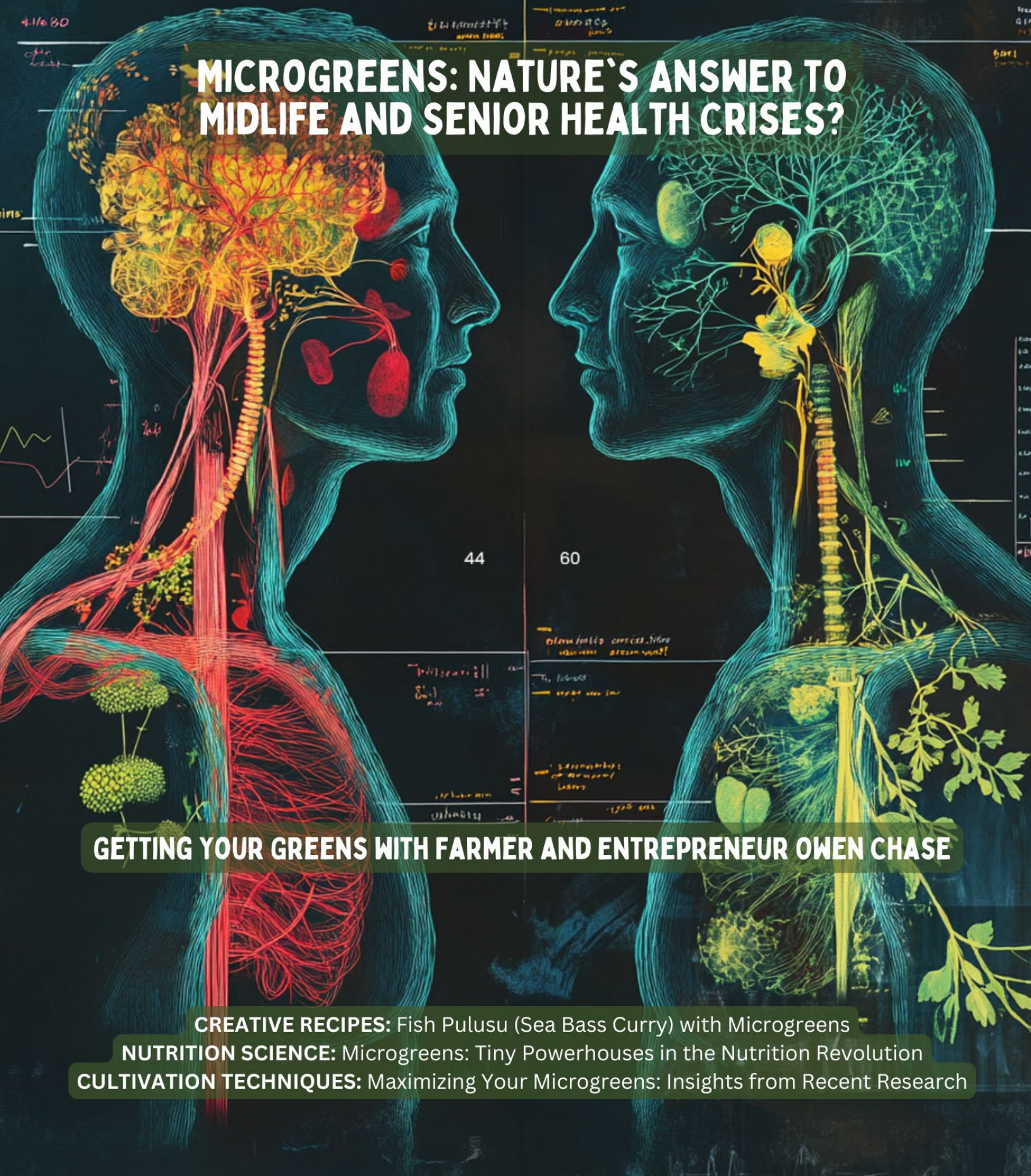
Volume 2024 Number 32 MICROGREENS WORLD Monday September 02 2024

WEEKLY DIGEST



MICROGREENS: NATURE`S ANSWER TO MIDLIFE AND SENIOR HEALTH CRISES?

GETTING YOUR GREENS WITH FARMER AND ENTREPRENEUR OWEN CHASE

CREATIVE RECIPES: Fish Pulusu (Sea Bass Curry) with Microgreens

NUTRITION SCIENCE: Microgreens: Tiny Powerhouses in the Nutrition Revolution

CULTIVATION TECHNIQUES: Maximizing Your Microgreens: Insights from Recent Research

"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.

Microgreens: Nature's Answer to Midlife and Senior Health Crises?

