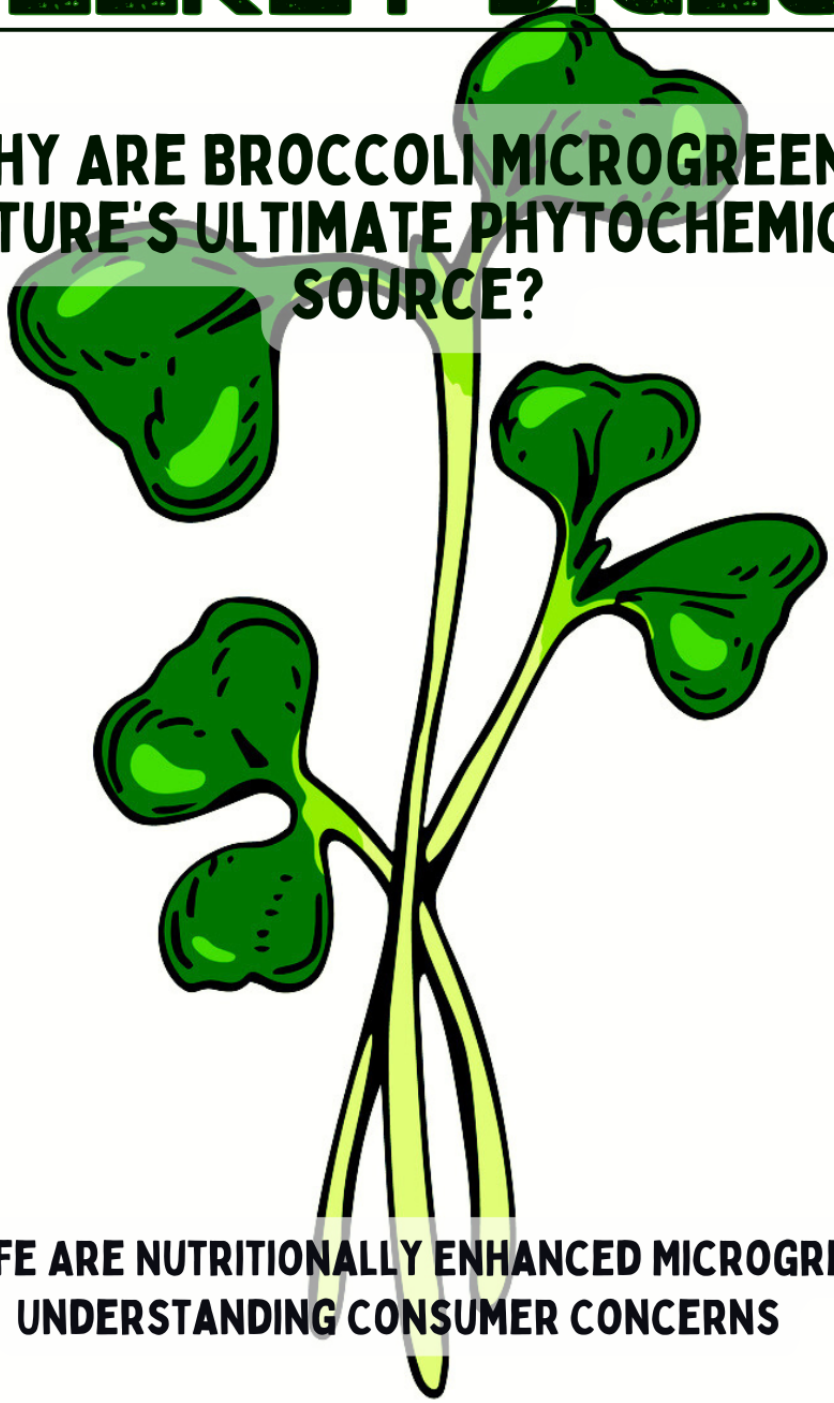
Volume 2024 Number 46 MICROGREENS WORLD Monday December 16 2024

WEEKLY DIGEST

WHY ARE BROCCOLI MICROGREENS NATURE'S ULTIMATE PHYTOCHEMICAL SOURCE?



