



A REVIEW ON THE ROLE OF MICROGREENS IN HUMAN HEALTH

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ABSTRACT

Microgreens, young edible seedlings of vegetables and herbs, have gained considerable attention due to their high nutritional content and potential health benefits. These nutrient-dense greens are rich in vitamins, minerals, antioxidants, and bioactive compounds that contribute to the prevention and management of chronic diseases such as cardiovascular disorders, diabetes, and cancer. Their ease of cultivation, sustainability, and superior nutritional profile make them an attractive addition to modern diets. This review explores the nutritional composition, health benefits, and potential applications of microgreens in human health, emphasizing their role in chronic disease prevention, immune system enhancement, digestive health, and weight management. With their rapid growth cycle and minimal resource requirements, microgreens offer promising solutions for sustainable agriculture and future dietary innovations.

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INTRODUCTION

Microgreens have gained significant popularity in recent years due to their high nutritional content and potential health benefits. These tiny, immature greens are harvested shortly after germination, typically within 7–21 days, and are known to contain higher concentrations of vitamins, minerals, and antioxidants compared to their mature counterparts. Their rising popularity is attributed to their ease of cultivation, vibrant flavors, and rich nutritional profile.

Historically, microgreens have been part of traditional diets in various cultures, but their recognition as a superfood has been relatively recent. The increased interest in plant-based nutrition, urban farming, and sustainable food sources has contributed to their

widespread adoption. Studies have shown that microgreens not only provide essential nutrients but also possess bioactive compounds that play a significant role in preventing and managing chronic diseases such as cardiovascular disorders, diabetes, and cancer (Xiao et al., 2012). Additionally, they contain antimicrobial and anti-inflammatory properties, making them highly valuable in supporting the immune system (Pinto et al., 2015).

One of the primary reasons microgreens have become a staple in health-conscious diets is their remarkable nutritional density. Compared to their mature counterparts, microgreens often contain higher concentrations of beneficial nutrients per gram, making them an efficient way to boost overall health. They also have the advantage of being easy to grow,

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requiring minimal space, and thriving in controlled indoor environments, which makes them an ideal choice for urban dwellers looking to cultivate fresh, nutrient-rich greens at home (Weber, 2017). Furthermore, as the demand for organic and pesticide-free foods grows, microgreens provide a sustainable and easily accessible solution for improving daily nutrition.

List of microgreens and their families











- **Amaranthaceae family:** Includes amaranth, beets, chard, quinoa, and spinach.
- **Amaryllidaceae family:** Includes chives, garlic, leeks, and onions.
- **Apiaceae family:** Includes carrot, celery, dill, and fennel.
- **Asteraceae family:** Includes chicory, endive, lettuce, and radicchio.
- **Brassicaceae family:** Includes arugula, broccoli, cabbage, cauliflower, radish, and watercress.

- **Cucurbitaceae family:** Includes cucumbers, melons, and squashes.
- **Lamiaceae family:** Includes most common herbs like mint, basil, rosemary, sage, and oregano.
- **Poaceae family:** Includes grasses and cereals like barley, corn, rice, oats, and wheatgrass. As well as legumes including beans, chickpeas, and lentils.

This article explores the extensive role of microgreens in human health, delving into their nutritional profile, disease-preventing properties, and practical ways to incorporate them into everyday meals. By understanding the science behind their health benefits, consumers can make informed choices about including microgreens in their diets for better overall well-being.

Nutritional Composition of Microgreens and Their Health Implications

Microgreens are nutrient-dense and provide an excellent source of essential vitamins and minerals, including:

MICROGREENS AND THEIR NUTRITIVE VALUE	
 Broccoli <ul style="list-style-type: none"> • High in vitamin C • High in vitamin E • Rich in protein 	 Red cabbage <ul style="list-style-type: none"> • High in vitamin C • Rich in vitamin K • Rich in vitamin E
 Cabbage <ul style="list-style-type: none"> • High in vitamin C • Rich in vitamin A • Rich in vitamin E 	 Garnet amaranth <ul style="list-style-type: none"> • Rich in vitamin K • High in vitamin E • Rich in manganese
 Radish <ul style="list-style-type: none"> • High in vitamin C • Rich in vitamin E • Rich in vitamin K 	 Mustard <ul style="list-style-type: none"> • High in vitamin K • High in vitamin E • Rich in manganese
 Pea <ul style="list-style-type: none"> • High in carotenoids • High in vitamin C • High in fiber 	 Sunflower <ul style="list-style-type: none"> • High in healthy fats • High in zinc • Rich in protein
 Pea <ul style="list-style-type: none"> • High in carotenoids • High in vitamin C 	 Sunflower <ul style="list-style-type: none"> • High in healthy fats • High in zinc

- **Vitamins:** High levels of vitamins C, E, and K, along with several B vitamins such as folate, which are essential for immune function, skin health, and cellular processes (Xiao et al., 2012).
- **Minerals:** Essential elements like iron, magnesium, zinc, calcium, and potassium, which contribute to bone health, nerve function, and cardiovascular wellness (Weber, 2017).
- **Antioxidants:** Abundant in polyphenols, carotenoids, and flavonoids, which contribute to their disease-fighting properties and prevent oxidative stress-related disorders (Pinto et al., 2015).
- **Phytonutrients:** Bioactive compounds that support immune function and reduce inflammation, essential in mitigating chronic diseases (Zhang et al., 2020).