Vol. 2024 No. 32 Monday, September 02, 2024

COMPREHENSIVE FOOD SAFETY FOR MICROGREENS FARMS

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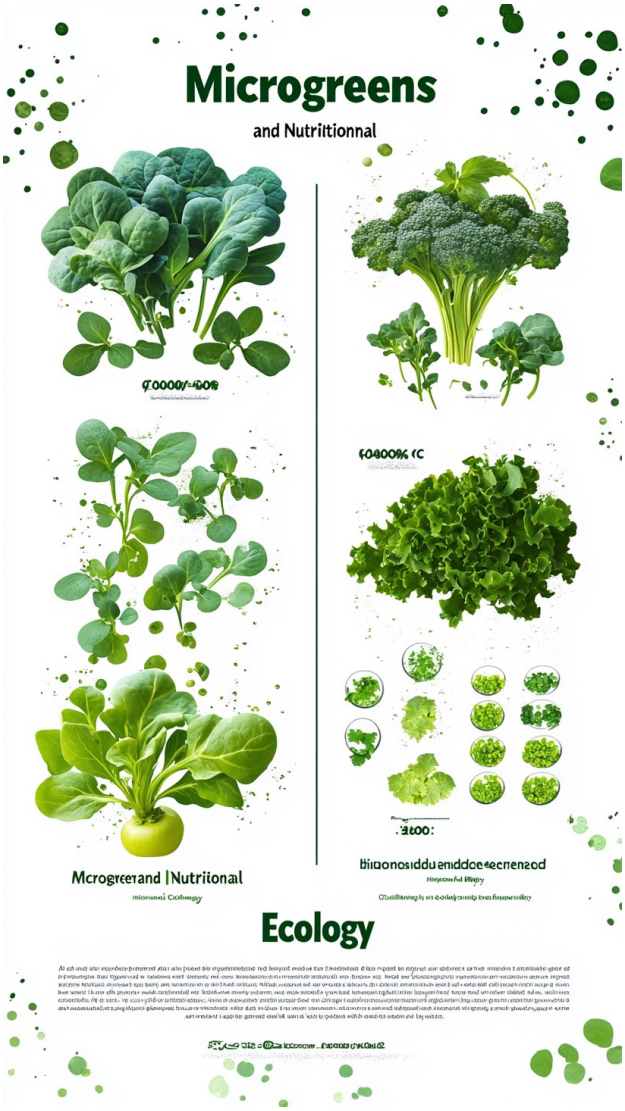
Nutrition Science

Microgreens: Tiny Powerhouses in the Nutrition Revolution



Andrew Bremer, MD PhD, director of the National Institutes of Health Office of Nutrition Research, is spearheading a paradigm shift in nutrition science.

His vision moves away from studying isolated nutrients (*micronutrients, carbohydrates, fats, and proteins*) to embracing a holistic "nutritional ecology" approach that considers how comprehensive dietary patterns affect overall health.

Key aspects of Dr. Bremer's vision include:

- Focusing on **whole foods** rather than individual nutrients
- Studying how dietary patterns impact health across **different life stages**
- Considering environmental and social factors in nutrition
- Advancing "food-is-medicine" and precision nutrition concepts

Dr. Bremer emphasizes the urgent need to address widespread malnutrition, even in food-abundant societies.

He calls for closer collaboration between nutrition researchers and food scientists to develop healthier, sustainable food products.

In this nutrition revolution, microgreens can play a significant role:

- **Nutrient density**: Microgreens pack a powerful nutritional punch in a small package, aligning with Bremer's focus on optimizing health through food.
- **Sustainable production**: These tiny plants require minimal resources to grow, supporting the goal of feeding a growing global population sustainably.
- **Versatility**: Microgreens can be easily incorporated into various dietary patterns, supporting the shift towards studying comprehensive diets rather than isolated nutrients.
- **Precision nutrition potential**: Different microgreen varieties offer diverse nutrient profiles, allowing for tailored dietary recommendations based on individual needs.
- **Food-as-medicine applications:** The high concentration of bioactive compounds in microgreens makes them promising candidates for therapeutic dietary interventions.

Dr. Bremer's approach also considers the impact of food processing on health.

While ultra-processed foods have had unintended negative consequences, microgreens represent a minimally processed whole food that aligns with the goals of optimizing both human and planetary health.

As nutrition science evolves, consumers can expect more personalized dietary advice and a greater emphasis on whole foods like microgreens.

This shift promises to address not just the prevention of nutrient deficiencies but the optimization of overall health through diet.

By embracing foods like microgreens and adopting a more holistic view of nutrition, we can work towards Dr. Bremer's vision of reducing nutrition-related illnesses and improving global health outcomes.

Neff, J. (2024, August 1). Andrew Bremer's holistic nutrition vision. *Food Technology Magazine*. Institute of Food Technologists. https://www.ift.org/news-and-publications/food-technology-magazine/issues/2024/august/features/andrew-bremers--holistic-nutrition-vision

Creative Recipes

Fish Pulusu (Sea Bass Curry) with Microgreens

Fish Pulusu, a beloved South Indian dish, tells a story of coastal heritage and culinary evolution.

This tangy fish curry reflects centuries of tradition.