HOW SAFE ARE NUTRITIONALLY ENHANCED MICROGREENS? UNDERSTANDING CONSUMER CONCERNS

Broccoli micro greens

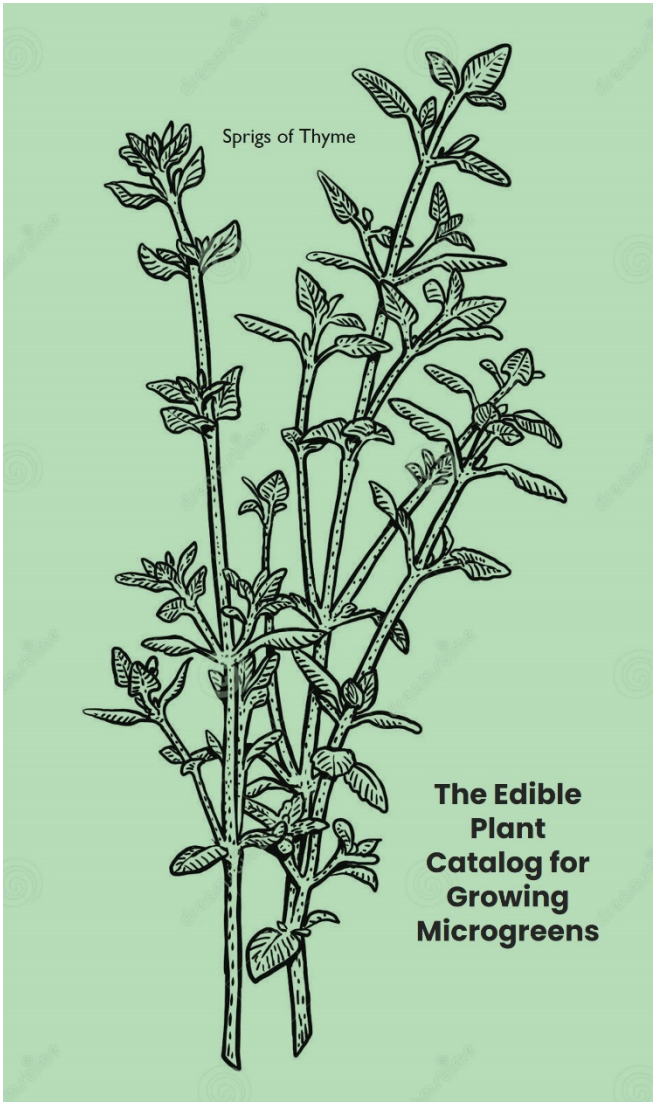
CREATIVE RECIPES: A Nourishing Heritage with Baked Cabbage with Radish Microgreens
COMMERCIAL BEST PRACTICES: Microgreens Are The Future of Indoor Farming
CULTIVATION TECHNIQUES: Innovative Hydroponics Enhance Campus Dining

"Delivered to Your Inbox Every Monday," your summary digest of the latest microgreens, urban, vertical farming, and new trends and exciting startup stories from around the world.

Why Are Broccoli Microgreens Nature's Ultimate Phytochemical Source?

Vol. 2024 No. 46 Monday, December 16, 2024

The Edible Plant Catalog for Growing Microgreens



Discover a wealth of possibilities in microgreen cultivation with our meticulously curated guide featuring **over 200 edible plant species**.

Each entry outlines specific growing requirements to jumpstart your microgreens growing journey, offering insights into optimal light, temperature, and watering conditions.

This invaluable resource caters to commercial growers, researchers, and home gardeners seeking to broaden their horizons beyond traditional crops.

Embrace this opportunity to innovate and contribute to the expanding field of microgreens, enhancing your expertise while enjoying the unique flavors and nutritional benefits of diverse plant varieties.

LEARN MORE

Nutrition Science

Boosting Nutrition in Red Cabbage Microgreens: The Role of Temperature and Light

This study explores how controlled environment agriculture (CEA) techniques can increase the nutritional value of red cabbage microgreens, specifically focusing on enhancing **anthocyanin** (ACN) content, a **cardioprotective phytochemical**.

Researchers tested different growth conditions, including variations in light and temperature, to determine their impact on ACN content, flavonol levels, and overall crop yield.

Key Findings

1. Temperature and Timing:

- Transferring microgreens to a cooler temperature (16°C) after six days of growth significantly increased anthocyanin and flavonol content. Still, it reduced the fresh weight of the crop.
- Transferring at 11 days maintained crop yield while still enhancing total anthocyanins, though not as effectively as the earlier transfer.

2. Light Quality:

The extended photosynthetic photon flux density (ePPFD) used throughout the

experiment supported the overall growth and phytochemical production, demonstrating the effectiveness of light manipulation in controlled environments.

SUMMARY

Two studies investigated optimizing the nutritional content of red cabbage microgreens through controlled environment agriculture (CEA).

The first study examined the effects of temperature manipulation on anthocyanin production, finding that altering temperatures increased anthocyanin content without significantly affecting yield.

The second study outlines a protocol to biofortify red cabbage microgreens using CEA and assess the bioavailability of nutrients and phytochemicals in humans through in vitro and in vivo testing.

Both studies aim to enhance the health benefits of red cabbage microgreens by maximizing their phytochemical content and bioavailability.

Funding for both studies came from the USDA.

3. **Trade-Offs**

While earlier temperature changes boosted nutritional content, they slightly compromised crop yield, highlighting the need to **balance nutritional benefits with production efficiency**.

Controlled environmental conditions, particularly strategic temperature adjustments, can enhance the health benefits of red cabbage microgreens by increasing their anthocyanin and flavonol levels.

The findings provide a framework for optimizing the biofortification of microgreens without significantly compromising yield.

Recommendations for Microgreens Farmers

1. Experiment with temperature reduction during mid-growth stages to maximize anthocyanin content.
2. Use advanced lighting systems to maintain consistent growth and phytochemical production.
3. Optimize growth protocols to balance yield and nutritional enhancements, catering to health-conscious

consumers seeking high-value products.

Source: Lee, S. Y., Fulton, O., Craver, J., Buiten, C. V., & Johnson, S. (2024). Controlled Environment Agriculture Increases Anthocyanin Content in Red Cabbage Microgreens. *Current Developments in Nutrition*, 8, 102270–102270. https://doi.org/10.1016/j.cdnut.2024.102270

Creative Recipes

A Nourishing Heritage: Baked Cabbage with Radish Microgreens

Cabbage has been revered since ancient times, with red cabbage varieties enjoyed by gourmands over 18 centuries ago.

The Egyptians honored it as sacred, making it their first dish at meals, a practice followed by the Greeks and Romans.

Ancient healers like Hippocrates prescribed it for ailments. Cato claimed it was a cure-all that helped Romans avoid needing doctors for 600 years.

The vegetable reached England around 1640, and it was introduced by Sir Anthony Ashley, who commemorated it with a cabbage on his monument.

While low in nutrients (90% water), cabbage remains popular, especially in German cuisine.

