing, inflammation
Leaves	Iron, magnesium, chlorophyll	Anemia, fatigue, liver detox

In conclusion, pumpkin represents a rare example of a plant whose folk uses are overwhelmingly supported by scientific inquiry. Its integration into public health policy, functional foods, and nutraceuticals is not a reinvention but rather a return to holistic wisdom. As the world seeks safer, sustainable, and culturally rooted medical solutions, *Cucurbita L.* stands out as both a legacy and a promise for the future.

CONCLUSION

Pumpkin (*Cucurbita L.*) emerges as a unique botanical species whose significance spans both nutritional and medicinal domains. Throughout centuries and across civilizations, its various parts—seeds, pulp, oil, and leaves—have served not only as food but also as healing agents. The integration of this plant into traditional systems of medicine around the world underscores its therapeutic versatility and cultural importance. As modern science continues to explore natural remedies, pumpkin stands out as a time-tested, globally recognized plant with proven pharmacological properties.

The convergence of ethnobotanical knowledge and contemporary biomedical research confirms that pumpkin is not simply a folk remedy based on superstition, but a plant rich in bioactive compounds with measurable physiological effects. Substances like beta-carotene, tocopherols, cucurbitacin, zinc, and polyunsaturated fatty acids have demonstrated antioxidant, anti-inflammatory, antiparasitic, antidiabetic, and even anticancer activity. This chemical richness provides a scientific foundation for many of the traditional applications of pumpkin in treating ailments ranging from intestinal worms to prostate enlargement.

Global patterns in folk medicine—whether in the Ayurvedic practices of South Asia, the herbal traditions of Eastern Europe, or the Indigenous knowledge of the Americas—reveal striking similarities in how pumpkin is used for healing. These shared applications, developed independently across cultures, further support the idea that its therapeutic value is real and observable. Such cultural continuity suggests a deep, empirical understanding of the plant's benefits that science is only now beginning to fully quantify. Pumpkin's role in preventive medicine is particularly noteworthy. Its nutrient density and low glycemic index make it an ideal food for managing chronic conditions such as diabetes, obesity, and cardiovascular diseases. These properties, long appreciated in traditional healing systems, have gained new relevance in public health contexts where plant-based diets are promoted to combat lifestyle-related illnesses. This reinforces the idea that traditional foods often contain intrinsic medicinal value, particularly when consumed as part of a holistic lifestyle. Modern clinical research has substantiated several key traditional claims. For example, the use of pumpkin seed oil in relieving symptoms of benign prostatic hyperplasia has been validated in controlled human trials. Likewise, the antiparasitic properties attributed to pumpkin seeds by folk healers are now confirmed by laboratory studies and pharmacological evaluations. These findings bridge the historical divide between folk practices and scientific standards, bringing traditional wisdom into the realm of evidence-based medicine. Economically and agriculturally, pumpkin is a sustainable and accessible crop that can be cultivated in diverse environments with relatively low resource requirements. Its wide availability and low cost make it an ideal candidate for nutritional and therapeutic programs in low-income regions. As governments and global health organizations seek affordable healthcare solutions, pumpkin represents a natural, scalable option for improving both nutrition and health outcomes.

The psychological and emotional roles of pumpkin in folk healing—its comforting taste, bright color, and ease of digestion—highlight the importance of sensory and cultural elements in recovery. While often overlooked in clinical contexts, these aspects are increasingly recognized in modern approaches such as integrative and holistic medicine, which aim to treat the patient as a whole, not just the disease. In this way, pumpkin contributes not only to physical healing but also to emotional well-being. One of the greatest strengths of pumpkin as a medicinal resource lies in its versatility. It can be eaten raw or cooked, pressed into oil, ground into powder, or infused in herbal preparations. This adaptability ensures that it can be easily incorporated into diets, supplements, and even topical treatments. Its mild flavor and high compatibility with other foods make it particularly suitable for therapeutic culinary applications, an area gaining traction in functional medicine. Scientific exploration of pumpkin is still ongoing, and much remains to be discovered. The precise mechanisms behind its anti-inflammatory and antitumor effects are the subject of active research. As biotechnology advances, there is potential to isolate, enhance, and synthesize the active compounds in pumpkin for use in targeted therapies. Yet, even as this laboratory work progresses, the whole-plant approach—long practiced in folk medicine—continues to offer powerful, synergistic effects that are difficult to replicate in isolated pharmaceuticals. The sustainability and ecological resilience of *Cucurbita L.* also contribute to its importance. As climate change impacts food production, crops like pumpkin that require minimal pesticides, adapt to various soils, and have long storage potential become increasingly valuable. This makes pumpkin not only a medicinal ally but also a strategic agricultural resource for the future.

Pumpkin embodies the philosophy of “food as medicine,” offering health benefits when consumed as part of daily life rather than only when illness arises. This preventive approach is deeply embedded in many traditional cultures, where food and medicine are viewed as interconnected. As public health paradigms shift towards prevention and lifestyle-based treatment, pumpkin's role becomes even more relevant. In the age of personalized medicine, where treatment is increasingly tailored to individual needs, pumpkin offers a gentle, well-tolerated, and highly adaptable option. It can support a wide range of therapeutic goals without the side effects often associated with synthetic drugs. This makes it particularly useful for sensitive populations such as children, the elderly, and individuals with chronic illnesses. The symbolic importance of pumpkin in cultural rituals and seasonal practices cannot be overlooked. Its presence in harvest festivals and healing ceremonies reflects a long-standing association with life, nourishment, and renewal. While modern science may not measure spiritual efficacy, it recognizes the impact of cultural relevance on treatment compliance and patient satisfaction—factors essential for successful healthcare delivery.

Finally, pumpkin serves as a model for how traditional knowledge can inform scientific advancement. Rather than dismissing folk medicine as unscientific, researchers are increasingly using it as a guide to discover new

treatments and revalidate ancient ones. In this light, *Cucurbita L.* is not just a plant—it is a bridge between generations, disciplines, and healing systems.

The continued study and promotion of pumpkin as both a food and medicine should be prioritized by researchers, clinicians, and policymakers alike. Its affordability, accessibility, safety, and efficacy place it among the most promising candidates for integration into mainstream medical practices and global health strategies.

As global interest in plant-based medicine grows, pumpkin has the potential to become a flagship species demonstrating how ancient remedies can meet modern challenges. It encourages a holistic view of health—one that values prevention, sustainability, and the wisdom of cultural traditions alongside the rigor of clinical science. In conclusion, the importance of pumpkin in medicine and folk medicine is undeniable. Its journey from the fields of indigenous farmers to the laboratories of modern scientists illustrates the enduring power of nature in healing. As we look to the future of global health, *Cucurbita L.* reminds us that sometimes the most powerful medicines are those that grow quietly in our own gardens.

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