Known as Chepala Pulusu in Telugu and Meen Kulambu in Tamil, it showcases the region's abundant seafood and local ingredients like tamarind and curry leaves.

Traditionally prepared in earthenware pots with freshwater or marine fish, the dish varies slightly between regions, with Andhra versions typically spicier.

Fish Pulusu isn't just food; it's a cultural touchstone, often gracing festival tables and considered a comforting staple.

As it finds its way onto restaurant menus and inspires fusion creations, Fish Pulusu continues to adapt, carrying its rich coastal legacy into the modern culinary world.

- Prep Time: 30 minutes
- Cook Time: 40 minutes
- Total Time: 1 hour 10 minutes
- Category: Main Course
- Method: Simmering

- Cuisine: South Indian (Andhra)
- Yield: 4-6 servings

Ingredients:

- 500g sea bass fillets, cut into 2-inch pieces
- 2 tbsp vegetable oil
- 1 tsp mustard seeds
- 1 tsp cumin seeds
- 2 onions, finely chopped
- 2 tomatoes, chopped
- 2 green chilies, slit lengthwise
- 1 tbsp ginger-garlic paste
- 1/4 tsp turmeric powder
- 1 tsp red chili powder
- 1 tsp coriander powder
- 1/2 tsp fenugreek seeds
- 2 cups water
- 1 tamarind pulp the size of a lemon
- Salt to taste
- Cilantro microgreens for cooking and garnish
- Mustard microgreens for garnish

Instructions:

1. Soak tamarind in 1/2 cup warm water for 15 minutes.
2. Extract the pulp and discard the fibers.
3. Heat oil in a large pan over medium heat.
4. Add mustard seeds and cumin seeds.
5. When they start to splutter, add onions and green chilies. Sauté until onions turn translucent.

6. Add ginger-garlic paste and sauté for a minute until the raw smell disappears.
7. Add chopped tomatoes, turmeric powder, red chili powder, coriander powder, and fenugreek seeds.
8. Cook until tomatoes turn mushy.
9. Pour in 2 cups of water and tamarind pulp.
10. Bring to a boil and simmer for 5 minutes.
11. Add sea bass pieces and a handful of cilantro microgreens.
12. Cook for 8-10 minutes or until the fish is cooked through.
13. Adjust salt to taste.
14. Garnish with fresh cilantro microgreens and mustard microgreens before serving.
15. Serve hot with steamed rice.

Note on Microgreens:

- Cilantro microgreens: Add some while cooking to infuse a fresh, citrusy flavor into the curry. Use more as a garnish for added aroma and visual appeal.
- Mustard microgreens: Use as a garnish to add a slight peppery kick that complements the tangy tamarind in the curry.

Alternative Protein and Vegetarian Variations for Fish Pulusu

These alternative protein options and vegetarian variations offer a wide range of possibilities for customizing the Fish Pulusu recipe:

Other Seafood Alternatives: Options like shrimp, squid, or crab can be used to maintain a seafood flavor while varying the texture.

Meat Alternatives: For those who don't eat fish but consume other meats, chicken or eggs can be good substitutes.

Vegetarian and Vegan Options: Numerous plant-based alternatives like mixed vegetables, tofu, mushrooms, jackfruit, or paneer (Indian cottage cheese) can mimic the texture of fish while absorbing the flavors of the curry.

Legume-Based Options: Chickpeas or lentils combined with vegetables can work well as added protein in vegetarian versions.

When making these substitutions, it's essential to adjust cooking times and techniques to suit the new main ingredient.

For instance, tofu might need to be pan-fried before adding to the curry.

Meanwhile, jackfruit would need longer cooking time to soften and absorb flavors.

The key is to maintain the signature tangy, spicy flavor profile of Fish Pulusu while adapting the protein or central ingredient.

This way, you can cater to different dietary preferences while still enjoying the essence of this traditional South Indian dish.

Community News

A Teenager's Impact on Madison's Culinary Landscape

Eighteen-year-old Jessica Ricci is making a significant impact in Madison, Wisconsin's restaurant scene with her microgreens business, New Life Greens, which she started in an aquaponics greenhouse in Paoli.

Initially growing lettuce as part of a high school internship,

Jessica quickly transitioned to cultivating nutrient-rich microgreens, noting their potential to contain 4 to 40 times more nutrients than their mature counterparts.

Guided by her mentor Mike Knight, who runs Clean Fresh Food, Jessica learned the intricacies of aquaponics—growing plants using fish wastewater.

Knight praises her perseverance and commitment to environmental care, highlighting her entrepreneurial spirit.

Jessica is also working on a Community Supported Agriculture (CSA) program to provide a continuous supply of greens to local residents throughout the year.

Her story showcases not only her individual initiative but also the growing trend of sustainable agriculture in urban dining.

Murray, P. (2023, August). *Trough to table: Budding environmentalist putting green stamp on Madison restaurant scene.* NBC15. Retrieved from https://www.wmtv15news.com/

Celebrate Local Foodways at the Bonita Springs Farmers Market

Pleyoo Microgreens, led by owner Ileana Perez, has been a notable vendor at the Bonita Springs Farmers Market since 2018.