This reimagined vintage recipe transforms humble cabbage into a sophisticated gratin-style dish.

The delicate white cabbage becomes almost custard-like when baked with cream, while a crown of spicy radish microgreens adds a contemporary punch and visual drama.

Recipe Information

- Prep Time: 15 minutes
- Cook Time: 45 minutes (25 for boiling, 20 for baking)
- Category: Side Dish
- Method: Boiled and Baked
- Cuisine: Modern European
- Yield: 4-6 servings

Ingredient

- 1 medium head young white cabbage, finely chopped
- 2 large free-range eggs
- 120ml single cream or rich whole milk
- Sea salt flakes
- Freshly cracked black pepper
- 30g radish microgreens
- Extra virgin olive oil, for drizzling

Preparation

1. Preheat your oven to 180°C (350°F).
2. Boil the chopped cabbage in well-salted water until tender but still maintaining some bite, about 25 minutes.
3. Drain thoroughly in a colander and allow to cool until just warm to touch.
4. Whisk together eggs and cream with a generous pinch of sea salt and black pepper.
5. Fold the cooled cabbage into the egg mixture until well combined.
6. Transfer to an ovenproof dish, ensuring an even layer.
7. Bake for 20 minutes or until golden brown on top and set in the middle.

Plating

Crown the warm dish with a generous scatter of radish microgreens.

Finish with a drizzle of your best olive oil and an extra sprinkle of sea salt flakes.

Benefits of Radish Microgreens

Radish microgreens are particularly beneficial for those managing Type 2 diabetes.

They contain concentrated levels of antioxidants and sulforaphane, which may help improve insulin sensitivity.

Their high vitamin C content aids in reducing inflammation, while their fiber content helps regulate blood sugar levels.

Community News

Ghana and OMG Collaborate for Education Initiatives

In a significant partnership formalized at the UNCCD COP 16 in Riyadh, Organic Microgreens Pvt. Ltd. (OMG) from India and the Center for Climate and Sustainability Empowerment (CCSE) from Ghana signed a Memorandum of Understanding (MOU) to launch the OMG Lab Initiative.

This initiative targets schools in Ghana to introduce sustainable farming techniques like hydroponics and microgreens cultivation.

The program intends to enhance education, nutrition, and entrepreneurship skills among students, aligning with several Sustainable Development Goals (SDGs), such as Zero Hunger and Quality Education.

Sourabh Sindhe, Founder of OMG, emphasized the initiative's goal of empowering youth with practical farming skills, fostering environmental consciousness, and developing entrepreneurial abilities to make a local and global impact.

The initiative is designed to address challenges like limited land availability using hydroponic systems that require minimal space and yield nutritious crops.

Kassim Hussein, Executive Director of CCSE, highlighted the collaboration as a step towards aligning with Ghana's

objectives for land restoration and community resilience.

Jointly, OMG and CCSE aim to implement this initiative in selected schools, eventually scaling it nationwide by providing the necessary training and resources.

This collaboration marks a pivotal step in leveraging international partnerships to tackle environmental and social challenges through education and innovation, setting an example for future sustainable development endeavors.

The initiative underlines the role of education and innovation in creating a greener and more equitable future globally.

Source: ANI. (2024, December 9). OMG partners with Ghana at UNCCD COP 16 to launch a transformative education and sustainability program. ANI News. Retrieved from OMG Partners with Ghana at UNCCD COP 16 to Launch Transformative Education and Sustainability Program

Healthy Holiday Options At Mystic Microgreens

Located at Booth 10 in the heart of the South Bend (Indiana) Farmer's Market, Mystic Microgreens is your source for all organic products and salad options.

Rob is known for his expertise and great customer service.

Justin recently took a field trip to learn more about Rob's creative booming business.

Source: HTL. (2024, December 9). Healthy holiday options at Mystic Microgreens. WSBT. https://wsbt.com/community/hometown-living/healthy-holiday-options-at-mystic-microgreens

MVES students explore botany in microgreens workshop

Published on the Latrobe Bulletin's website, this article describes a hands-on educational event that took place on November 19.

In this workshop, third-graders from Mountain View Elementary School engaged in a session led by Dr. Paula Purnell of the Westmoreland Land Trust and AmeriCorps member Monica Rebar.

The students learned about botanical concepts like seeds, plant structures, and growth processes.

As an application of their newfound knowledge, the students planted sunflower and popcorn seeds, which were nurtured under grow lights.

This hands-on activity aims to enhance their understanding of plant biology.

It encourages them to become "**botanists for the day**."

The workshop marks the beginning of a series of science lessons designed to deepen the student's educational experience.

Source: MVES students explore botany in microgreens workshop. (n.d.). The Latrobe Bulletin. Retrieved from https://www.latrobebulletinnews.com/education/mves-students-explore-botany-in-microgreens-workshop/article_ba0325ea-b8d8-11ef-8778-2f76a8658e9f.html

Certified Naturally Grown's List of Winter Conferences

Certified Naturally Grown

Conference season is about to be in full swing! Farm conferences are a wonderful way to learn and connect with growers in a vibrant regional context. Below is a short list of conferences aligned with CNG's sustainable farming ethos.

Make sure to tag us in your conference photos @cngfarming!