Microgreens Chart

Microgreen	Taste	Nutritional Highlights	Common Uses
Arugula	Peppery, slightly spicy	Vitamins A, C, K, calcium, folate	Sandwiches, salads, garnishes
Radish	Spicy, crisp	Vitamin C, antioxidants	Tacos, rice bowls, salads
Broccoli	Mild, slightly bitter	Sulforaphane, Vitamins A, C, E, K	Smoothies, wraps, soups
Sunflower	Nutty, crunchy	Protein, zinc, vitamin E	Grain bowls, stir-fry, snacks
Beet	Earthy, sweet	Iron, magnesium, potassium	Juices, wraps, hummus toppings
Pea Shoots	Sweet, tender	Vitamin C, A, folate, fiber	Stir-fry, pasta, sandwiches
Amaranth	Mild, slightly earthy	Lysine, calcium, iron	Garnishing soups, gourmet dishes
Basil	Strong, aromatic	Vitamin K, magnesium, anti-inflammatory compounds	Pasta, pizza, pesto
Cilantro	Citrusy, fresh	Vitamin A, K, antioxidants	Tacos, curry, rice dishes
Kale	Mild, cabbage-like	High in vitamins K, C, A, and antioxidants	Green smoothies, salad mix-ins

Health Benefits of Microgreens: A Comprehensive Analysis

1. Rich Source of Antioxidants and Their Role in Chronic Disease Prevention

Microgreens contain powerful antioxidants that help combat oxidative stress, which is linked to chronic diseases such as cancer, cardiovascular disease, and neurodegenerative disorders. Polyphenols found in microgreens have been shown to reduce inflammation and protect cells from damage, making them highly

effective in reducing oxidative damage in human cells (Gawlik-Dziki, 2012).

2. Microgreens and Cardiovascular Health: Reducing Cholesterol and Blood Pressure

Studies suggest that microgreens, especially those rich in polyphenols like red cabbage and radish microgreens, may help lower cholesterol levels and improve heart health (Xiao et al., 2019). Potassium in microgreens also contributes to reducing blood pressure and maintaining a healthy cardiovascular system (Weber, 2017).

3. Enhancing Digestive Health with Fiber-Rich Microgreens

Microgreens are rich in dietary fiber, which supports gut health by promoting beneficial bacteria and improving digestion. Additionally, they contain enzymes that aid in breaking down food, enhancing nutrient absorption and preventing gastrointestinal disorders (Treadwell et al., 2016).

4. Regulating Blood Sugar Levels and Managing Diabetes with Microgreens

Certain microgreens, such as fenugreek and broccoli microgreens, have been shown to improve insulin sensitivity and regulate blood sugar levels (Tian et al., 2016). This makes them beneficial for individuals with diabetes or those at risk of developing the condition.

5. Boosting Immunity Through Nutrient-Dense Microgreens

The high vitamin C content in microgreens strengthens the immune system, helping the body fight infections (Zhang et al., 2020). Additionally, their antimicrobial and anti-inflammatory properties provide added protection against illnesses and infections (Xiao et al., 2012).

6. Microgreens for Weight Management: Nutrient Density and Satiety

Microgreens are low in calories but high in essential nutrients, making them an excellent addition to weight-loss diets. Their fiber content promotes satiety and reduces overall calorie intake, assisting in weight management (Weber, 2017).

Conclusion

Microgreens are a powerhouse of nutrition, offering numerous health benefits ranging from enhanced immunity and heart health to improved digestion and weight management. Their ease of cultivation and versatility make them an excellent addition to a healthy diet. Incorporating microgreens into daily meals can significantly contribute to overall well-being and disease prevention, making them a valuable superfood for human health.

Moreover, microgreens play a vital role in sustainable agriculture and food security. Given their ability to grow in minimal space with limited resources, they offer an eco-friendly solution for enhancing food production, especially in urban settings. As research into microgreens continues, their potential as functional foods with specific health-enhancing properties is expected to expand, paving the way for their inclusion in therapeutic diets and nutraceutical formulations. By adopting microgreens as a regular part of the diet, individuals can harness their nutritional benefits and contribute to a more sustainable and health-conscious food system.

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