Ileana's roots trace back to Cuba, where she learned to appreciate freshly harvested vegetables from her mother.

At the market, she creates custom orders of microgreens, which are tiny edible plants harvested at an early stage, contributing vibrant flavors and nutrients to various dishes.

The microgreens are part of the culinary landscape, enhancing meals prepared with local ingredients, such as heirloom

tomatoes from 12 Seasons Farm.

Pleyoo emphasizes sustainability and community connections, with Ileana expressing how her upbringing influences her passion for growing and sharing fresh produce.

By participating in the farmers market, Pleyoo Microgreens not only provides tasty additions to meals but also fosters relationships with the local community, enriching the food culture in Bonita Springs.

Jamieson, C. (2024, August 28). Celebrate local foodways at the Bonita Springs Farmers Market. Gulfshore Life. https://gulfshorelife.com/things-to-do/celebrate-local-foodways-at-the-bonita-springs-farmers-market

Sabra Farm now open in Magnolia

Sabra Farm, recently opened on June 1 in Magnolia, Texas, offers a variety of fresh produce, including eggplants, tomatoes, and cucumbers.

Owners Rabih and Sandy Sabra aim to promote local food production and quality offerings for the community.

The farm sources produce from other local farmers while also growing their own microgreens.

Currently, Sabra Farm can only grow during spring and fall.

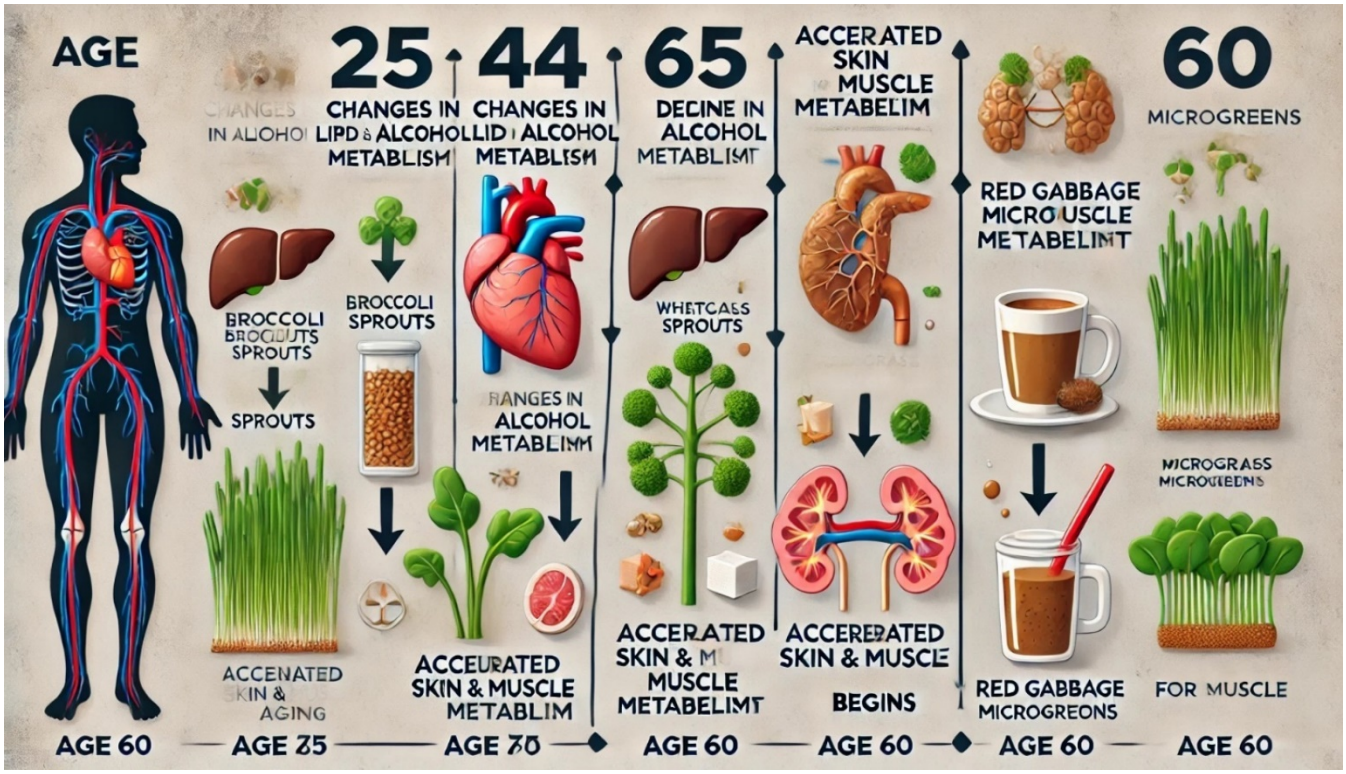
However, they have plans to expand to provide year-round produce availability.