December 17-19, 2024 – Manchester, NH	New England Vegetable and Fruit Conference (NEVF)
January 10-12, 2025 – Roanoke, VA	Virginia Association for Biological Farming Conference (VABF)
January 17-18, 2025 – Silver Spring, MD	Future Harvest
January 23-25, 2025 – Frankfort, KY	Organic Association of Kentucky Annual Farming Conference (OAK)
January 24-25, 2025 – Montrose, CO	Western Co. Health, Food & Farm Forum
January 29th-February 1st, 2025 – Hot Springs, AR	Arkansas Grown Conference & Expo
February 4-6, 2025 – Atlanta, GA	SOWTH
February 5-7, 2025 – Lancaster, PA	PASA Sustainable Agriculture Conference
February 13-15, 2025 – Newark, Ohio	Ohio Ecological Food and Farming Association Conference
February 15, 2025 – Burlington, VT	Northeast Organic Farming Association of Vermont (NOFAVT)

Source: *Certified Naturally Grown*. (2024, October 2). Certified Naturally Grown's List of Winter Conferences. https://www.naturallygrown.org/certified-naturally-growns-list-of-winter-conferences/

FEATURED ARTICLE

Broccoli Microgreens: Nature's Ultimate Phytochemical Source?

Broccoli microgreens stand as nature's most potent phytochemical source due to their exceptional nutrient density, containing up to 40 times more beneficial compounds than mature vegetables.

These young plants reach their nutritional peak during the microgreen stage, 7-10 days after germination, when they're packed with sulforaphane, glucosinolates, flavonoids, and essential vitamins A, C, and E.

They've evolved from being a chef's garnish to a mainstream superfood, offering concentrated health benefits in small servings. What's particularly extraordinary is their superior anti-inflammatory and cancer-fighting properties, making them a powerful ally in disease prevention. The science behind their extraordinary potency reveals an even more fascinating story.

Keep reading to discover why this precise 7-10 day window after germination creates what scientists are calling a "nutritional perfect storm" and how understanding this timing could help you harness these benefits for your own health revolution.

The Microgreens Phenomenon

Imagine stumbling upon a peculiar twist in nature's story - a moment when a plant's survival instinct creates something extraordinary for human health. **Microgreens**, those tiny leaves that look like miniature versions of the vegetables we know, aren't just playing small; they're playing smart.

Take **broccoli microgreens**, for instance. These delicate shoots have become the unlikely heroes of our modern food narrative, emerging from the elite kitchens of high-end restaurants to capture the imagination of scientists and health enthusiasts alike. What makes them remarkable isn't just their concentrated nutrients - up to **40 times more potent** than their full-grown relatives - but the fascinating story of why they pack such a punch.

At their heart lies **sulforaphane**, a compound that these seedlings produce in abundance during their vulnerable early days. It's as if these young plants, in their drive to survive, create their own pharmaceutical factory. The irony? Their defensive strategy has become our health advantage.

This isn't just another superfood trend. It's a window into how nature's survival mechanisms can align perfectly with human health needs. When these microgreens protect themselves, they're inadvertently producing some of the most potent natural medicines we've discovered - **antioxidants**, **flavonoids**, and vital nutrients that our bodies crave.

What Are Broccoli Microgreens?

Let's consider a curious moment in a plant's life - the brief window between being a seed and becoming the vegetable we know. These are **broccoli microgreens**, harvested in their youth, just **7-21 days** after germination, when they've barely unfurled their first true leaves.

Unlike their mature siblings that demand months of patience and acres of land, these **tender shoots** offer a fascinating shortcut to nutrition. They're not quite sprouts and certainly not fully grown broccoli - they're something in between, caught in a magical moment when their nutritional content peaks at up to **40 times** that of their adult counterparts.

What makes this story even more remarkable is its simplicity. These **nutrient-dense crops** ask for little more than clean trays, decent soil, and proper lighting. Give them **16-18 hours** of daily light and consistent moisture, and they'll reward you with a harvest in just over a week.

For anyone interested in growing their own food, these **microgreens** offer an unusually forgiving entry point. They thrive year-round in controlled indoor environments, making them accessible regardless of season or space constraints. It's as if nature designed a perfect starter kit for aspiring urban farmers.

The Phytochemical Powerhouse of Broccoli Microgreens

Hidden inside every tender **broccoli microgreen** lies a fascinating chemical drama waiting to unfold. At the heart of this story is a compound called **sulforaphane**, but it doesn't exist until you take that first bite. Instead, these tiny greens hold their precursor, **glucosinolate**, patiently waiting for the moment of destruction.

When you chop or chew these delicate shoots, you trigger a remarkable transformation. An enzyme called **myrosinase** springs into action, converting those waiting for glucosinolates into **isothiocyanates** - including our star player, sulforaphane. It's nature's version of a chemical magic trick, performed countless times on your plate.

What makes these microgreens truly remarkable is their concentration of these compounds - up to **100 times more sulforaphane** than their fully-grown relatives. But sulforaphane isn't working alone. These young plants are packed with an entire arsenal

of protective compounds: **polyphenols**, **flavonoids**, and a robust team of vitamins (**A**, **C**, and **E**).

Compound	Microgreens	Mature Broccoli	Health Benefits
Sulforaphane	100x	1x	Cancer-fighting
Antioxidants	40x	1x	Anti-aging
Vitamin C	20x	1x	Immune support
Glucosinolates	50x	1x	Anti-inflammatory

The story gets even more interesting when we consider storage. These powerful compounds aren't as fragile as you might think. When kept cool in airtight containers, the precursor **glucoraphanin** remains stable for months, like a sleeping giant waiting to be awakened. Even gentle drying at **45°C** preserves most of these valuable nutrients - though fresh is always best.

It's as if these tiny plants, in their brief window of growth, concentrate everything they need for survival into an intense package of protective compounds. And we, fortunate eaters, get to benefit from their defensive strategy.

