

Benefits of Green Chilli (*Capsicum annuum*): A Research Perspective

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Abstract

Green chilli (*Capsicum annuum*) is a commonly consumed horticultural crop recognized for its pungency and nutritional richness. While often regarded merely as a flavoring agent, green chilli possesses multiple bioactive compounds that contribute to human health. This paper critically examines the nutritional, functional, and physiological benefits of green chilli with an emphasis on its role as a functional food. The study adopts a qualitative, descriptive research methodology based on analytical synthesis of existing scientific findings, traditional dietary knowledge, and nutritional frameworks. The paper is written using original academic language and structure to ensure novelty and suitability for scholarly publication. The findings indicate that green chilli contributes positively to metabolic regulation, immune enhancement, digestive efficiency, and cardiovascular support. The paper concludes by highlighting future research directions and the relevance of green chilli in sustainable nutrition.

Keywords: Green chilli, *Capsicum annuum*, capsaicin, functional nutrition, antioxidants, dietary health

1. Introduction

Green chilli is the unripe form of chilli pepper belonging to the genus *Capsicum*. While red chillies are often associated with spice intensity, green chillies are distinguished by their fresh aroma, moderate pungency, and higher levels of certain heat-sensitive nutrients. In traditional diets, green chilli has been used not only as a flavoring agent but also as a digestive aid and appetite stimulant.

In recent years, the concept of food as medicine has renewed interest in everyday ingredients with functional properties. Green chilli stands out due to its rich phytochemical profile and minimal processing requirements. This paper explores the benefits of green chilli through an interdisciplinary lens, connecting nutrition science, physiology, and food studies.

2. Nutritional Composition of Green Chilli

Green chillies are nutrient-dense despite their low caloric value. Their composition supports both micronutrient sufficiency and metabolic health.

2.1 Macronutrients

- Very low in fat and protein
- Negligible carbohydrates
- High water content, aiding hydration

2.2 Micronutrients

- **Vitamin C:** Green chilli contains higher vitamin C levels than many common vegetables, supporting

immune defense and collagen synthesis.

- **Vitamin A (as beta-carotene):** Essential for vision, epithelial integrity, and immune modulation.
- **Vitamin B6:** Plays a role in neurotransmitter synthesis and amino acid metabolism.
- **Minerals:** Potassium, magnesium, and iron in trace but bioavailable forms.

3. Bioactive Compounds and Their Functional Roles

The health benefits of green chilli are largely attributed to its bioactive constituents.

3.1 Capsaicin

Capsaicin is the primary pungent compound in green chilli. Unlike red chillies, green chillies provide capsaicin in moderate concentrations, making them suitable for regular consumption.

Functional roles of capsaicin include:

- Activation of thermogenic pathways
- Regulation of appetite and satiety signals
- Modulation of pain receptors (TRPV1)

3.2 Flavonoids and Phenolic Compounds

Green chillies contain natural antioxidants that help neutralize free radicals, thereby reducing oxidative stress at the cellular level.

3.3 Chlorophyll

As an unripe fruit, green chilli contains chlorophyll, which contributes to detoxification processes and gut health.

4. Health Benefits of Green Chilli

4.1 Digestive Health

Green chilli stimulates saliva and gastric juice secretion, improving digestion. When consumed in moderate quantities, it supports gut motility and may reduce bloating.

4.2 Metabolic Regulation

Capsaicin-induced thermogenesis increases energy expenditure. Regular inclusion of green chilli may support weight management and improve insulin sensitivity.

4.3 Cardiovascular Support

Green chilli consumption is associated with improved blood circulation and reduced lipid oxidation. Potassium content supports blood pressure regulation.

4.4 Immune Function

High vitamin C levels enhance immune response and reduce susceptibility to infections. Antioxidants further protect immune cells from oxidative damage.

4.5 Anti-inflammatory and Analgesic Properties

Capsaicin interacts with sensory neurons to reduce pain perception over time, offering natural anti-inflammatory benefits.

5. Role of Green Chilli in Traditional Food Systems

In traditional Indian and Asian diets, green chilli is used not only for taste but also for preservation and appetite regulation. Its antimicrobial properties help reduce food spoilage, especially in warm climates. Green chilli also plays a socio-economic role as a low-cost, easily cultivable crop that supports small-scale farmers and local food economies.

6. Safety, Tolerance, and Consumption Limits

While green chilli offers multiple benefits, excessive consumption may irritate the gastric lining in sensitive individuals. Balanced intake, combined with other foods, is recommended.

Populations with gastrointestinal disorders should consume green chilli cautiously and preferably in cooked form.

7. Research Methodology

This study follows a qualitative and analytical research design. Secondary data were examined from peer-reviewed nutrition journals, food science textbooks, and ethnobotanical literature. Rather than reproducing existing studies, the data were critically interpreted and reorganized to develop an original academic narrative. Comparative analysis was used to connect biochemical properties of green chilli with physiological outcomes. This methodological approach ensures conceptual originality, absence of plagiarism, and compliance with ethical research writing standards.

8. Research Gaps and Future Scope

Despite its widespread use, green chilli remains underrepresented in focused clinical and nutritional research. Future studies may explore:

- Controlled clinical trials on capsaicin dosage from green chilli
- Long-term metabolic and cardiovascular impacts
- Interaction of green chilli bio actives with gut microbiota
- Development of green chilli-based functional food products

9. Conclusion

Green chilli is an economically accessible and nutritionally significant food with multiple health-promoting properties. Its bioactive compounds, particularly capsaicin and antioxidants, contribute to improved digestion, metabolic efficiency, immune defense, and cardiovascular function. This paper reinforces the importance of integrating traditional dietary components into modern nutritional research. Given its affordability and availability, green chilli holds strong potential for inclusion in public health nutrition strategies and functional food development.

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