This initiative aligns with their mission to enhance local agricultural sustainability.

Shaheen, N. (2024, August 28). *Sabra Farm now open in Magnolia*. Community Impact. https://communityimpact.com/houston/tomball-magnolia/business/2024/08/28/sabra-farm-now-open-in-magnolia/

FEATURED ARTICLE

Microgreens: Nature's Answer to Midlife and Senior Health Crises?



Hey there, microgreens health enthusiasts!

A recent study from Stanford University reveals that significant molecular changes in our bodies occur around the ages of 44 and 60 rather than gradually over time.

Researchers analyzed over 135,000 types of molecules from 108 participants.

They discovered that 81% of these molecules fluctuate notably at these two life stages.

Findings indicate changes related to **cardiovascular health**, **metabolism**, and **immune function**.

The study underscores the importance of lifestyle choices like diet and exercise starting in one's 40s to mitigate the impacts of aging and related diseases as these biological transformations take effect.

Study Findings

Let's dive into this exciting new research about aging and how we can stay ahead of the game.

Scientists have been busy studying how our bodies change as we get older, and boy, do they have some interesting findings to share!

So, here's the deal: researchers looked at 108 people aged 25 to 75 and tracked all sorts of biological changes in their bodies over time.

They were looking for patterns in how we age, BUT they found something surprising.

Instead of our bodies changing steadily as we get older, they discovered two major "turning points" where a lot happens all at once.

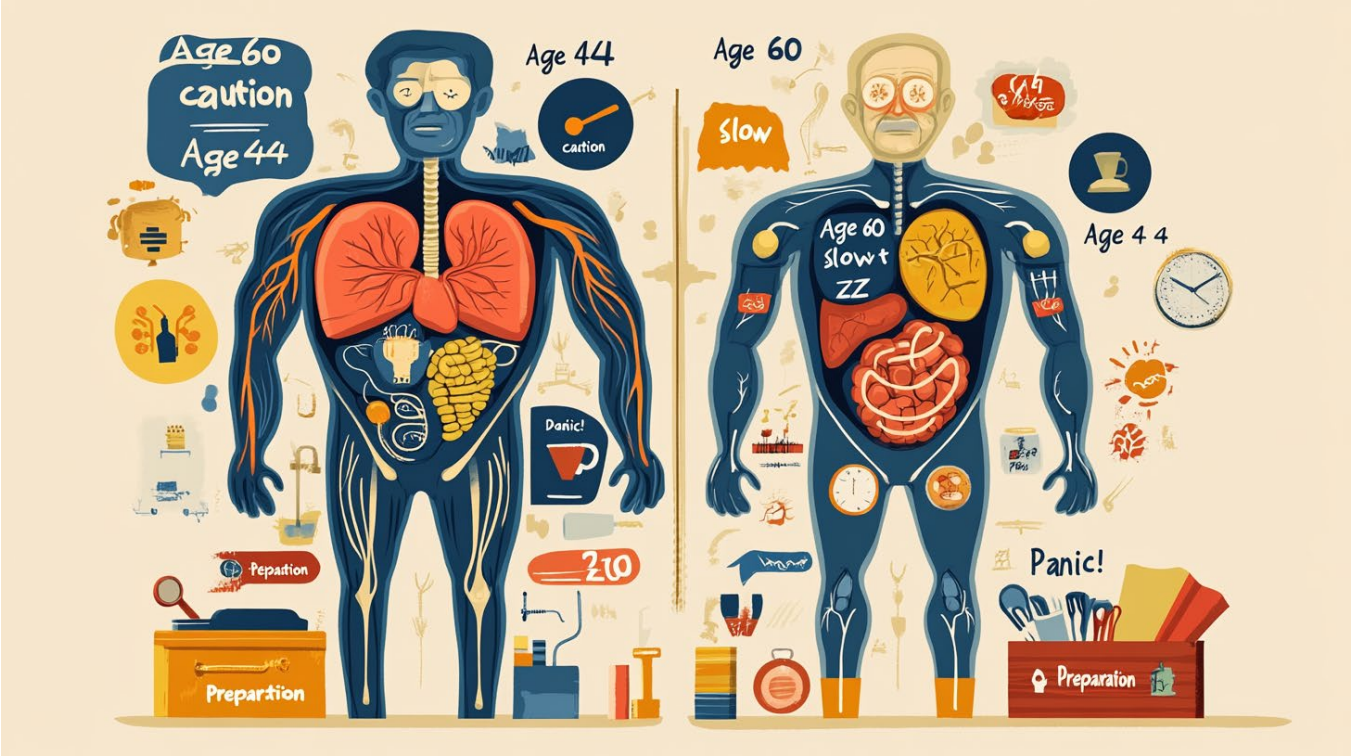
The first big change comes around age 44, and the second hits us at about 60.

It's like our bodies are running a marathon with two big hills to climb!

At these points, lots of things in our body start to shift gears.

Let's break it down.