Why Sulforaphane Is a Game-Changer

In the remarkable story of plant compounds, sulforaphane emerges as a true hero, wielding not one but two powerful weapons against disease. This molecule, abundant in broccoli microgreens, works like a skilled defender in our bodies, both neutralizing dangerous free radicals and calming the fires of inflammation.

But what makes sulforaphane truly extraordinary is its ability to activate our body's own defense systems. Think of it as a general rallying the troops - it triggers the production of **protective enzymes** that continue their guard duty long after we've finished our meal. Even more impressive, it can cross the **blood-brain barrier**. This feat makes it a potential ally in protecting our cognitive health.

The numbers tell a compelling story. In **clinical trials**, people consuming these microgreens showed significant improvements in **cardiovascular markers**. One particularly striking study revealed that regular consumption improved **memory and cognitive function** scores by up to **28%** over twelve weeks.

Scientists at **Johns Hopkins University** discovered something even more fascinating - sulforaphane helps shield **brain cells** from oxidative stress while simultaneously improving our **DNA repair mechanisms**. It's as if nature designed a compound that knows

exactly where to go and what to do when it arrives, operating like a precise military operation at the cellular level.

DID YOU KNOW?

"Did you know that broccoli microgreens contain up to 100 times the glucoraphanin content of mature broccoli?"

Surpassing their mature counterparts, broccoli microgreens pack an exceptional nutritional punch with glucoraphanin levels up to 100 times higher than fully grown broccoli heads. This astonishing concentration of glucoraphanin, the precursor to sulforaphane, makes these tiny greens a powerhouse of cancer-fighting potential.

When consumed, glucoraphanin converts to sulforaphane through the action of myrosinase enzymes, providing improved cellular protection.

What's particularly fascinating is how nature concentrates these beneficial compounds in the plant's early growth stages. During the first 7-10 days after germination, broccoli microgreens channel their energy into producing these protective phytochemicals. It's like the plant's own survival strategy becomes our health advantage.

Recent research from Johns Hopkins University confirmed these heightened glucoraphanin levels, suggesting that just a small serving of broccoli microgreens could provide the same beneficial compounds as a large portion of mature broccoli.

For those seeking to maximize their intake of protective compounds, incorporating these nutrient-dense microgreens into daily meals offers an efficient and practical approach to increasing overall wellness. Their concentrated nutrition makes them an ideal choice for health-conscious consumers.

How Broccoli Microgreens Stack Up Against Other Foods

Imagine finding a vegetable that packs **40 times** the nutritional punch of its grown-up version. That's the story of **broccoli microgreens**, those tiny leaves that are quietly revolutionizing how we think about nutrient density.

When scientists compare these miniature greens to traditional powerhouses like **kale** and **spinach**, the results are startling. They consistently outperform their larger cousins in everything from **vitamin C** content to **antioxidant levels**. What's more remarkable is that you need just a small handful to get the same benefits as a plateful of mature vegetables.

But perhaps their most winning quality is their **versatility**. Unlike their mature counterparts' sometimes bitter personalities, these microgreens offer a **mild, nutty flavor** that slides effortlessly into everyday meals. Whether they're enhancing your morning smoothie,

adding crunch to sandwiches, or elevating a simple salad, they deliver their **concentrated nutrition** without any fuss or preparation.

Preserving Phytochemical Integrity

In the quest to preserve nature's pharmacy, temperature emerges as both friend and foe to **broccoli microgreens**. The story begins with drying - a delicate dance where **gentle heat** at precisely **45°C** preserves up to **89%** of their precious compounds, while anything hotter risks destroying these hard-earned nutrients.

Freeze-drying stands as the gold standard, capturing nearly all of the greens' goodness in suspended animation. But for those without industrial equipment, there's hope in simpler methods. Store these delicate shoots between **35-40°F** (2-4°C), and they'll keep their **sulforaphane potential** for up to **21 days**.

Drying Method	Nutrient Retention	Quality Impact

Freeze-drying (-50°C)	Highest (90-100%)	Minimal color change
Low-temp air (45°C)	Good (80-90%)	Slight darkening
High-temp air (95°C)	Poor (40-60%)	Significant darkening

The secret lies in the details: **ventilated containers** lined with slightly damp paper towels create a perfect microclimate. Perhaps most surprisingly, these tiny greens benefit from a brief daily exposure to **indirect light** - about four hours - helping maintain their valuable **glucoraphanin** levels. It's as if these microgreens are still participating in the dance of photosynthesis, even after harvest.

Cultivating Your Own Phytochemical Source

Think of growing **broccoli microgreens** as a kind of kitchen alchemy, where a handful of seeds transforms into nutrient-rich greens in just **7-10 days**. The recipe for this transformation is surprisingly simple: some **organic soil**, shallow trays with drainage holes, and a commitment to gentle misting twice daily.

These tiny greens ask for little in return for their bounty - just **12-16 hours** of indirect sunlight or LED light positioned a few inches above their tender leaves. What's remarkable is the economics of it all: a $5 investment in seeds can yield multiple harvests, turning what might cost **$30-40 per pound** at the store into a **$2-3 per pound** home crop.

But perhaps the most compelling part of this story is its sustainability. A standard **10x20-inch tray** can produce enough microgreens for several servings, all while using minimal water and zero pesticides, making it a perfect solution for urban gardeners seeking both nutrition and environmental responsibility.