Key findings relevant to people in their 40s and early 60s



1. Around age 44:
    - Our bodies start to handle fats and alcohol differently
    - We don't process caffeine as well (goodbye, late-night coffee!)
    - Our skin and muscles begin to show more signs of aging
2. Then, at the big 6-0:
    - Our immune system takes a hit

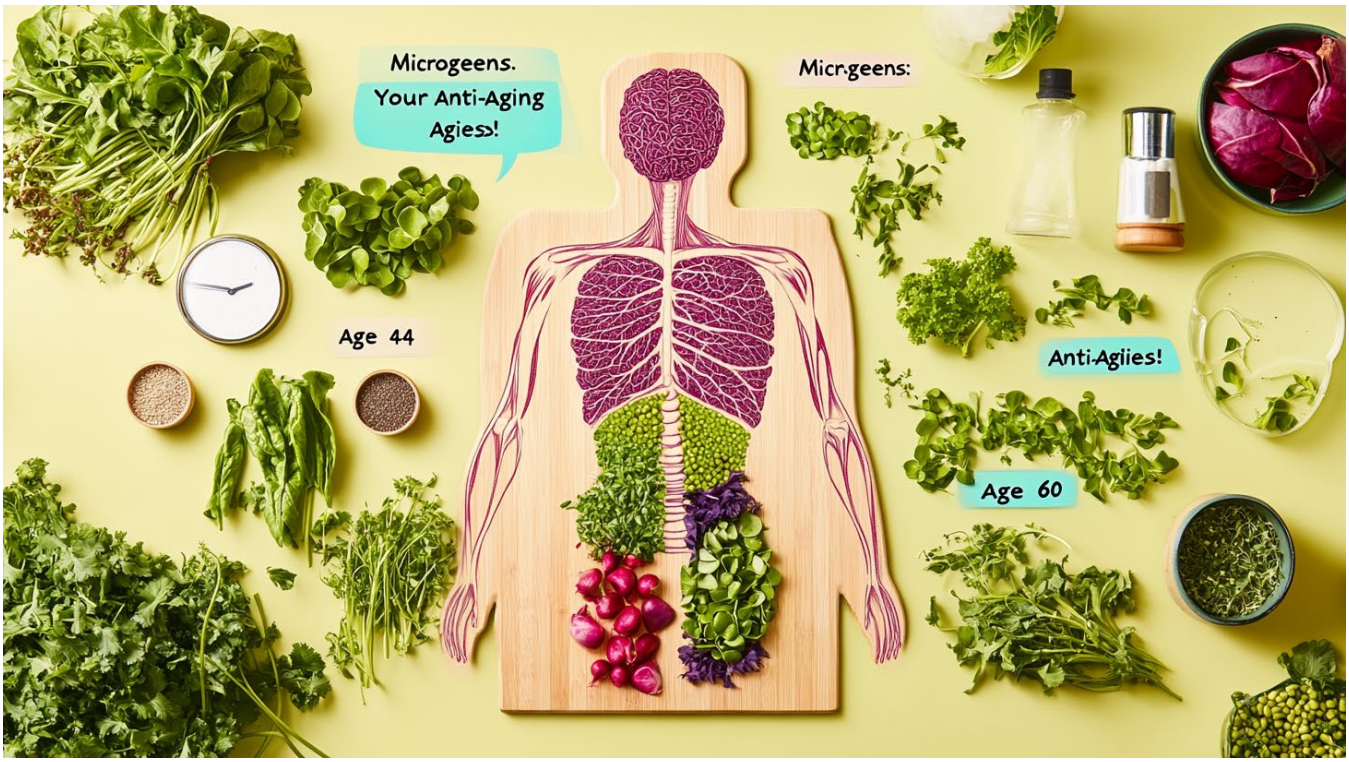
- Kidneys don't work quite as well
- We're at higher risk for heart problems and diabetes
- Our body has a harder time dealing with carbs
- We face more "oxidative stress" (that's when harmful molecules build up in our cells)

Now, this might sound a bit scary, BUT don't worry!

There's good news, too.

By knowing about these changes, we can prepare for them and maybe even slow them down.

And that's where microgreens come in!



Microgreens are the overachievers of the plant world!

Adding these little powerhouses to your diet could help you tackle those age-related changes head-on.

Here's how microgreens can be your secret weapon:

1. *They're loaded with vitamins, minerals, and antioxidants*: Many microgreens are high in antioxidants like vitamins C and E, carotenoids, and polyphenols.

These fight the oxidative stress we talked about earlier, which the study found increases significantly after age 60.

2. *They support heart health*: Some microgreens like red cabbage and beet can help keep your blood pressure and cholesterol in check.

3. *They might help with blood sugar*: This could be a big deal when it comes to handling carbs better as we age.

Some microgreens, such as fenugreek and wheatgrass, can help reduce the risk of type 2 diabetes.

4. *They're great for your immune system*: Microgreens are packed with vitamins A and C that keep your immune system strong.

This could help counteract the rapid decline in immune function observed at age 60.

5. *They support kidney health*: The antioxidants and anti-inflammatory compounds in microgreens might help your kidneys stay in top shape, which the study found declines around age 60.

6. *They're good for your skin*: All those nutrients can help keep your skin looking young and healthy.

7. *They might help your muscles*: Some microgreens are rich in proteins that could support muscle health and potentially slow the acceleration of muscle aging identified in the study.

8. *They could help your liver*: Some microgreens, like broccoli, contain compounds that support liver function.

This is great news for handling those changes in how we process fats and alcohol beginning around age 44.

9. *Cellular health:* The high nutrient content of microgreens may support cellular processes like autophagy and DNA repair, which the study found change during aging.

The study emphasizes the importance of these transition periods for potential interventions to promote healthy aging.

While the paper does not explicitly mention microgreens, they can be an excellent addition to your diet to help prepare for and navigate these critical transition periods:

Incorporating More Microgreens in Your Meals

So, how can you add these super-veggies to your diet? It's easier than you might think!

- Toss them in your salads

- Add them to your sandwiches or wraps
- Blend them into smoothies or juices
- Use as a garnish for soups, omelets, or main dishes.
- Mix them into your morning eggs
- Incorporate into pesto or other sauces.

Remember, microgreens aren't a magic pill that will stop aging in its tracks.

BUT they can be a tasty and nutritious way to give your body extra support as you navigate those big changes at 44 and 60.

Wrap-up: Aging gracefully

The bottom line is this: our bodies face challenges as we age, BUT with the proper knowledge and tools (like microgreens!), we can meet those challenges head-on.

It's all about being proactive and making small, consistent changes to support our health.

While microgreens alone cannot prevent aging, their high nutrient content and potential health benefits make them a valuable addition to a balanced diet, especially when preparing for and navigating the critical transition periods identified in this study.

So, next time you're at the grocery store or farmers market, why not pick up some microgreens?

Your future self might thank you for it!

After all, aging is a journey we're all on together, AND with a little help from these mighty mini-veggies, we can make it a healthier, happier trip.

As always, it's essential to maintain a varied diet, regular exercise, and consult with healthcare professionals for personalized advice on healthy aging strategies.

Remember, folks: knowledge is power, AND in this case, it's also delicious!

Here's to healthy aging, one microgreen at a time!

Research

Shen, X., Wang, C., Zhou, X., Zhou, W., Hornburg, D., Wu, S., & Snyder, M. P. (2024). Nonlinear dynamics of multi-omics profiles during human aging. Nature Aging, 1–16. https://doi.org/10.1038/s43587-024-00692-2

Fong, S., Pabis, K., Djakim Latumalea, Nomuundari Dugersuren, Unfried, M., Tolwinski, N., Kennedy, B., & Gruber, J. (2024). Principal component-based clinical aging clocks identify signatures of healthy aging and targets for clinical intervention. Nature Aging. https://doi.org/10.1038/s43587-024-00646-8

Param Priya Singh, & Benayoun, B. A. (2023). Considerations for reproducible omics in aging research. Nature Aging, 3(8), 921–930. https://doi.org/10.1038/s43587-023-00448-4

Ahadi, S., Zhou, W., Schüssler-Fiorenza Rose, S. M., Sailani, M. R., Contrepois, K., Avina, M., Ashland, M., Brunet, A., & Snyder, M. (2020). Personal aging markers and ageotypes revealed by deep longitudinal profiling. Nature Medicine, 26(1), 83–90. https://doi.org/10.1038/s41591-019-0719-5

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Evidence-based Expertise

Getting Your Greens with Farmer and Entrepreneur Owen Chase

Owen Chase, a global environmental studies major at Clark University, Worcester, MA, founded Just For Fun Farms, a microgreens business.

Initially seeking a sustainable crop for year-round growth, he has successfully sold his produce at campus pop-up markets and local farmer's markets throughout the summer.

Chase attributes his entrepreneurial growth to participating in Clark Tank, where he gained vital business insights and funding.

His venture emphasizes food justice, as he frequently donates to local food pantries, embodying his belief in the environmental benefits of locally sourced food.

He expresses that contributing to community welfare while promoting sustainable practices is essential in addressing global challenges.

Listen to the Podcast:

Chase, O. (2024, August 30). *Getting your greens with farmer and entrepreneur Owen Chase '26*. Clark University. https://clarknow.clarku.edu/getting-your-greens-with-farmer-and-entrepreneur-owen-chase-26/

Cultivation Techniques

Maximizing Your Microgreens: Insights from Recent Research

Hey there, microgreens enthusiasts!

Whether you're growing these nutrient-packed powerhouses at home or running a commercial operation, we've got some juicy research findings to share.

A recent study explored how sowing density and harvest time affect microgreen yield and quality, focusing on rapini and kale varieties.