Wrap-Up: Broccoli Microgreens as Nature's Ultimate Phytochemical Source

In the grand theater of plant nutrition, **broccoli microgreens** perform what seems like botanical magic, concentrating the power of their mature counterparts into a package **40 times** more potent. These tiny performers don't just carry a single star nutrient - they deliver an entire ensemble of **bioactive compounds** that work in harmony to defend our bodies against inflammation and oxidative stress.

What makes this story even more remarkable is the timeframe: in just **7-10 days**, these seedlings reach their peak **phytochemical levels**, producing up to **100 times** more **sulforaphane** than their full-

grown relatives. It's as if nature compressed months of nutritional development into a brief window of extraordinary productivity.

The practical implications are just as impressive as the science. Anyone with a sunny windowsill or some **LED grow lights** can become their own producer of this concentrated nutrition. The recipe is surprisingly simple: some soil, daily misting, and a bit of patience. Whether you add them fresh to salads and smoothies or gently dry them at **45°C** for longer-term storage, these microgreens offer a remarkably efficient way to access nature's pharmacy.

Growing Essentials	**Basic Setup**	**Advanced Setup**
Growing Medium	Soil	Hydroponic
Light Source	Window	LED Grow Light

Temperature	Room Temp	Climate Control
Water Needs	Daily Mist	Auto-Irrigation
Harvest Time	10-14 Days	7-10 Days

Think of it as your own miniature superfood factory, running on nothing more than water, light, and the remarkable chemistry of plant development. In return, you get nature's most concentrated source of protective compounds, delivered fresh from windowsill to plate in less than two weeks.

These compact gardens offer a sustainable way to access fresh, nutrient-dense produce year-round while ensuring optimal phytochemical content through careful temperature control during growth.

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Evidence-based Expertise

How Safe Are Nutritionally Enhanced Microgreens? Consumer Concerns

The study investigates consumer perceptions of risk associated with various methods used to enhance the nutritional content of microgreens.

Conducted via an online survey of 820 Tennessee, USA residents, the research highlights **consumer attitudes toward eight production practices**, including plant breeding, gene editing, lighting manipulation, and soil amendments.

Using probit models, the study measures perceived safety for both personal consumption and environmental impacts.

Key Findings

1. **Safest Practices:** Consumers rated plant species selection and lighting manipulation as the safest for both consumption and environmental impact.
2. **Riskier Methods:** Gene editing and genetic modification were perceived as the least safe, reflecting concerns about advanced biotechnological methods.
3. **Knowledge and Perception:** Greater familiarity with a method correlated with increased perception of safety. Those who considered a method the

"best strategy" for enhancing nutrition also rated it safer.

4. **Demographics Matter:** Urban residents showed higher acceptance of innovative methods. Women were more cautious about gene editing and post-harvest nutrient addition. African American participants were more likely to perceive fertilizer and soil amendments as environmentally safe compared to other groups.

Recommendations for Farmers

- **Focus on Lighting and Species Selection:** These practices align with consumer preferences and safety perceptions, making them ideal for marketing.
- **Educate Consumers:** Increased awareness about the benefits and safety of advanced methods, such as gene editing, can reduce negative perceptions and build trust.
- **Tailor Marketing Strategies:** Highlight natural methods like plant species selection when targeting cautious consumers and emphasize urban-friendly practices to appeal to city dwellers.

SUMMARY

This research study investigates Tennessean consumers' perceptions of risk associated with various microgreen production methods aimed at enhancing nutritional content.

Using an online survey and probit models, the researchers analyzed how consumption and environmental safety perceptions varied across methods like plant breeding, gene editing, and lighting manipulation.

Results showed that simpler methods were viewed more favorably, while gene editing and genetic modification were perceived as riskier.

Consumer familiarity with microgreens and existing knowledge of production methods significantly influenced risk perceptions, alongside demographic factors such as gender, education, and urban residency.

The findings highlight the need for targeted consumer education to improve acceptance of innovative microgreen production techniques.

By addressing these insights, farmers and retailers can align

production methods with consumer expectations, enhancing the acceptance and marketability of nutrient-rich microgreens.

Source: Rihn, A. L., Walters, K., Bumgarner, N., & Pralhad Bajgain. (2024). Consumers' Risk Perceptions of Production Practices to Enhance the Nutrient Content of Microgreens. *Journal of Agriculture and Food Research*, 101542–101542. https://doi.org/10.1016/j.jafr.2024.101542

Cultivation Techniques

Innovative Hydroponics Enhance Campus Dining

Let's take a look at the integration of Babylon Micro-Farms at the University of Virginia's Darden School of Business.

Established by alumni Alexander Olesen and Graham Smith, these indoor hydroponic systems are making waves in campus sustainability and food service.

The project realized through the Darden School's Batten Institute for Entrepreneurship, allows for the cultivation of greens and herbs directly within Abbott Dining Hall.

Carl Lasley, the food and beverage director, emphasizes using these fresh herbs in meals like vinaigrettes and chicken salads.

The Babylon units, monitored remotely for optimal growth conditions, exemplify a move towards modern, sustainable food production, providing a tangible learning opportunity for students.

Rebecca Duff, from the Batten Institute, appreciates this initiative as a symbol of

leveraging innovative student ideas for practical applications.

Lasley plans to expand crop varieties and integrate microgreens into catering services, underpinning a commitment to sustainability and local produce.

Babylon Micro-Farms, serving roughly 260 global clients, continues to evolve with a dual focus on growth and culinary application, underscoring a larger sustainable food movement at Darden.