Here's what you need to know:

Sowing Density Matters

- Higher densities (up to 5 seeds/cm²) increased yields by 24-26%
- But watch out! Denser sowings can lead to less uniform growth.

Timing is Everything

- Harvesting rapini at 14 days vs. 11 days boosted yields by 55%
- Later harvests produced taller plants with larger leaves

Variety Makes a Difference

- Rapini varieties (Cima grande vs. Fasanese) showed distinct growth patterns.
- Kale varieties (Barese vs. Altamura) differed in development speed and yield.

Key Takeaways for Growers

- Consider your end goal: Higher density for maximum yield or lower density for better aesthetics?

- Experiment with harvest times to find the sweet spot for your varieties
- Don't overlook local landraces – they might offer unique characteristics and cost savings

Remember, there's no one-size-fits-all approach.

The ideal balance of density, timing, and variety will depend on your specific goals and growing conditions.

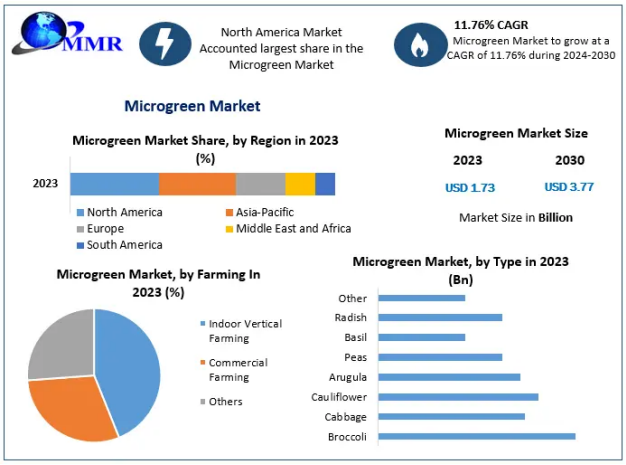
So, fellow microgreens mavens, it's time to get out there and apply this knowledge!

Happy growing, and may your trays be ever bountiful!

Signore, Angelo, et al. "Optimising Sowing Density for Microgreens Production in Rapini, Kale and Cress." Horticulturae, vol. 10, no. 3, 12 Mar. 2024, pp. 274–274, https://doi.org/10.3390/horticulturae10030274.

Emerging Industry News

The Microgreens Market Continues to Grow



The Microgreen Market is projected to grow at an impressive 11.76% CAGR until 2030 due to increasing demand from health-conscious consumers and advancements in sustainable farming practices.

Summary

The Microgreen Market is expected to see substantial growth over the next seven years, fueled primarily by health-conscious consumers.

The market is projected to grow at a compound annual growth rate (CAGR) of 11.76%, reaching a market size of

approximately USD 3.77 billion by 2030, up from USD 1.73 billion in 2023.

Major contributors to this growth include:

- Health-oriented consumer preferences.
- The gourmet food industry.
- Urban farming initiatives, particularly in large urban centers (e.g., New York, Los Angeles).
- Automated farming technologies and AI-based growth optimization to improve cultivation efficiency.
- Innovations in sustainable practices, such as renewable energy usage and water recycling systems, are critical for market growth.

Broccoli remains the leading type of microgreen due to its health benefits and culinary versatility.

North America dominates the global microgreens market, accounting for over 60% of revenue owing to a rise in health consciousness and the demand for fresh foods.

Increased investments and advances in **vertical farming** are enabling more effective production of microgreens.

The growth of culinary trends and **demand from restaurants** presents significant opportunities for the market.

Key players in the industry include AeroFarms, Gotham Greens, and Farmbox Greens, focusing on organic and sustainable practices.

Maximize Market Research. (2023). Home. Maximize Market Research. https://www.maximizemarketresearch.com/

Commercial Best Practices

Are microgreens replacing dhania in modern Indian restaurants?

Microgreens have become increasingly popular in modern Indian restaurants, representing a shift towards more innovative culinary practices.

For example, during a recent food festival in Delhi, dishes like Fish Pulusu and Nadru Matter Ke Kebab featured vibrant microgreens, enhancing both flavor and presentation.

Chef Vineet Bhatia's new restaurant, Ziya, also showcased microgreens in his dishes, demonstrating their ability to elevate traditional cuisine.

This trend indicates a growing preference for fresh, visually appealing garnishes among diners, even leading some chefs to replace classic coriander with subtler microgreen variants.

While some restaurants, such as Leela's Jamavar, have adopted this trend of abolishing traditional garnishes, there remains a balancing act.

Notably, coriander still holds its place in many recipes, especially in traditional dishes like biryani.

Overall, microgreens symbolize a modern approach to Indian cuisine, merging tradition with contemporary dining aesthetics, making them a staple in progressive culinary settings.

Mint. (2024, August 31). Chef Vineet Bhatia launches Ziya with innovative Indian cuisine. Live Mint. https://www.livemint.com/mint-lounge/food/chef-vineet-bhatia-launches-ziya-with-innovative-indian-cuisine-11721373229282.html

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