Source: Kelly, M. (2024, December 10). UVA alums' 'micro farm' has Darden school seeing greens. *UVA Today*. Retrieved from https://news.virginia.edu/news-category/faculty-spotlight?utm_campaign=news&utm_medium=owned&utm_source=houseada&utm_content=facultyspotlightaggregation&utm_term=orangeclassroom

MSU vegetable short course set for Feb. 25-26

VERONA, Miss. -- Current and prospective commercial vegetable growers can learn about specialized production methods during Mississippi State University's **2025 Vegetable Short Course Feb. 25-26.**

The course will be held at the North Mississippi Research and Extension Center's Magnolia Building in Verona from 8 a.m. to 5 p.m. each day.

It is open to greenhouse, high-tunnel, and field vegetable producers throughout the Southeast.

Attendees will learn about vegetable management practices for growing tomatoes, lettuce, and other crops via greenhouse, high-tunnel, and field production.

Participants will attend educational sessions and participate in hands-on activities.

Topics include microgreens, nutrient management, pesticide safety, floating growing systems, and insect and disease issues.

Speakers will also present information on current tomato, strawberry, and lettuce research.

Vendors will offer various goods and services.

Preregistration is available until Feb. 15

PRE-REGISTER!

Preregistration is $40 per person. On-site registration is $50 for both days or $25 for one day per person.

The fee covers conference materials, lunch, and refreshments.

The Magnolia Building is located at 5395 Mississippi Highway 145 South.

The event is organized by personnel with the MSU Extension Service and Mississippi Agricultural and Forestry Experiment Station.

Emerging Industry News

Saudi Arabia Microgreens Market Dynamics for 2033

The "Saudi Arabia Microgreens Market Dynamics for 2033" outlines the emerging trends and drivers of the microgreens market in Saudi Arabia, emphasizing healthy lifestyles

and organic foods' rising popularity.

Key trends include the adoption of hydroponic and vertical farming methods, which offer efficient resource use and sustainable practices.

Locally grown and organic products are becoming increasingly preferable among consumers.

Market growth is propelled by heightened health awareness—microgreens are rich in nutrients and have become a staple in various culinary applications.

The burgeoning food service industry further fuels demand as chefs embrace microgreens for their flavors and vibrant presentations.

However, challenges such as public awareness and the availability of quality seeds persist.

Despite these hurdles, the market shows growth potential through strategic vendor positioning and comprehensive market analysis.

Source: Report Ocean. (2024, December 9). Saudi Arabia Microgreens Market Top Companies, Business Growth, Investment Opportunities, Share, And Forecast To 2033. https://www.taiwannews.com.tw/news/5987596.

Hooked on Microgreens

Microgreens are growing in popularity and impact in Richmond, Virginia, USA.

Microgreens, tiny but nutrient-packed seedlings, have become a significant health trend and are revolutionizing urban farming. Urban farmer Justin Upshaw of EssentialRVA Microgreens cultivates microgreens like sunflower, broccoli, radish, and mustard, focusing on their nutritional benefits.

His venture into microgreens was accidental but successful, leading him to establish a business after initial experimentation.

Upshaw emphasizes the importance of nutrient-rich soil in producing healthier microgreens, contributing to a sustainable lifestyle in Richmond.

The demand for microgreens reflects a broader interest in high-nutrient foods that can grow in limited spaces.

Moreover, **The Sowers' Row**, an organic farm in Goochland County run by Jodi Strohmayer and James Hammond, highlights diverse farming techniques and microgreens' adaptability.

Their enterprise began in a shed and now thrives in a climate-controlled barn, offering varieties like mild and spicy mixes.

The farm emphasizes the importance of observing customer preferences and adapting to market demands, with broccoli microgreens being especially popular for their high sulforaphane content.

Overall, microgreens have transformed culinary and farming practices by being easy to cultivate with high nutritional value, which is particularly beneficial in densely populated areas.

This has made them popular with urban farmers and health enthusiasts alike, providing a sustainable and versatile food option.

The historical context and current entrepreneurial stories reinforce their significance in contemporary society.

Source: Kester, R. (2024, December 11). Hooked on microgreens. *Style Weekly*. Retrieved from

https://www.styleweekly.com/hooked-on-microgreens/

Commercial Best Practices

Dubai's Flower Farm Feeds Michelin-Star Dreams

In the heart of Jebel Ali, a groundbreaking agricultural venture called Greeneration Farm is revolutionizing the UAE's culinary landscape by producing 15,000 edible flowers and microgreens daily.

Founded by former investment banker Roman Ulyanov, the facility **began operations in February 2024** and has quickly become a crucial supplier to over 100 high-end and Michelin-starred restaurants across Dubai and Abu Dhabi.

The farm's operations begin in the early hours, with harvesting taking place between 3am and 6am, ensuring the freshest possible produce reaches restaurants by 7am.

What sets Greeneration apart is its innovative approach to farming - they've introduced 25 new crops to the UAE, many of which were previously impossible to source locally due to their delicate nature.

This local production has significantly reduced both costs and carbon emissions associated with importing these specialty ingredients.

The facility maintains exceptional cleanliness standards, requiring employees to pass through air cleaning units before entering. Instead of traditional soil, they use Rockwool for seed germination,

eliminating the need to wash the delicate flowers.

The growing process is carefully controlled, with seeds first placed in dark, humid conditions to mimic underground environments before being transferred to light facilities.

While the farm leverages advanced technology for growing conditions, the human touch remains crucial, particularly in harvesting.

The facility grows various unique products, including the electric flower, which temporarily numbs the tongue, and purple shiso (Japanese mint), which is popular in Asian cuisine.

They work closely with chefs to customize products according to specific requirements, even adjusting leaf sizes to match particular dish presentations.

Perhaps most notably, Greeneration has achieved what many vertical farms struggle with - financial viability.

The facility expects to break even just months after opening, proving that sustainable agriculture can be both environmentally and commercially successful.

Beyond their commercial success, they maintain a strong commitment to community engagement through educational programs, providing hydroponic sets to schools, and operating an online university for worker development.

Source: Abdulla, N. (2024, December 12). Electric plants? Inside Dubai farm, growing unique greens and flowers you can eat. *Khaleej Times*. Retrieved from https://www.khaleejtimes.com

Microgreens: The Future of Indoor Farming

Nate Roma, an entrepreneur from Sheridan, transformed his indoor farming hobby into a thriving business, Root to Shoot, which focuses on cultivating microgreens.

Roma's journey began during his botany studies at the University of Wyoming in 2021.

He specialized in growing nutrient-rich microgreens such as sunflower, broccoli, and beets.

These young plants are favored for their high mineral and antioxidant content and are typically harvested 13 days after planting.

Root to Shoot supplies local markets and participates in programs like the USDA Farm to School, enhancing Eastern Wyoming schools' access to fresh produce.

Roma's innovative approach and the progress of his business were recognized at Gillette's Energy Capital Start-Up Challenge, where he was awarded $5,000 and an Audience Choice Award of $1,000.

His plans for expansion include leasing a new facility in Sheridan, transitioning to vertical farming methods, and achieving food safety certification.

Embracing vertical agriculture allows Roma to control growing conditions while maintaining eco-friendly practices.

Supported by the Wyoming Food Freedom Act, he pursues grants to offset costs. He aims to expand production into

challenging climates, improving access to fresh produce in areas with less agricultural viability.

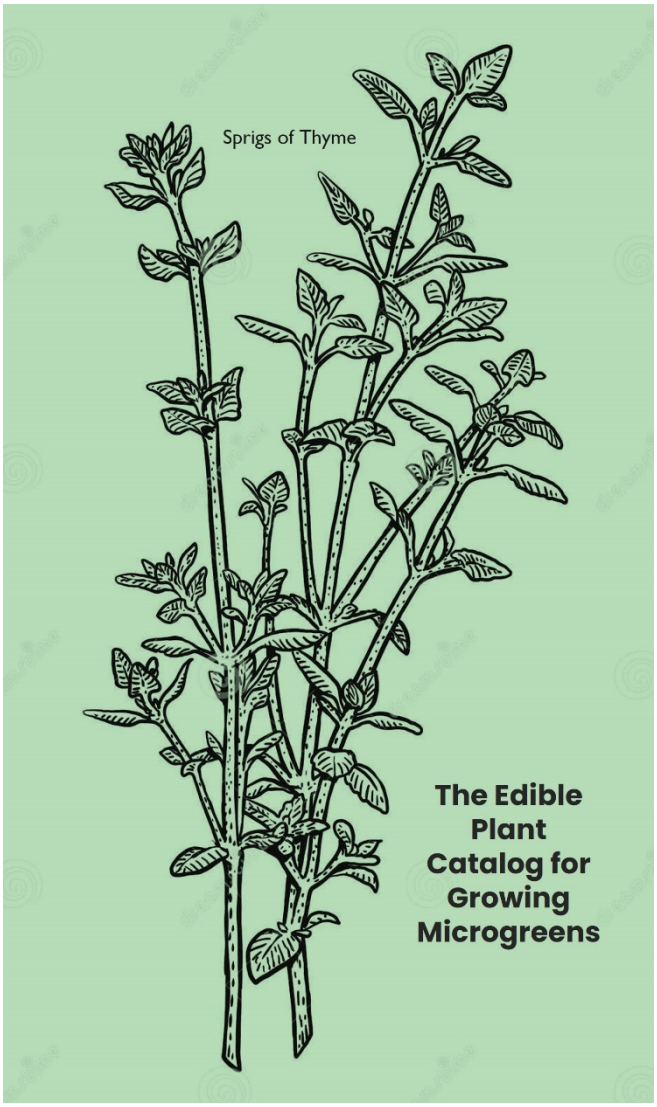
Source: Lodewyk, G. (2024, December 14). Future of farming: Homegrown business harvests microgreens. *The Sheridan Press*. https://www.thesheridanpress.com/outdoors/future-of-farming-homegrown-business-harvests-microgreens/article_137d8f3a-b987-11ef-8584-d3bb250bfd2a.html

Insider Secrets: Using trends to maximize microgreen sales

In this interactive workshop, dive deep into the strategies and tools to scale microgreens businesses by leveraging current consumer trends in sustainability and health-conscious eating.

Source: Microgreen Workshop. (2024, November 4). *Microgreens workshop: Maximizing sales through current trends* [Video]. YouTube. https://youtube.com/watch?v=5PyKcu7GkP4

The Edible Plant Catalog for Growing Microgreens



Discover a wealth of possibilities in microgreen cultivation with our meticulously curated guide featuring **over 200 edible plant species**.

Each entry outlines specific growing requirements to jumpstart your microgreens growing journey, offering insights into optimal light, temperature, and watering conditions.

This invaluable resource caters to commercial growers, researchers, and home gardeners seeking to broaden their horizons beyond traditional crops.

Embrace this opportunity to innovate and contribute to the expanding field of microgreens, enhancing your expertise while enjoying the unique flavors and nutritional benefits of diverse plant varieties.

LEARN MORE

Brought to you by **Doc Green**, Andrew Neves' personally trained AI assistant. "You may ask me anything about microgreens."

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